Towards Conducting Viable Competitor Analysis in Early-Stage Startups: A Design Science Approach

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Diplom-Kauffrau Nadja Hatzijordanou

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Referent: Prof. Dr. Orestis Terzidis

Korreferent: Prof. Dr. Katharina Hölzle

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Nadja Hatzijordanou

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LIST OF ABBREVIATIONS

BM	Business model
BPC	Business plan competition
CA	Competitor analysis
CAF	Competitor analysis framework
DSR	Design Science Research
E-School	School of Entrepreneurship at HPI
e.g.	exempli gratia/ for example
ESS	Early-stage startups
HPI	Hasso Plattner Institute
i.e.	id est/ that is to say
IT	Information technology
MVP	Minimum viable product
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
SLR	Systematic literature review
SME	Small and medium enterprise
USP	Unique selling proposition

„You can't look at the competition and say you're going to do it better.
You have to look at the competition and say you're going to do it differently."
- Steve Jobs, CEO and Co-founder of Apple Inc.

1 INTRODUCTION

1.1 MOTIVATION AND RELEVANCE OF THE TOPIC

"Every firm competing in an industry has a competitive strategy, whether explicit or implicit" (Porter, 1980, p. xxi). Ever since the seminal works of Porter (1980, 1985), competitor analysis (CA) has become a central pillar of strategic decision-making.

Competition lies at the heart of the market economy. To succeed in a market, a company must build and strengthen its competitive advantages by developing competitive strategies in interplay between the company, its competitors and its customers' needs (Bamberger & Wrona, 2004, p. 124; Simon, 1988).

The purpose of CA is to generate insights for the development of successful business strategies (Aaker, 2013). As such, CA forms an integral part of strategic management which deals with initiatives of firms to enhance their performance in the external environment (Nag et al., 2007). This means that strategic decisions need to be informed by an assessment of an organization's external environment (Dishman & Calof, 2008). However, due to the intensified internationalization of business and accelerating rates of technological innovation, competition has increased even further and market environments have become less predictable than ever before. Hence there is an even greater need for informed decision-making based on intelligence about the competitive environment (Jennings & Jones, 1999; McEwen, 2008). The consequences of formulating or implementing a business strategy without the benefit of actionable and properly judged competitive intelligence can be dire, as illustrated by the story of Kodak. Kodak, founded in the 1880s, was a market leader in the photography industry with sales revenues exceeding ten billion dollar in 1981, but it filed for bankruptcy in 2012 (BrandMinds, 2018). Even though the first digital camera was invented by a Kodak engineer, and information about the potentially disrupting digital photography technology was available, management misjudged its competitors and failed to react accordingly (Anthony, 2016; Kotler & Armstrong, 2018, p. 543; Mui, 2012). The story of Nintendo's Wii, on the other hand, shows how CA, when well executed and applied, can play a central role in ensuring a companies' success. Between 2004 and 2008, Nintendo experienced a more than five-fold increase in its share price. A cornerstone of its success story was a realistic analysis of its two main competitors: Sony, as the producer of the playstation, and Microsoft with its Xbox console. Nintendo

realized that the industry's standard, in terms of performance, resolution and high-quality graphics, is set by the expectations of the target segment made up of male hardcore gamers. Based on this analysis, Nintendo's management took the strategic decision to turn away from the hardcore gaming marketplace and aim its products at families instead, developing easy-to-use entertainment and learning games, with great success (Aaker, 2013, p. 49 f.; O'Gorman, 2008).

In today's fast-changing industries, startup companies (startups, from now on) have the advantage of being more agile and independent of the needs of existing customers (Christensen & Bower, 1996). They are often among the first to exploit new business opportunities by providing innovative offerings, products and services. In this context, Baumol (2004, p. 9) finds that "revolutionary breakthroughs continue to come predominantly from small entrepreneurial enterprises". New ventures are supposed to be drivers of job creation and to have positive effects on the labour market (Fritsch, 2008). Thus, it is widely recognized that entrepreneurship is a crucial factor for the development, growth and competitiveness of an economy (Cuervo et al., 2007; Fueglistaller et al., 2016, p. 4; Kollmann et al., 2018). The OECD shares this point of view and states that, "entrepreneurship and entrepreneurs are important sources of innovation, growth and employment" (OECD, 2014, p. 7), specifying that

> "Entrepreneurship is considered key to economic performance, in particular with respect to innovative change, playing an important structural and dynamic role in all economies. Encouraging entrepreneurship is increasingly recognised [...] as an effective means of: i) creating jobs; ii) increasing productivity and competitiveness; and iii) alleviating poverty and achieving societal goals" (OECD, 2004, p. 5)

However, the probability of failure for startups is high. For instance, Kerr et al. (2014), investigating "startup ventures [in the US] that received their first round of early-stage financing for the years between 1985 and 2009", find that 55 percent "were terminated at a loss" (Kerr et al., 2014, p. 30). A similar pattern was observed by the SBA Office of Advocacy, where only 51% of the sample of new firms survived for five years or more (SBA Office of Advocacy, 2016). Also, the analysis company CB Insights revealed in their R.I.P. Report that between 2010 and 2013, 55 percent of the failed technology companies raised one million dollar or less, and 70 percent before raising five million dollars (CB Insights, 2014).

It has been argued that, to successfully address the challenge of strategy formulation, it is essential for startups to not only take into account their environment (Zahra & Bogner, 2000), and the dynamics of competition in their industries in particular (Adler & Klein, 2015; Vella & McGonagle, 1988). Thus, information about the actual competitive environment is considered key for the success of new ventures (Zahra & Bogner, 2000), and is also a key

component of each business plan, pitch or grant application. However, certain problems surface with regard to how startups deal (or do not deal) with their competition.

Indeed, CB Insights reported that one of the top four reasons for ventures to fail is that they "get outcompeted" (CB Insights, 2016). Mohan-Neill (1995) finds that startups are likely to ignore the need for formal CA activities. Media have hinted at problems entrepreneurs seem to have when performing CA activities. In that matter The Startups Team (2017) writes "some Founders [...] insist that they're the first and only company to do what they do or offer the service they offer" or Yoskovitz (2011) states that "competitive research and analysis is one of those areas that is often horribly lacking from any pitch". Moreover, the author of this paper works as startup coach in an academic startup center and is also responsible for the support of early-stage portfolio companies of a seed fund. Within the scope of her daily work with entrepreneurs and in exchange with colleagues, she has observed that founding teams, especially in the early stages, frequently struggle to conduct a meaningful CA. This weakness is particularly perceptible in the development of business plans, pitch decks and in the course of investor discussions. The superficial and poorly developed analyses of the competitive environment lead to ill-informed decisions by founders and are unconvincing for startup coaches and investors.

In this context, McEwen (2008, p. 1) also speaks of a "capability gap because of the discrepancy between [the entrepreneurs'] current knowledge and the information that is relevant to the current business environment". Finding ways to close this capability gap are therefore important. In particular, such practices should be part of Entrepreneurship Education. CA is usually seen as part of the description of the market opportunity (Edelman et al., 2008), but this acknowledgement is not more than a starting point for the development of CA competences. As an example illustrating the current sense of priority for the topic, the "EntreComp conceptual model" – a model for entrepreneurial competences published by the European Commission's in-house science service – only mentions CA as a form of social skill under the section 'working with others' (Bacigalupo et al., 2016, p. 13). Similarly, in an OECD background paper on Entrepreneurship Education, CA is not mentioned at all (Lackéus, 2015, p. 13). Implicitly, CA may play a role in topics like "opportunity recognition", "business plan" or "marketing assessment", but this reflects a very low priority in the overall picture of entrepreneurship competences. Based on the observations, both in the field and in the role of CA in entrepreneurship education approaches, there seems to be a competence gap, which among other reasons, may relate to the lack of methods and tools for CA in the context of new ventures. With regard to entrepreneurship teaching and practice, (Gruber, 2007, p. 782) suggests an "adaptive, "toolkit" approach to business planning". Tools, that can be used for different entrepreneurial activities along the entrepreneurial process, have been developed in the past

years. Among others are the well-known Business Model Canvas by (Osterwalder, 2004; Osterwalder & Pigneur, 2010), the Lean Canvas by Ash Maurya , the Value Proposition Canvas, the Jobs-to-be-Done Framework and others. Yet, with regard to an analysis of the market and competitors, a look at recent entrepreneurial literature reveals, that they often refer to classical tools, such as the works of Porter (see Adler & Klein, 2015; Byers et al., 2015, p. 74; Kollmann, 2016; Kuckertz, 2015, p. 66; Pöppelbuß & Orde, 2015; Wirtz, 2018, p. 273). However, given the time of origin and targeted users, namely larger established companies, one can doubt the practical usefulness of traditional tools in today's economy (Sheehan, 2005) and for the specific situation of entrepreneurial teams (Freiling & Kollmann, 2015b, p. 5). And even though with the recognition, that " a small business is not a little big business" (Welsh & White, 1981, p. 18), considerable effort has been made to take into account the particularities of entrepreneurial companies in different fields, such as marketing (Freiling & Kollmann, 2015b; Kuckertz, 2015) or finance (Börner & Grichnik, 2005), the central task of conducting a CA, however, has been somewhat neglected in the entrepreneurship literature.

1.2 RESEARCH APPROACH AND QUESTION

Motivated by these considerations, a design science research (DSR) project is carried out, which aims to develop an artefact to support entrepreneurs to perform a viable CA taking into account their specific requirements. DSR is "a research paradigm in which a designer answers questions relevant to human problems via the creation of innovative artifacts, thereby contributing new knowledge to the body of scientific evidence" (Hevner & Chatterjee, 2010, p. 5). Whereas empirical research wants to "describe, explain, and predict", design science seeks "to change the world, [...] improve it, and [...] create new worlds [...] by developing artefacts that can help people fulfil their needs, overcome their problems, and grasp new opportunities" (Johannesson & Perjons, 2014, p. 1). Artefacts can be defined as "an object made by humans with the intention to be used for addressing a practical problem" (Johannesson & Perjons, 2014, p. 7). DSR is conducted at the interplay of three interdependent DSR cycles: the relevance cycle, which connects the environmental context with the research activities and specifies the addressed problems and requirements for the artefact (Hevner, 2007; Hevner et al., 2004); the rigor cycle, which ensures that the artefacts are not created and evaluated independently of natural laws or behavioural theories, and build upon an existing knowledge base in a rigorous way (Baskerville et al., 2018; Gregor & Hevner, 2013; Hevner et al., 2004; van Aken & Romme, 2012); and the design cycle, in which the creative and iterative construction of the artefact is conducted based on the insights from the other two (Hevner, 2007; Hevner et al., 2004).

Although design activities are central to most applied disciplines, have a long history in many research fields including building, engineering, and material science, and are especially relevant to the computing and information technology field (Hevner & Chatterjee, 2010), DSR is a young but emerging and promising field in management and entrepreneurship literature (Dimov, 2016; Romme, 2016; Romme & Reymen, 2018). In addition to positivist and narrative research method, scholars have called upon DSR (van Aken & Romme, 2009) to increase the understanding of the "how" rather than the "why" and "what" of entrepreneurship (Stevenson & Jarillo, 1990, p. 21) in order to bridge the relevance gap between management and entrepreneurship research and practice (van Aken, 2005; Van Burg & Romme, 2014). Research also shows, that decision effectiveness is influenced by the decision-making process (Dean & Sharfman, 1996). Hence, this thesis is conceptualized as a design science research project in the field of entrepreneurial CA motivated by the research question: *How can early-stage startups conduct a viable CA?*

Besides the overarching goal of creating an artefact, that enables startups to conduct a viable CA, the project aims to achieve the following additional outcomes:

1. An enhanced understanding of the CA phenomenon.
2. The production of guidance for educators and practitioners wishing to gain an overview of the topic and to teach or utilize CA.
3. An outline of potential avenues for future research.
4. A proposal of a DSR project approach within the entrepreneurship literature.

1.3 STRUCTURE OF THE THESIS

The thesis follows the traditional 5-part structure of a thesis (introduction, review of related literature, methodology, findings, and conclusion). However, with regard to the DSR approach an iterative element has been implemented that is typical for the DSR methodology. Figure 1 presents the structure of this thesis.

The first chapter describes the relevance and motivation of the thesis, introduces the research question and approach, and provides an outline of the content.

The theoretical background is described in chapter two, which reviews the literature associated with this study and for the classification of the research project into existing literature. It serves to ground the theoretical roots, relevance and rationale of CA within relevant research streams. It is also used as a first input into the required "archival knowledge base", which needs to be the set up for a DSR project (Hevner & Chatterjee, 2010, p. 15), and as foundation for further research along the DSR project. The research context also provides the basis for the interpretation of interim results and discussions. Underlying theoretical approaches, as well as strategic management, marketing, and entrepreneurship literature are presented,

with special focus on CA related contributions. The main terms and concepts used throughout this study are defined.

Chapter three includes an overview of possible research methodologies, the derivation of the chosen DSR approach and lays out the empirical research design with specific reference to the principles of DSR.

Chapter four presents the data, analysis and findings of the empirical research following the iterative design science structure. The chapter begins with the development of the archival knowledge base as foundation for the creation and evaluation of the artefact. A systematic literature review is chosen as a rigorous method for the derivation of such a knowledge base, which is supplemented by a review of textbooks and other literature to gain a comprehensive review of the field of CA. In a next step, the problems startups seem to have with conducting CA are examined further by conducting case studies. Finally, an artefact is created in three iterative cycles by defining the solution space, designing and developing an artefact, and demonstrating and evaluating the artefact. Built into these cycles is the communication of the project and interim results.

Building on that, chapter five discusses the major results and limitations, derives practical and theoretical contributions, and limitations and proposes avenues for future research. Chapter six concludes on the research project.

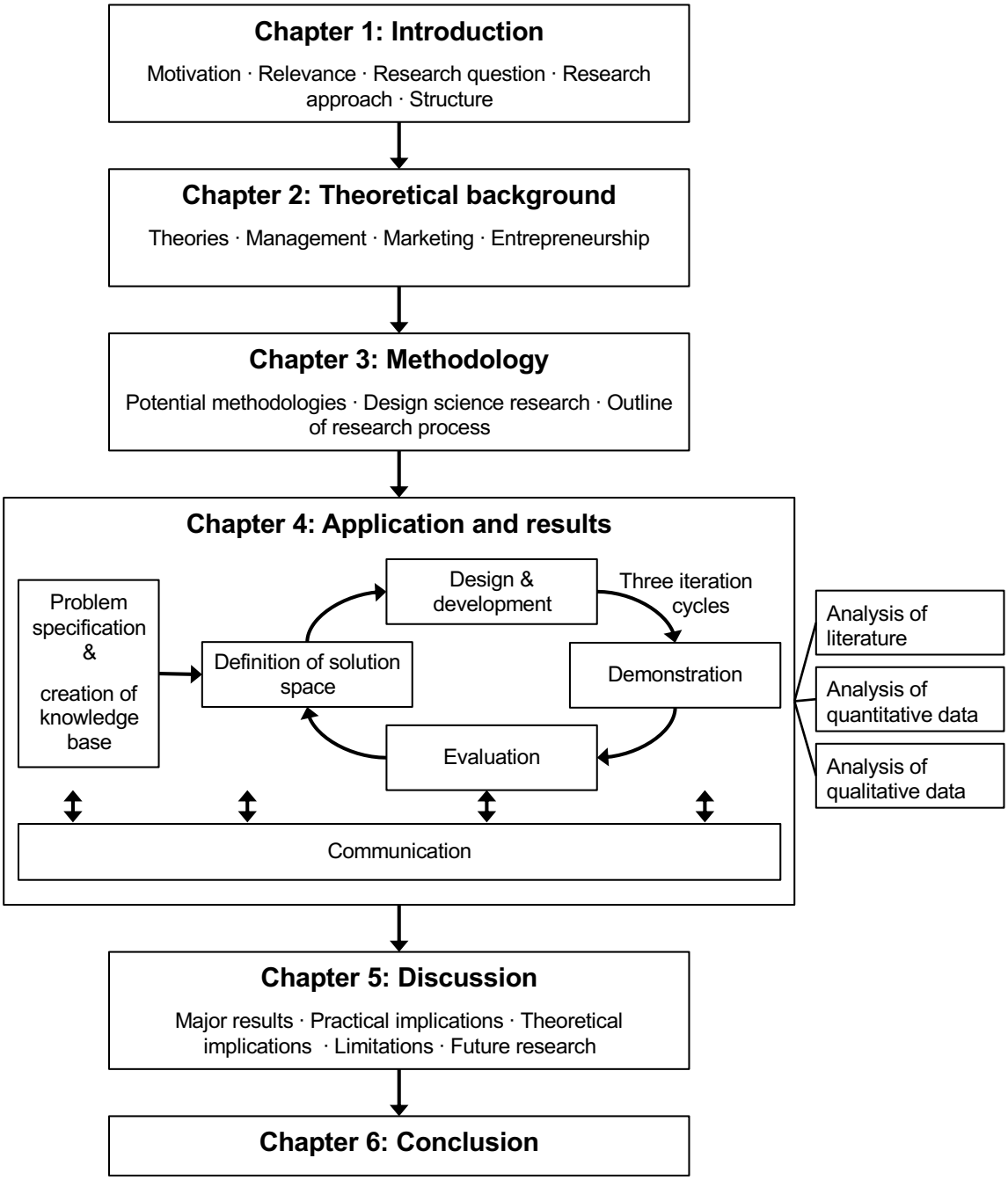


Figure 1: Structure of the thesis

2 THEORETICAL BACKGROUND

This section intends to describe the research context associated with the concepts of this study. It serves to ground the theoretical roots, relevance, and rationale of CA within relevant research streams. It is also used as a first input for the required archival knowledge base, and as a foundation for further research strategy. The research context also serves as a basis for the interpretation and discussion of (interim) results. Underlying theoretical approaches, as well as associations to strategic management, marketing, and entrepreneurship literature are presented, with a particular focus on CA related contributions. In addition, the main terms and concepts used throughout this study are defined.

The chapter begins with the presentation of underlying theoretical concepts. After that, the relevant literature is discussed with regard to their relationship to CA. The identified relevant literature is located in the realm of three areas: strategic management, marketing, and entrepreneurship. Concerning the first and second area, a classification into the strategic management and marketing literature is made. Traditional CA processes are presented, as well as contemporary startup related instruments and tools of strategic management, such as the Business Model Canvas. The concepts of environment and markets will be outlined. In the third area, the concepts of entrepreneurship, entrepreneur, startup and related terms are presented and the object of investigation of the thesis specified.

2.1 THEORETICAL CONCEPTS

The theoretical approaches of organization, management, and corporate governance can be used as a conceptual frame of reference for this work. Even if these three concepts do have several differences in substance, their theoretical basis is highly overlapping (Wolf, 2008, p. 48 f.). The theories or theoretical approaches[1] are manifold, partly building on each other, but sometimes competing. Macharzina & Wolf (2015) state that individual approaches cover only partial areas of the management problem. Therefore, it seems appropriate to select several theoretical foundations as conceptual frame for this work. However, following the recommendation of Wolf (2008, p. 53) that individual scientific studies should always be based on only a few theories, in order not to deteriorate the consistency of the argumentation, the theoretical basis of this work will be carefully selected and presented in the following section.

For grounding the theoretical roots of CA, it makes sense to use theories that take into account the environment and explain how information is processed. On this basis, two theories

[1] The phrase theory and theoroetical approaches are widely used synonymously. For a discussion of reasons for distinction see Wolf (2008).

have been identified. The fact that companies not only operate within their borders but are closely intertwined via input-output relationships with the markets relevant to them and the environment outside the market, and that there are also many other environmental relationships, is explicitly considered in the system-oriented approach. The contingency or situation approach seeks to explain and understand correlations between contextual factors and the design and performance of organizations.

Economic theories have traditionally had a strong influence on strategic management. Depending on the focal point, the significance of the market and industry situation, i.e. the market-based view/ industrial organization (see Porter, 1979), internal resources, i.e. resource-based theory based on the works of Barney (1991) and Penrose (1959) or the question of resource coordination (institutional economics) are in the foreground here (Bamberger & Wrona, 2004, p. 39 ff.). In the context of this work, the first two are of particular interest. Recent literature argues that a synergetic consideration of both views (integrative perspective) is necessary to explain performance potentials (Bamberger & Wrona, 1996; Wolf, 2008, p. 597).

Rationales for CA can also be found in organizational learning theories. In addition, a theoretical foundation of the importance of information in the market process, especially with regard to entrepreneurial activity is outlined.

One could argue that game theory, a prescriptive decision theory, which was introduced with an economic perspective by (Harsanyi, 1967; Nash, 1950b, 1950a; Selten, 1965) also provides an appropriate foundation, especially in decision situations characterized by competition and conflicts. However, the weaknesses of this theory, such as the assumption that the rules of the conflict structure are fully comprehensible and known by the players (Wolf, 2008, p. 152) in combination with the fact that it is a mathematic approach to decision-making, lead to the exclusion of this theory for this work.

The selected approaches will be introduced in detail in the next section to be used as research-guiding preliminary decisions of this work.

2.1.1 Systems theory

The whole is more than the sum of its parts: a statement ascribed to aristotle can be described as a holistic law of general systems theory (Ropohl, 2012, p. 25 f.). Wolf (2008, p. 158 f.) summarizes five key elements of what constitutes a system. Systems consist of elements, such as employees, divisions, machines, that have specific characteristics. Across these elements a hierarchical structure exists so that several elements form subsystems and are interlaced. This pattern of elements, subsystems, and nesting is also applied for the environment of

a considered system. Across the elements and subsystems exist manifold relationships and transactions, which makes the system complex. The elements and subsystems define the state of the system, which can change. The relationship structure provides the system with a certain stable structure. System theorists assume that a company can be characterized as such a system. Modern system theory is about open systems. They have an inner and an outer system (Luhmann, 1971, 1999).

Systems exchange intangible and tangible resources with their environment [2].Living systems absorb not only energy (persons, material, etc.) but also information from their environment. However, the extent to which these can be utilized depends on the respective internal ability to select and translate external signals (Wolf, 2008, p. 164 f.).

A subsystem created in the course of the development of organizations is a management system. It performs three functions: Coordination of substructures, conflict resolution between hierarchical boundaries and coordination of external requirements with organizational resources and needs (Katz & Kahn, 1978).

Strategic management is the subsystem that is responsible for the overall positioning of the system in its environment, for the fundamental link between the system and the environment, as well as for the mechanisms that are necessary for positioning and repositioning. This primarily serves the purpose of complexity management. Management in the sense of systems theory underlies the paradigms that information is never available to a sufficient extent for legitimating decisions. The systemic approach assumes that, in essence, planning is not a mental anticipation of future states, but is either aimed at making decisions in the present with the greatest possible consideration of their future effects, or to find out the future determinating effects of past decisions, or to place a main emphasis on ongoing adaptation (Malik, 1992).

Summarized it can be stated, that according to open systems theory, an organization's ability to adapt to its environment is crucial for organizational survival and growth (Smeltzer et al., 1988) and that, thus, organizations need to understand the environments they are facing (Fahey & Christensen, 1986). Thus, CA as an instrument of strategic management delivers information about the environment and, hence, serves to be aware of the nature of the environment that an organization currently faces.

[2] The question of the system boundary becomes particularly important, when taking into account that one element can be part of more than one (sub)system. There is discretionary scope when interpreting the system's boundaries, and can be dependent on the investigation goal (Grochla, 1978)

2.1.2 Contingency theory

Contingency theory argues that there is no one best way to manage an organization, but that it all depends on the particular situation and circumstances – the context matters. The basis model as outlined by Wolf (2008, p. 201) (see Figure 2), implies that a fit between the situation and the design is required to ensure success. Design in the context of contingency theory refers to the "gestalt or configuration of an organization" (Khandwalla, 1973, p. 493) and includes the entire spectrum of behaviours and forms of strategies, structures, instruments and processes Wolf (2008, p. 197)[3].

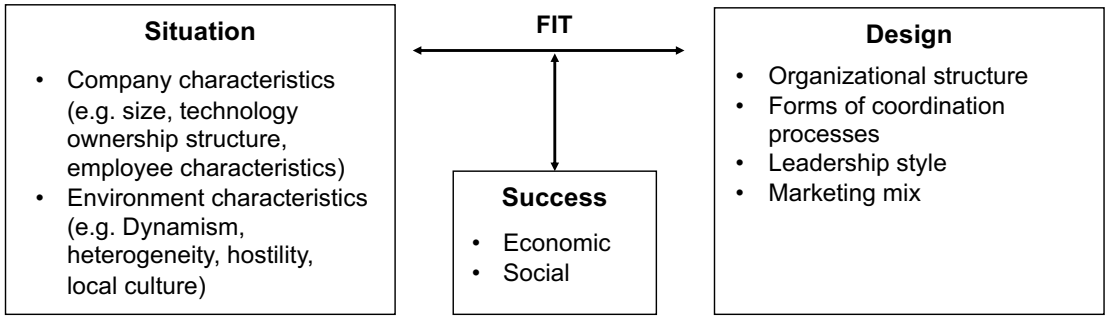


Figure 2: The basic model of contingency theory, translated from Wolf (2008, p. 201)

The fit concept is a basic element of contingency theory. The literature distinguishes three different understandings of the fit concept (Wolf, 2000, p. 39 ff.). The selection approach follows a deterministic perspective of the view, which assumes that the organization has no influence whatsoever on the environment but can only accept it as given and behave accordingly. Proactive management would therefore not be possible. This leads to particular criticism of this deterministic variant of contingency theory (Child, 1972; Schreyögg & Geiger, 2016, p. 230 ff.; Wolf, 2008, p. 200 ff.). The interaction approach, on the other hand, assumes that it is the interplay between context and design which leads to success. A third variation is the systems approach which gives up the assumption that the company characteristics can be considered independently of each other. The contingencies, alternatives and success criteria must be considered at the same time. Furthermore, the advocates of this approach assume that there are several equally favourable forms of design under the same context conditions (concept of equifinality). Besides the concept of equifinality, which implies that there is no compulsion to act imposed on a company by its environment, but that different expedient actions exist (Wolf, 2000, p. 53 ff.), further core assumptions of the contingency theory approach are that in reality only a fraction of theoretically possible configurations is existent or capable of surviving and

[3] Here also an overlap to the design science methodology itself can be noticed, insofar that within the emergence of gestalts processes of meaning and interpretive schemata are involved (Wolf, 2000, p. 24 f.).

that the fit concept is dynamic and is therefore subject to changes over time (Wolf, 2000, p. 70).

If one omits the discussion about a company's possibilities of influence on the environment, one can deduce from this theory for this work that the design of the company and its strategy must be attuned to the environment, including the competitive situation.

The influence of contingency theory on this work is twofold. On the one hand, this theory can be used to explain why it is necessary to build up a distinct instrument for the CA in startups. The differences between startups and established companies (see chapter 2.4.2) lead to the justified assumption that an instrument produced for the needs of established companies does not necessarily meet the needs of young companies likewise. Otley (1980), for example, proposed the contingency theory of management accounting systems, which is based on the assumption that there is no universally appropriate accounting system. Thus, under contingency theory aspects a system must be identified which demonstrates an appropriate matching under certain circumstances. In this research, the organizational context is the entrepreneurial context of building a new venture and the system under construction is CA. The specific aspects of CA to demonstrate a matching must be identified throughout this work. On the other hand, this theory justifies the necessity of conducting a CA as a prerequisite for a fit with the environment. The fit requires knowledge of the market, which can be acquired with the help of CA. In doing so, the concept of equifinality is taken into account, so that it is not assumed that only one correct recommendation for action can be derived from analysis.

2.1.3 The market-based view

In the literature, two perspectives are prevalent to explain the emergence of competitive advantages (Krüger & Homp, 1996). The market-based view, derived from the industrial organization theory, follows the structure-conduct-performance-paradigm[4], which is outlined in Figure 3.

Figure 3: The structure-conduct-performance paradigm

The basic idea behind this paradigm is the hypothesis of a causal relationship between market structure, market behaviour, and market results. The structure of a market is determined by the supply and demand conditions. These include, for example, supplier concentration, cost function characteristics, product properties and the elasticity of demand. These

[4] Elaborated by Bain (1959)

structural data determine the behaviour of companies in the market, e. g. with regard to pricing, investment, research and development, and advertising. The chain of arguments is concluded by the fact that market behaviour determines the market results. These include, among other things, the profit margins of companies, industrial productivity, the rate of technological progress and the allocative efficiency of the market (see Bester, 2017, p. 3).

New industrial organization theory takes into account that the behaviour of the firm can influence the structure, such as innovations lead to entry barriers, mergers affect the degree of concentration (Al-Laham, 2003, p. 208). In particular, Porter's seminal book publications "Competitive Strategy" (1980) and "Competitive Advantage" (1985) can be assigned to this market-based view. Following the market-based view, a company is therefore particularly successful if it operates in an attractive industry and pursues a suitable competitive position in this sector (Porter, 1985, p. 1 f.) (see Chapter 2.2.3 and 2.2.4).

2.1.4 The resource-based view

As a counter position to the market-based view and based on its criticism, the resource-based view[5] is developed, which is based on a resource-conduct-performance effect chain (see Figure 4).

Figure 4: The resource-conduct-performance paradigm

The fundamental point of view based on the seminal works of Selznick (1957) and Penrose (1959), is that companies can be seen as bundles, vectors or portfolios of tangible and intangible resources. It can now be assumed that companies are heterogeneous in terms of their factor endowment and position. Resources, therefore, make the company specific and form the basis and object of strategic behavior. Differences in factor equipment form the basis of competitive advantages (see Bamberger & Wrona,1996). In order to achieve economic rents, however, it is necessary that these resources have certain characteristics. In accordance with the VRIO framework (Value, Rareness, Imitability, Organization) (see Barney 1991, 1997; Peteraf, 1993) the resource should be:

- valuable to the firm, i.e. it should enable to mitigate a threat, exploit an opportunity or improve the efficiency or effectiveness of the company.
- rare, i.e. available to as few competitors as possible.
- not be imitable or substitutable.

[5] For an overview of the resource-based approach see (Barney (1997); Rühli (1993); Wernerfelt (1984, 1995).

- exploitable by the organisation (organisational structure, organisational systems and culture).

Two specifications of the resource-based view are to be mentioned. The first specification is the concept of core competencies, based on (Prahalad & Hamel, 1990), which is situated very closely to the resource concept, but emphasizes action, uses the concept for the question of corporate diversification and demands a replacement of the thinking in strategic business units, rather than in core competencies (Wolf, 2008, p. 570). The second specification is the knowledge-based view, which is based on the core idea that knowledge provision and change of knowledge through learning processes leads to the heterogeneity of companies. These are linked to differences in success (Spender & Grant, 1996). Thus, knowledge can create competitive advantages that are difficult to imitate (Corsten & Corsten, 2012, p. 35 f.). Knowledge comprises information, knowledge, and skills that are available to an actor and which he uses consciously or unconsciously to solve tasks and problems (Al-Laham, 2003, p. 43). Knowledge as the company's resource has a direct influence on competitive success. Furthermore, a strategy is recorded as an intervening variable between knowledge and success (Al-Laham, 2003, p. 179 ff.). Figure 5 displays this connection.

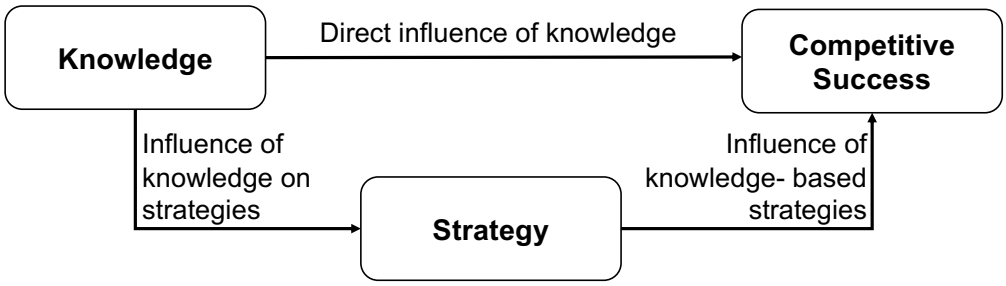


Figure 5: The connection of knowledge, strategy, and success, adapted from Al-Laham (2003, p. 180)

In this sense, following the classification of Al-Laham, 2003, p. 340 ff., CA can be characterized as an instrument of strategic knowledge management, that serves to acquire, apply and exploit basic knowledge and to fill knowledge gaps. Whereas basic knowledge is relevant for the current competitive strategy and is not protected against imitation, knowledge gaps are characterized as being of high strategic importance.

2.1.5 Integrative perspective of market-based and resource-based view and the role of strategy

Recent literature argues that both perspectives, the market-based as well as the resource-based view, are not to be considered as mutually exclusive. Instead, they complement

each other (Bamberger & Wrona, 1996; Corsten & Corsten, 2012, p. 37; Freiling, 2015; Krüger & Homp, 1996, p. 6 ff.; Wolf, 2008, p. 597).

Performance potentials as a basis for future above-average profits can be external as well as internal. They arise from the choice of attractive industries or markets, i. e. industries or markets which possess a (permanent) above-average profitability or which allow to realize it in the future. On the other hand, performance potentials result from the company's position in the industry or on the market. The position is expressed in competitive advantages. Industrial economics and the resource-based view lay the theoretical foundations for explaining and developing both types of performance potential. Thus, the resource-based view and the market-based view complement each other (Bamberger & Wrona, 1996).

A strategy can then be seen as the connecting element between the company and its external environment. For a strategy to be successful a strategic fit needs to be established, aligning the characteristics of the environment with internal conditions of the company (see Figure 6).

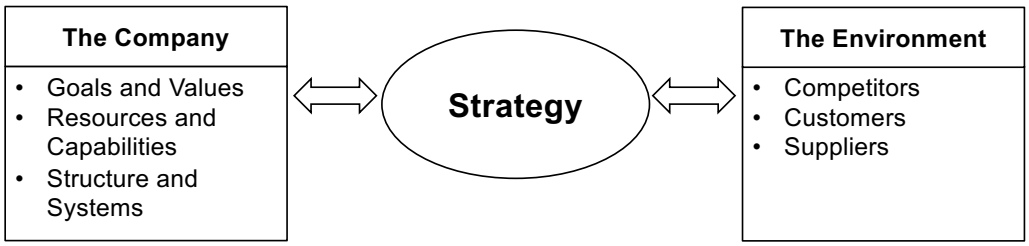


Figure 6: Strategy as a connecting element between the company and its environment, translated from Grant & Nippa (2006, p. 34)

Krüger & Homp (1996, p. 7 ff.) look at this connection in a similar way. They introduce the core characteristics as a conceptual link between resources and the market. Core characteristics are those characteristics of the products and services of a company or individual, organizational units that create particular external benefits. Those responsible for strategy must then decide on these core characteristics, which distinguish the company from others and what make it unique.

Again, this perspective demonstrates the necessity of information about competitors to derive successful strategies.

2.1.6 **Organizational learning**

The concept of organizational learning is closely linked to the concept of knowledge, as the development of the knowledge base and its change is the dominating view on organizational learning (Bamberger & Wrona, 1996, p. 453). “An entity learns if, through its processing of information, the range of its potential behaviors is changed” (Huber, 1991, p. 89).

That organizations are able to learn is a common view in organization and management theories. Learning is considered, alongside planning and visionary leadership, as a process of organizational change (Mintzberg & Westley, 1992).

Huber (1991) gives an overview of constructs and processes associated with organizational learning (Figure 7).

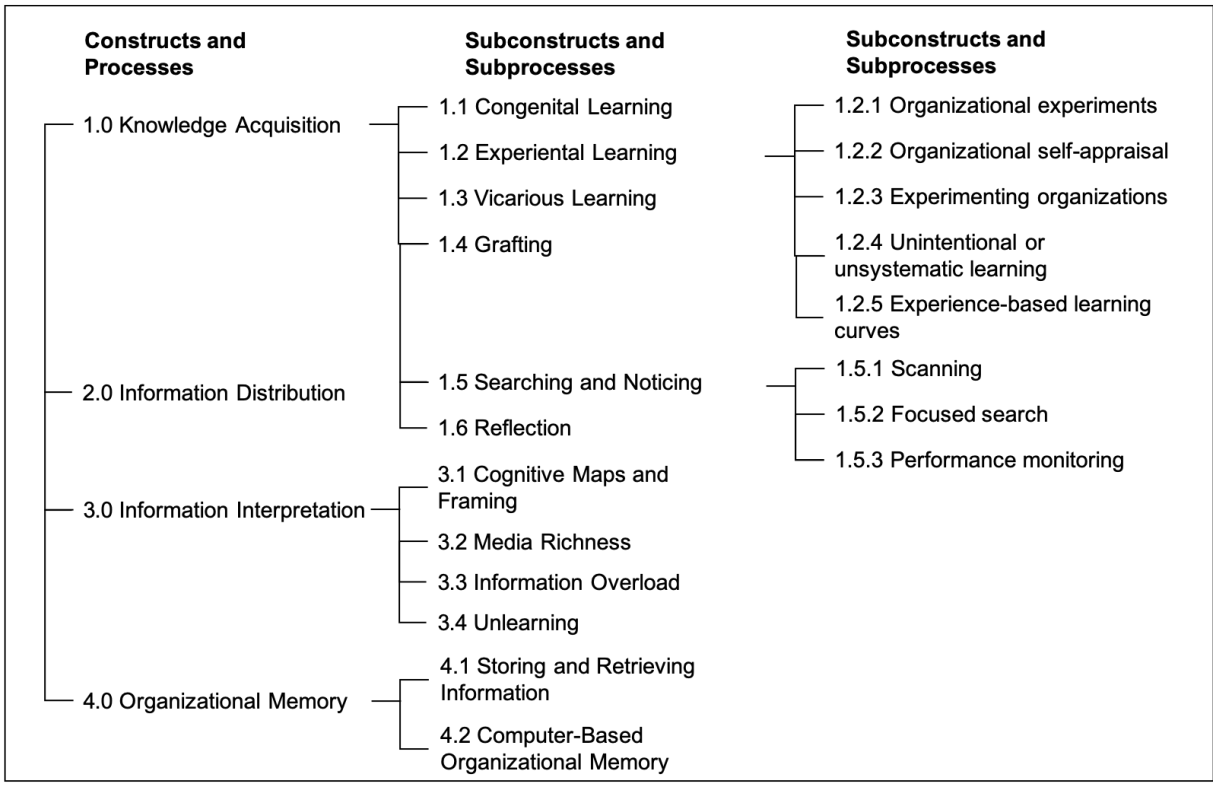


Figure 7: Constructs and processes associated with organizational learning from Huber (1991, p. 90) expanded by Bamberger and Wrona (1996, p. 463)

The process by which knowledge is obtained is knowledge acquisition. Information distribution deals with how information from different sources is shared. Thereby new information or understanding is created. Information is interpreted through endowing one or more commonly understood interpretations. How knowledge is stored for future use is treated in the organizational memory concept (Huber, 1991).

The core of organizational learning is the acquisition of knowledge. Huber (1991) differentiates among:

- Congenital learning: Learning in the episode from the idea to the foundation, as an essential setting for the learning context after the foundation.
- Experimental learning: Own actions are observed, evaluated and adjusted.
- Vicarious learning: Knowledge of other organizations is acquired, e. g. through applied techniques or alliances.
- Grafting: Incorporate new knowledge bases, e.g. through new employees or mergers.

- Searching and Noticing: Directed (focused search) or indirected search (scanning) of information. Control of success can be integrated (performance monitoring).

Bamberger & Wrona (1996), p. 464 add a sixth form of learning:

- Reflection: Existing knowledge can be combined in a new way; new patterns can be recognized, or new conclusions can be drawn.

Management systems, such as CA as information and communication system, can be considered as institutionalized learning support systems (Bamberger & Wrona, 2004, p. 450). Learning is a particularly emphasized pattern of change in the early phase of companies (Mintzberg & Westley, 1992).

2.1.7 The importance of information and the entrepreneur

The satisfaction of human needs is the basic intention of economic activity. However, the needs usually exceed the limited goods. There is a scarcity. This scarcity creates phenomena of economic activity such as barter, division of labour, markets, business or competition in search of effective scarcity reduction. Economizing means making rational decisions about the use of scarce resources for the fulfilment of given purposes. Information plays an important role in all forms of scarcity reduction, such as innovation, production detours and division of labour and specialization (Picot et al., 2003, p. 22 ff.).

On a market demand offers and demands meet, and exchange processes are enabled. There are two different theoretical approaches to the analysis of market events. On the one hand, the market equilibrium theory considers the conditions determined by market data. The coordination mechanism here is the price. The market is in equilibrium when all voluntary exchanges have been completed, i. e. the demand corresponds to the supply. Households maximise their benefits and companies maximise their profits depending on the price. It is assumed that consumers have complete information about the nature and benefits of each good, that all producers have access to all production technologies. Furthermore, all actors have knowledge of the prices of quality and unlimited capacity for information processing (Picot et al., 2003, p. 30 ff.). Perfect competition leads, according to this neoclassical microeconomic theory, to economic welfare. Thus, industrial organization economists strive to derive public policies that promote competition. However, strategy researchers reverse this intent to form strategic recommendations that strive to limit competition (Jacobson, 1992). (Porter, 1981, p. 617) concludes that "there is gold to mine in applying IO [industrial organization] concepts to strategy formulation." As such, a business units' strategic goal is to create a defendable position against the competitive forces or to influence them in its favor Porter (Porter, 1980, p. 29).

Even though the influence on strategic thinking from theoretical perspectives derived from industrial organization is substantial, the utility has been questioned by scholars due to the following reasons (see Jacobson, 1992):

- The motivation and consequence of innovation is not sufficiently explained, as it is a disequilibrium phenomenon, that leads to profits stemming from the lead time over competition
- If perfect competition maximizes welfare and strategy researchers are trying to restrict competition in order to maximize profits, then that leads to a reduction of welfare, which is a moral problem

Another economic perspective based on these weaknesses is provided by the Austrian market process theory, which looks at the changes in market processes caused by unequal distribution of information (Picot et al. 2003, 22 ff.).

Austrian theory stresses the beneficial role of competition. However, competition is treated as a dynamic process rather than a static notion. Hayek (1948) noted that in the neoclassical economics' "perfect competition" a market is already in equilibrium, that is, there is no opportunity to compete. As such, only the effects of competition after the process has reached its limits are analysed. The analysis does not explain the competitive process that led to the equilibrium. The Austrians focus on this process (Jacobson, 1992). The entrepreneur is a significant part of that process. Kirzner (1973, 1979) describes entrepreneurs as arbitrageurs, who discover a market that is in disequilibrium and use this information advantage to achieve risk-free profits. These opportunities are however short-lived because other entrepreneurs become aware of the opportunity and outcompete each other until the arbitrage erodes (Picot et al., 2003, p. 32 ff.) Entrepreneurial profits can thus be gained through the possession of superior information. The entrepreneurial role is therefore defined by gathering, evaluating, and utilizing information (Jacobson, 1992). In the view of Schumpeter (1934) the entrepreneur as a creative agent is the mechanism that drives the competitive process through innovation and new products, production processes, and organizational techniques. This process, as it destroys the current equilibrium, is called creative destruction. The profits earned by that innovation are also short-lived due to imitation by other entrepreneurs. In both views of the entrepreneur, competition and entrepreneurship can be viewed as inseparable (Jacobson, 1992).

Also common for both views is the importance of information. Information is a scarce resource, that is dispersed. The unequal distribution, therefore, poses a potential source of information advantages that can be exploited through arbitrage or innovation (Picot et al., 2003, p. 36). As Casson (2010, p. 5, 8 f.) states "competition rewards entrepreneurs who demonstrate good judgement, and penalizes those who do not" whereas "judgemental decisions normally

require the synthesis of different types of information." CA, in this regard, can be classified as a tool to obtain necessary information.

2.2 STRATEGIC MANAGEMENT LITERATURE

By its nature, management theory is a teaching of systematic analysis of control problems, i.e. problems that arise in the construction and management of a company are concretely addressed. This principle of problem orientation calls for understanding, formulating and generating knowledge that helps to solve problems across all disciplines (Steinmann et al., 2013, p. 40 f.).

Management can be seen as a cross-cutting function to the company's business functions such as procurement, production, and sales. CA is usually classified as being part of the classical cross-cutting management function 'planning' (Steinmann et al., 2013), also related to as strategic management. Nag et al. (2007, p. 942) find through a large-scale survey a consensual definition: "strategic management deals with (a) the major intended and emergent initiatives (b) taken by general managers on behalf of owners, (c) involving utilization of resources (d) to enhance the performance (e) of firms (f) in their external environments." The coordination of the environment is, thus, a core task of management (Macharzina & Wolf, 2015).

Bea & Haas (2017) define six integrative building blocks of the concept of strategic management:

- Organisation: Organistion can be defined as an institution, as an instrument or as a process. Organisation serves to achieve strategic goals.
- Organizational culture: The culture of an organization influences the strategy and structure of a company.
- Information management: Management of external and internal information, whereas a piece of information is a decision-relevant notice. Information systems can be computer-assisted, such as executive information systems, which are interactive, IT-based, information systems for the integrative informational support of management tasks.
- Strategic planning: an information-processing procedure to reconcile the requirements of the environment with the company's potential in order to secure long-term success with the help of strategies.
- Strategic control: accompanies the planning continuously. It controls for the premises, progress and strategic potentials.
- Strategic performance potential: They are a storage of specific strengths, which enable a company to position itself successfully in a changing environment. These can be

differentiated between management and performance potentials, that can be achieved through marketing, production, financing, technology or procurement strategies.

In doing so, they stress that the fit concept plays a central role in modern strategic management. This fit includes three levels: intra-planning-fit (coordination within the planning system), intra-system-fit (coordination across subsystems) and the system-environment fit, which deals with the coordination of the environment and the organizational system.

With regard to the overarching objective of strategic management, i.e. the enhancement of performance (Nag et al., 2007), it can be said it is not short-term profit maximization to be pursued, but long-term preservation and construction of strategic performance potentials, which are also known as competitive advantage (Macharzina & Wolf, 2015). The two elemental strategic questions to be answered are (see Grant & Nippa, 2006, p. 44 ff.):

- Where should the company compete (industry and markets)?
- How should the company compete (competitive strategy)?

Steinmann et al. (2015, p.163 ff.) outline the strategic management process as generating strategic options that are created through an analysis of the environment and of internal possibilities and limits (see Figure 8).

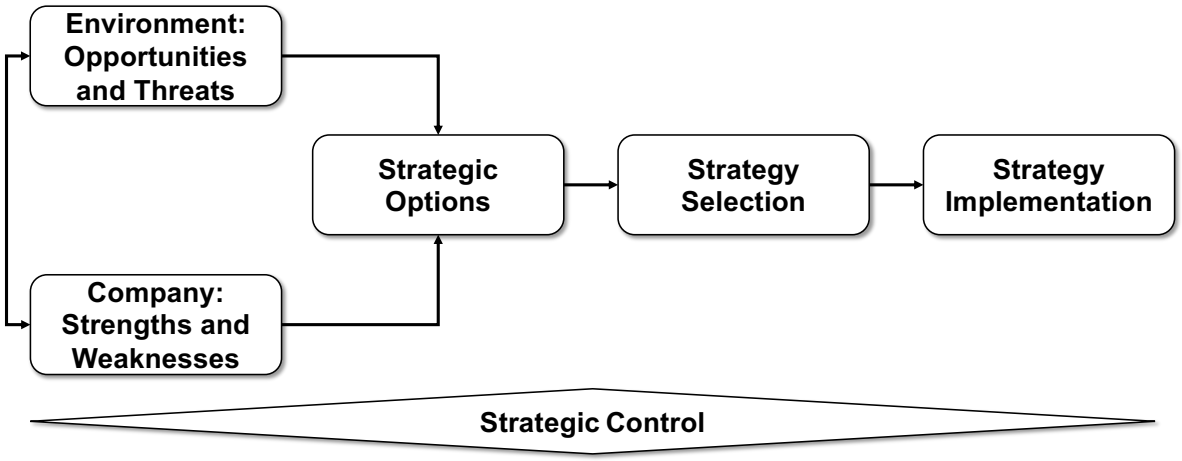


Figure 8: The strategic management process, adapted from Steinmann et al. (2015, p. 163)

The strategic analysis represents the informational prerequisite for a successful strategy formulation. It is comprised of the analysis of the environment and the company. From the external analysis opportunities and threats can be derived, from the internal analysis strengths and weaknesses (Corsten & Corsten, 2012, p. 66). In addition to global environmental analysis, analysis of the competitive environment is of central importance to assess the current situation (Bea & Haas, 2017; Macharzina & Wolf, 2015; Steinmann et al., 2013).

Macharzina and Wolf (2015) assign analytical instruments to three ideal-typical steps of strategy formulation (see Table 1). CA is classified as an instrument of the assessment of

current and future, internal and external conditions as a first step in the strategy formulation phase.

Strategy Formulation Step	Instruments
Strategically oriented assessment of present and future, internal and external conditions	Environmental analysis Internal company analysis Value chain analysis Industry structure and competitor analysis Coopetition model Opportunity and threat analysis Gap analysis Strategic foresight Benchmarking VRIO
Development of strategic options/ search field analysis	Space analysis Product-matrix-analysis TOWS analysis
Determination of strategies	Product-market-portfolio Technology portfolio

Table 1: Strategy formulation steps and analytical instruments, adapted from Macharzina & Wolf (2015)

Having reviewed the concepts, process steps and goals of strategic management, it can be said, that CA is an instrument of the executive information management system, used in strategic management to assess the current situation in order to generate strategic options, formulate strategies or to identify strategic performance potentials. With regard to the fit concept, CA is an instrument for assuring the system-environment fit.

2.2.1 Strategy formulation

As pointed out, strategic analysis is seen as a starting point for strategy formulation within the strategic management literature. However, different opinions exist about the importance of strategy formulation itself. Although strategy formation is usually treated as a rational, formal and analytic planning process (Mintzberg, 1990). Mintzberg (1978), however, differentiates between intended, realized and emergent strategies (see Figure 9). He finds out, that only 10 to 30 percent of the planned strategy will be realized. The predominant strategies evolve without intention (emergent strategies). This learning school describes strategy as an emergent and complex process of organizational decision-making, which takes into account the interdependence of strategy formulation and implementation and its iterative adaption through experience and insights (Grant & Nippa, 2006, p. 48).

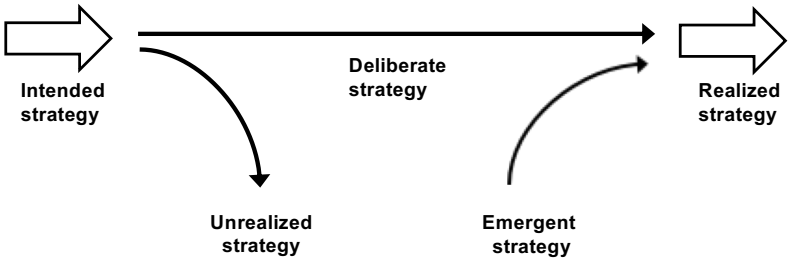


Figure 9: Types of strategies, source: Mintzberg (1978)

The scientific discussion about planning versus learning is abundant. However, neither can do it all. The processes can intertwine (Mintzberg, 1991) and complement each other (Grant & Nippa, 2006, p. 48; Markides, 1999, p. 147 ff.).

Acknowledging the fact, that strategy can evolve unplanned and that strategy formulation is a combination of the design and emergence of strategies, the goal of analysis is not to provide generally applicable solutions, but to help understand problems, identify, classify, understand, and assess factors of strategic decision-making (see Grant and Nippa, 2006, p. 54).

2.2.2 Causation, effectuation, and the Lean Startup

In line with that thought are contemporary management methodologies for startups, such as, the lean start-up and effectuation approach, which offer a perspective on strategy formulation in startups complementary to the traditional planning scheme.

Causation. The underpinning logic of traditional planning is what (Sarasvathy, 2001a, 2008) terms causation. Within the causation logic predictions about the future are expected to be accurate, because they are based on solid knowledge. Thus, startups only need to act upon a predefined, well-thought-out plan (Ripsas et al., 2016). The causal logic is based on the fact that the future is predictable and based on accurate knowledge rather than assumptions. In situations of low uncertainty and existing market information, this classical, planning approach, which dominates business studies, should be applied (Mauer & Grichnik, 2011; Ripsas et al., 2016).

Linear-causal thinking can be useful for good decision-making if goals are given, the future is predictable, and boundary conditions are stable (Faschingbauer, 2010). Faschingbauer (2010, p. 21) gives examples for situations, where this thinking is appropriate: build a factory, write software for a clearly defined purpose, fill a well-defined job position, make a make-or-buy decision or choose the right strategy for conquering a known market. In causation logic before acting, always stands planning and the goal is clearly defined, can be searched for and evaluated before acting.

A tool usually associated with a more causation-based logic is the business plan. A typical structure for a business plan usually includes an analysis of the competition (see Ripsas & Zumholz, 2011). Delmar & Shane (2003) find that the likelihood of a startups' survival increases and product development and venture organizing efforts are facilitated if the founders engage in business planning. The results of a study by Gruber (2007) suggest that there are tradeoffs between the time spent on planning and the outcome. Thus, entrepreneurs need to be efficient planners, focusing on high-value planning activities. Also, business planning is valuable, even if writing a formal plan is under certain circumstances not (Hannon & Atherton, 1998). This result is even more pronounced for startups in dynamic environments. A comparable result obtain Brinckmann et al. (2010) in their meta-analysis of 46 studies. They find a positive relationship between business planning and performance, however, arguing that for startups a dynamic understanding of the planning process is necessary, that goes along with learning and iteration. The business plan in its present form appears to be essentially oriented towards the interests of the investors. Founders need a more flexible instrument that should be clearly more success- and sales-oriented. Thinking in terms of additional customer benefit and strategic competitive advantage is necessary (Ripsas & Zumholz, 2011).

Effectuation. Effectuation, on the other hand, follows a different logic. Effectuation (Sarasvathy, 2001b, 2001a) is a concept introduced while studying expert entrepreneurs and their approaches to bringing a product to the market. Effectuation processes are specified as taking "a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001a, p. 245). Entrepreneurs start with the means at hand and ask themselves: "Given who I am, what I know, and whom I know, what can I do? What types of effects can I create?" in contrast to the causal reasoning which would as "What ought I do?" in order to achieve a particular goal (Sarasvathy, 2003, p. 208). This includes any traits, abilities and attributes of the entrepreneur, the education, experience and expertise, as well as the social networks and the available pool of resources (Sarasvathy et al., 2008). The effectuation logic is based on the following five principles (Sarasvathy, 2008, p. 15 ff.):

1. The crazy-quilt principle: Negotiations are conducted and partnerships formed with all stakeholders that are willing to commit themselves, instead of finding the 'right' differentiation from competitors or finding the 'right' partner. The onboarded stakeholders then determine further the goals of the company.
2. The affordable loss principle: An entrepreneur risks what he is willing to lose instead of being guided by the expected returns he is hoping for.
3. The bird-in-hand principle: Means-driven as opposed to goal driven action for creating something new, instead of finding a new way to reach a given goal.

4. The lemonade principle: Contingencies and coincidences are not seen as disturbance but as opportunities. They do not need to be avoided, they need to be overcome or be adapted to.
5. The pilot-in-the-plane principle: The principle emphasizes the driver of opportunities lying within people rather than exploiting trajectories and trends.

Lean Startup. Backed by effectual thinking literature and other scientific support (Frederiksen & Brem, 2017), such as experimentation (Kerr et al., 2014), the practice-oriented management approach for launching a new venture, called Lean Startup, gained influence and popularity in recent years among academics and practitioners.

The Lean Startup approach (Blank & Dorf, 2012; Ries, 2011), encourages startups to develop their product or service iteratively taking into account the fact that they operate in an environment defined by high uncertainty and turbulence (Gruber, 2004), often without a full understanding of the customer problem and the required solution (Giardino et al., 2015). Its goal is to maximize learning while keeping the resource investment low. Based on these validated learnings, the existing development path is being continued or changed. This procedure constitutes the Build-Measure-Learn cycle which iteratively creates knowledge using resources efficiently (Shahid Bajwa et al., 2016). Thus, the goal of the Lean Startup methodology and its predecessor, discovery-driven planning, is to allow for fast and resource-saving learning cycles in order to avoid business failure (McGrath & MacMillan, 1995; Ries, 2011). McGrath and MacMillan (1995) introduce discovery-driven planning as opposed to what they call the platform-based approach, which can be compared to a causation-based logic. It operates on the premise that future results can be extrapolated and predicted from past experience, which does only make sense for ongoing businesses, but not for startups due to the inherent uncertainty (McGrath and MacMillan, 1995). Instead, they propose a systematic way of uncovering implicit assumptions, including a reverse income statement, a pro forma operations specs, a key assumptions list, and a milestone planning chart. The implicit assumptions need then to be tested before committing to them.

The so-called Build-Measure-Learn feedback loop (Ries 2014, p. 75) starts with hypotheses to be tested. Derived from these hypotheses a Minimum Viable Product (MVP) needs to be created. An MVP only contains the essential characteristics of the future product that are currently being tested. The MVP will then be further shaped in the course of time and learnings. The tests and evaluations of the MVPs do not only have to deal with direct product features. Pricing, distribution and sales channels, as well as marketing approaches and thus the elements of the business model, can also be discussed here. Changes and improvements are made on the basis of the evaluations and measured fulfilment of needs. These, in turn, will be

tested until the end of a multiple feedback loop, the marketable product and the operative business model stand for market entry (product-market fit) (Eckert, 2018).

Thus, a core principle of the Lean Startup approach is the concept of pivots. Every experiment leads to the question if the original hypothesis is right or not. Ries (2011, p. 149) defines a pivot as "a structured course correction designed to test new fundamental hypothesis about the product, strategy and engine of growth"

A synthesis. As Sarasvathy (2001a, p. 246) already states at the beginning of her effectuation research "both causation and effectuation are integral parts of human reasoning that can occur simultaneously, overlapping and intertwining over different contexts of decisions and actions", it seems clear, that the process of founding a startup is always a mixture of causation and effectuation. Even though, effectuation logic stands in contrast to the underpinning logic of traditional planning, Chandler et al. (2011, p. 388) argue that both processes are "legitimate ways to initiate and grow businesses". One can also argue, that CA, although being an instrument of traditional planning, can support to prove and validate primary hypothesis through actual information, avoiding effort based on false assumptions in the mindset of the Lean Startup approach and effectual thinking. The use of CA information in the context of this work should be regarded in this sense. CA can support founders making better decisions along their way of finding a viable, sustainable business model. For the course of this work and in the context of entrepreneurship literature, it stands to reason to use CA as a tool on the way to iterating through the process of finding a viable business model. It may be a matter of timing and design to make it an appropriate tool. In that matter, one can argue that a CA especially designed for early-stage startups help on the way to a viable business model and reducing uncertainties.

2.2.3 Competitive advantage and competitive strategies

Competitive advantages are positional advantages of a supplier in comparison to the competition, i. e. they result from a comparison between competitors and are therefore not absolute, but always a relative advantage (Corsten & Corsten, 2012). Simply put, a firm that outperforms its competitors has a competitive advantage. Rothaermel (2008, p. 203) simply puts it as "a firm that outperforms its competitors has a competitive advantage. If this firm is able to dominate its competitors for prolonged periods of time, the company is said to have a sustained competitive advantage."

Porter (1985, p. 3) argues that competitive advantage grows out of value a firm is able to create for its customers that exceed the cost of creating it. Value is what customers are willing

to pay. Firms can either offer lower prices than competitors for equivalent benefits or providing unique benefits that more than compensate for a higher price.

Day & Wensley (1988) describe a cyclical process in which the creation and sustenance of competitive advantage are the outcomes. A relative superiority in the skills and resources leads to a positional and performance superiority. The business needs to set up barriers, that make imitation difficult, which are continually eroding. Therefore, the firm must be continually investing to sustain or improve. Which competitive advantage to strive for is the core part of the competitive strategy (Homburg, 2017, p. 512).

2.2.4 Competitive strategy and strategic positioning

"Competitive strategy is about being different" (Porter, 1996, p. 64). Porter (1980, p. 34 ff.) identifies three generic strategies for achieving a superior position (see Table 2): (1) Overall cost leadership: A company achieves cost leadership by having low costs relative to its competitors. Cost control and minimization help to achieve this strategy; (2) Differentiation: The differentiation strategy is set to create something that is perceived as unique throughout the industry. Differentiation can be achieved through brand, design, technology, features, customer service, dealer network, and others or a combination of these; (3) Focus: the tactics behind the focus strategy is to serve a specific target more effectively and efficiently than competitors who are competing industrywide. Low cost, differentiation or both can be achieved with regard to the specific market target.

Strategic advantage / **Strategic target**	**Uniqueness perceived by the customer**	**Low cost position**
Industrywide	Differentiation	Overall cost leadership
Particular segment only	Focus	

Table 2: Porter's three generic competitive strategies, source: Porter (1980, p. 39)

Porter refines the outlined generic strategies with the classification of strategic positions, that arise according to the chosen competitive strategy and the bases for differentiation as (see Porter, 1996): variety-based positioning, which is based on the choice of products or services; needs-based positioning, which is based on the focus of one specific customer group; and access-based positioning, which is based on a superior way of reaching customers. These positions are, however, not mutually exclusive and can be combined (Porter, 1996).

With regard to the differentiation strategy Homburg (2017, p. 513 ff.) distinguishes between two manifestations: Differentiation on the basis of superior products or on the basis of superior customer relationships. Typical characteristics of a competitive strategy based on superior products may comprise a constant optimization of the performance of the products,

intensive brand management, elaborate product designs or a high price level. Differentiation through superior relationships focuses on building long-term and stable customer relationships. Typical characteristics of this competitive strategy may comprise intensive analysis of individual customer needs, a high degree of individualization of the customer approach and the services offerings, or the systematic exploitation of cross-selling potentials among customers. Differentiation through linkages is also possible. Associations with other firms might affect the uniqueness, such as linkages within the value chain, with suppliers, or channel linkages (Afuah & Tucci, 2003, p. 57; Porter, 1985, p. 125).

If the differentiation offers an added value from the customer's point of view and thus a clear benefit in satisfying needs, the company will only differentiate itself on the market if no other competitor in the real or digital economy already offers this satisfaction of needs in the envisaged form. This is also referred to as the unique selling proposition (USP) of the business idea, the superiority of the business idea in terms of customer benefit compared to the product range of other providers. A unique selling proposition must fulfill certain characteristics. It must be important to the customer, distinctive, superior, communicable, preemptive, affordable, profitable (Kollmann, 2016, p. 244; Kotler & Armstrong, 2008, p. 207).

2.2.5 Information and communication system

The information and communication system is a management system. A management system consists of structures, processes, and instruments that execute or support management tasks and can be divided according to the management functions, such as planning and control systems, information and communication systems or leadership systems (Bamberger & Wrona, 2004, p. 213 ff.). These systems should increase the capabilities of the management and rationalize actions. Thereby the basic functions of management, such as coordination, reduction of complexity, dealing with uncertainty, and adaption to the environment, as well as the requirements for a company capable of progress, such as learning skills, ability to act, and responsiveness should be supported (Bamberger & Wrona, 2004, p. 220).

The information and communication system are structures, processes and instruments for information and communication in a company. The characteristics of this system are (Bamberger and Wrona, 2004, p. 240 f.):

- Elements: Persons and material involved in the information and communication activities
- Activities/Processes: Search, collection, storage, processing, transfer of data
- Outputs: Prepared information
- Methods: Support of processes

Classifications of the information and communication system are manifold. The functional perspective distinguishes between systems that fulfill or support tasks such as information generation, preparation, or transmission. The department perspective distinguishes between the recipient of information, such as marketing, personnel, production or supply. The time perspective takes into account whether the information is related to the past, present or future.

CA can be categorized as an instrument of the information and communication system, which provides information to improve management actions.

2.2.6 **Business model**

Since its first mentioning in the literature 50 years ago by Bellman et al. (1957) the concept of the business model (BM) has become increasingly important as it can create a competitive advantage and is relevant for success (Magretta, 2002; Osterwalder et al., 2005). Wirtz et al. (2016) examine where the business model concept comes from and how it has developed. They found that the business model topic is found in technology-oriented (BM has been used in the sense of process models to create suitable information systems), organisation-oriented (BM as abstract representation of a company's structure) and strategy-oriented (BM as basis for strategic decision-making) literature. These influences have led to various definitions, a heterogeneous understanding of the term and concept and, thus, to criticism towards the clarity of the BM concept. However, an increasingly converging view has been established up to now even if there is no generally accepted definition. Analysing several definitions of the BM concept and taking into account the latest developments in the literature, Wirtz et al. (2016, p. 41) define a BM as follows:

"A business model is a simplified and aggregated representation of the relevant activities of a company. It describes how marketable information, products and/or services are generated by means of a company's value-added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the superordinate goal of generating, or rather, securing the competitive advantage. To fulfill this latter purpose, a current business model should always be critically regarded from a dynamic perspective, thus within the consciousness that there may be the need for business model evolution or business model innovation, due to internal or external changes over time."

2.2.6.1 Business model and strategy

The diverse influences by distinct research streams also led to the problem of contrasting the BM concept to established concepts, such as strategy (Al-Debei & Avison, 2010; Wirtz et al., 2016). The prevailing view is that both concepts intersect, but are not the same (Al-Debei & Avison, 2010; Casadesus-Masanell & Ricart, 2010; Morris et al., 2005; Osiyevskyy et al., 2018; Zott & Amit, 2008), where the BM builds a theoretical layer between the business strategy and processes (Al-Debei & Avison, 2010). Casadesus-Masanell & Ricart (2010, p. 212) stress: "In our formulation, strategy and business model, though related, are different concepts: a business model is the direct result of strategy but is not, itself, strategy." Zott and Amit (2008) emphasize the fit between the product market strategy, i.e. the positioning of the firm in the competitive landscape, and the business model, which are complementary rather than substitutes and both yield sources for competitive advantage, independently as well as jointly.

However, there are also scholars expressing scepticism towards the business model concept. In that way, Porter (2001, p. 73) claims that "the definition of a business model is murky at best. Most often, it seems to refer to a loose conception of how a company does business and generates revenue" and serves as "an invitation for faulty thinking and self-delusion". Despite such criticism, scholars have elaborated arguments to defend the concept, such as the business models that yield abnormal returns or the business model as innovation opportunity (Massa et al., 2017). The BM functions as extracted by Al-Debei and Avison, 2010, in a literature review are:

- the BM as an alignment instrument improves harmonization and consistency among strategy and business process including their supportive information systems.
- the BM as an interceding framework connects technological potentials and innovations with the realization of economic value and the achievement of strategic outcomes.
- the BM as knowledge capital is an intangible and tactical information/knowledge asset, supports strategic decision-making and is, thus, valuable in providing the company with an enduring competitive advantage.

2.2.6.2 Business model components

According to Wirtz et al. (2016) the content of a BM, expressed as components, is relevant in the literature. The most commonly known BM approach (Giessmann & Legner, 2016) was developed by Osterwalder (2004) and Osterwalder and Pigneur (2010), called the Business Model Canvas (see Figure 10). The approach reflects the value that a company offers its customers, as well as the relationship to customers and partners, and includes necessary resources. It consists of nine building blocks: key partners, key activities, key resources, value

proposition, customer relationships, channels (to the customer), customer segments, cost structure, and revenue streams.

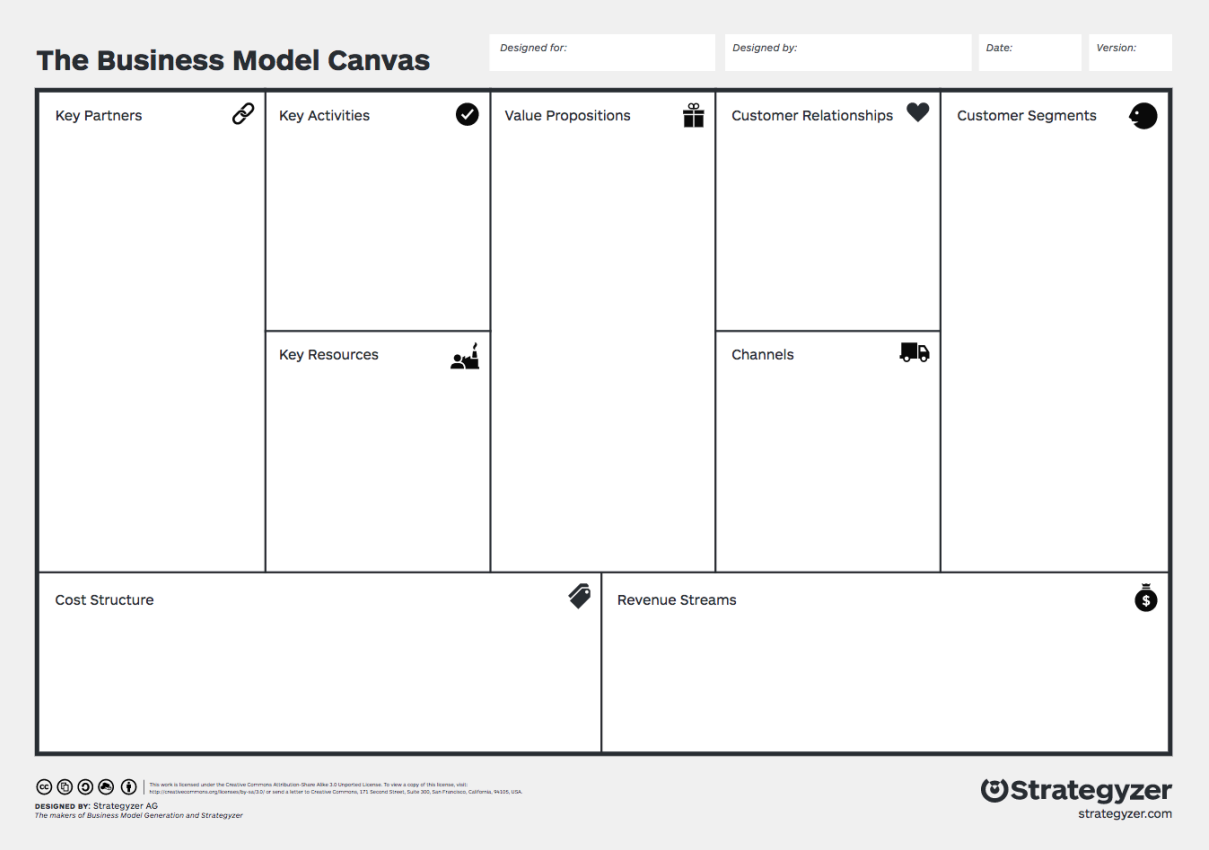


Figure 10: The Business Model Canvas (Strategyzer AG, 2018)

Lukas (2018) summarizes the advantages of the BM Canvas with regard to:

- Graphical factor: Contents can be constantly reconsidered and then represented graphically. This promotes creative ideas and new approaches. Large printouts give the user or even an outsider a quick overview, and contents can be easily modified.
- Storytelling: A developed business model can be evaluated easily and vividly with outsiders. Based on the nine fields one can guide a viewer step by step through the developed business model and point out changes, advantages and critical factors in a short time. Accordingly, it can serve as a decision-making basis for stakeholders.
- Team: The application in a team is possible and may lead to more creative approaches and more innovative results.
- Time management: The time required for the application must be weighed up to the results. Time management is possible using the Canvas.

A repeated criticism of the BM Canvas is that the analysis of competition is excluded (Ching & Fauvel, 2013).

However, there are other less practice-oriented approaches to summarize business model components. Wirtz et al. (2016) analyze 16 BM approaches according to their included

components and derive an integrated BM (see Figure 11) including strategic, customer and market and value creation components. The components are subdivided into three submodels each. The strategic components are divided into the strategy model, the resource model, and the network model. Customer and market components are distinguished between the partial-models customer model, market model, and revenue model. Finally, the manufacturing model, the procurement model, and the financial model are submodels of the value creation components. However, Wirtz et al. (2016) reason that the components are only presented separately for reasons of an abstract presentation and that in practice such a strict separation is not always feasible. Therefore, the presented components are understood as interrelated. In that BM display, competitors are part of the customer and market component and the market offer model.

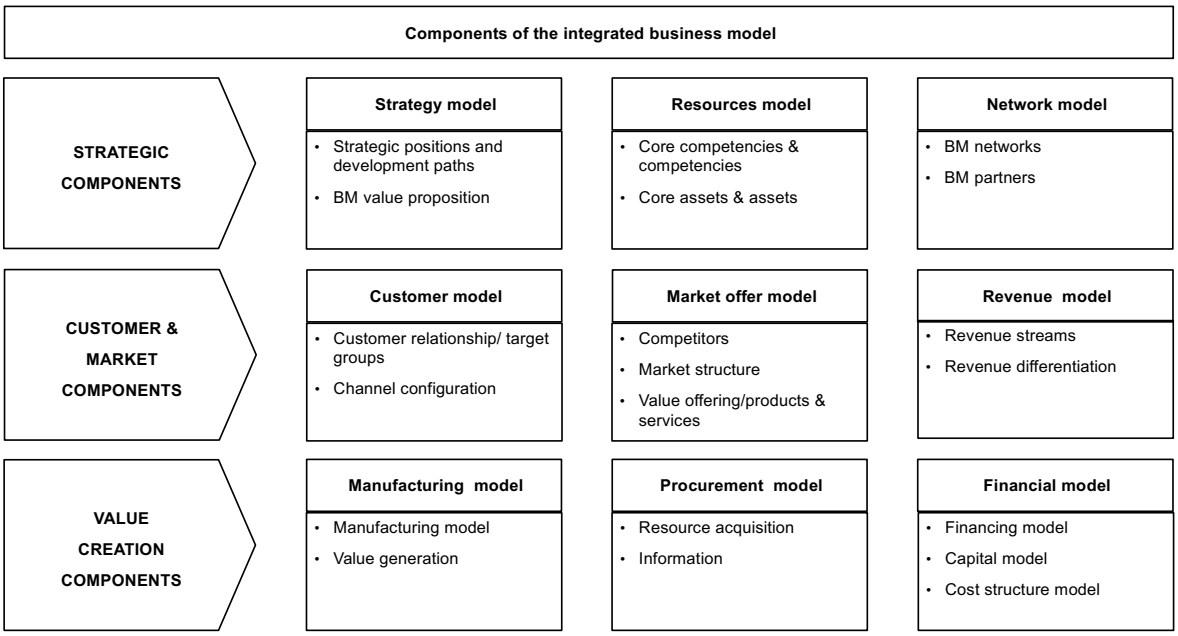


Figure 11: Components of an integrated business model by Wirtz et al. (2016)

Another attempt to classify BM components has been made by Al-Debei & Fitzgerald (2010) and Al-Debei and Avison (2010) which extract an ontological structure of business models (Figure 12). It is comprised of four value dimensions, i.e. the value proposition, that demonstrates the business logic of creating value for customers and/or to each party involved through products and services that satisfy the needs of their target segments; the value architecture, that includes the technological architecture and organizational infrastructure that allows the provisioning of these products and services; the value network, which includes the way in which an organization enables transactions through coordination and collaboration among parties and multiple companies, and the value finance, that deals with issues related to costing, pricing, and revenue. It is highlighted that the value dimensions are substantially interrelated and interdependent (Al-Debei & Avison, 2010).

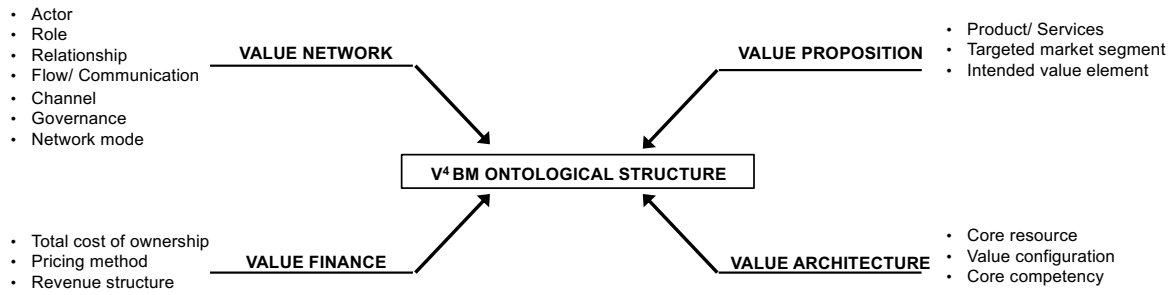


Figure 12: The V4 ontological structure of business models, source: Al-Debei and Fitzgerald (2010), visualization from Al-Debei & Avison (2010, p. 368)

2.2.6.3 Business model development

As already stated, the design of a BM is the core of the entrepreneurial process (Faltin & Ripsas, 2011). Thus, the BM development process is elaborated in the following section, which mainly refers to the nine-stage business model development process as proposed by Wirtz and Merman (2015) and Wirtz (2018) and includes all measures that are important in the context of a business model life-cycle. The first process step, the analysis of the initial situation, depends on the general conditions. Depending on whether the business model development takes place as part of a company foundation or in an established company, the specific situation of the entrepreneur and the market situation, available resources or the existing BM are examined in this phase. At the same time, the aim on the market side is to identify market gaps or existing market niches. Idea generation, the second process step, is closely linked to the analysis of the initial situation. It builds on the results of the previous analysis and uses them as a basis for deriving potential new business ideas or business model innovations. Sources for new ideas, among others, can be employees of the research and development department, external sales staff, employees of the customer service department and customer complaints as sources on the company's internal side. On the external site, for example, interviews with customers, information about competitors, innovations in other markets and trend and market studies from independent institutes are listed as sources (see Homburg et al. (2013, p. 115). After the BM orientation and first ideas have been determined, the first rough concepts are drawn up. After the development of a rough concept, the feasibility analysis follows, whereby again the environment must be analysed. Compared to the first process step, the analysis is executed against the background of the newly generated ideas in order to identify implications for the developed basic concepts. The environmental analysis consists of the environment analysis, industry and market analysis, and CA (see Wirtz, 2018, p. 270 ff.). The aim is to assess the feasibility of the business idea and to identify the need to adapt existing strategic components during the further development of the idea. At the end of the feasibility analysis, a refined and coordinated design, consisting of the strategic and customer and market-related components of the business model should be available for the realizable business ideas. Herein

also the potential for cooperation among stakeholders, i.e. coopetition, is assessed. Complementing products are a possible coopetition scenario. The next process step is the creation of business model prototypes, which are compared and weighed up in the next step, decision-making. Subsequently, when the business model is to be implemented, the business model serves as a construction plan for a company. This step is iterative and must take account of changes in the environment through adjustments. Planning and conception, communication, team set-up, actual implementation and project completion are steps in the implementation phase. It ends with the transition to the operation phase. During the phase of business model operation, the implemented business model is transferred to the operative business. This involves the implementation of the business model at the process level. This includes realizing the business model processes and guidelines in day-to-day business. The next step in the process, monitoring and controlling, is to check whether the business model has achieved its goals. The overriding goal here is to generate and secure competitive advantages, which are to be monitored with the aid of planning and controlling tools. If deficits are disclosed within the framework of monitoring and controlling, the possible causes must be identified. If these deficits are due to the business model, the phase of adjustment and change of the business model must be initiated. Figure 13 shows the development process and highlights the influence of market information, including those about competitors, in each phase according to Wirtz (2018; Wirtz & Merman (2015) and Wirtz et al. (2016). As can be seen, information about the market may influence each step of the business model design process.

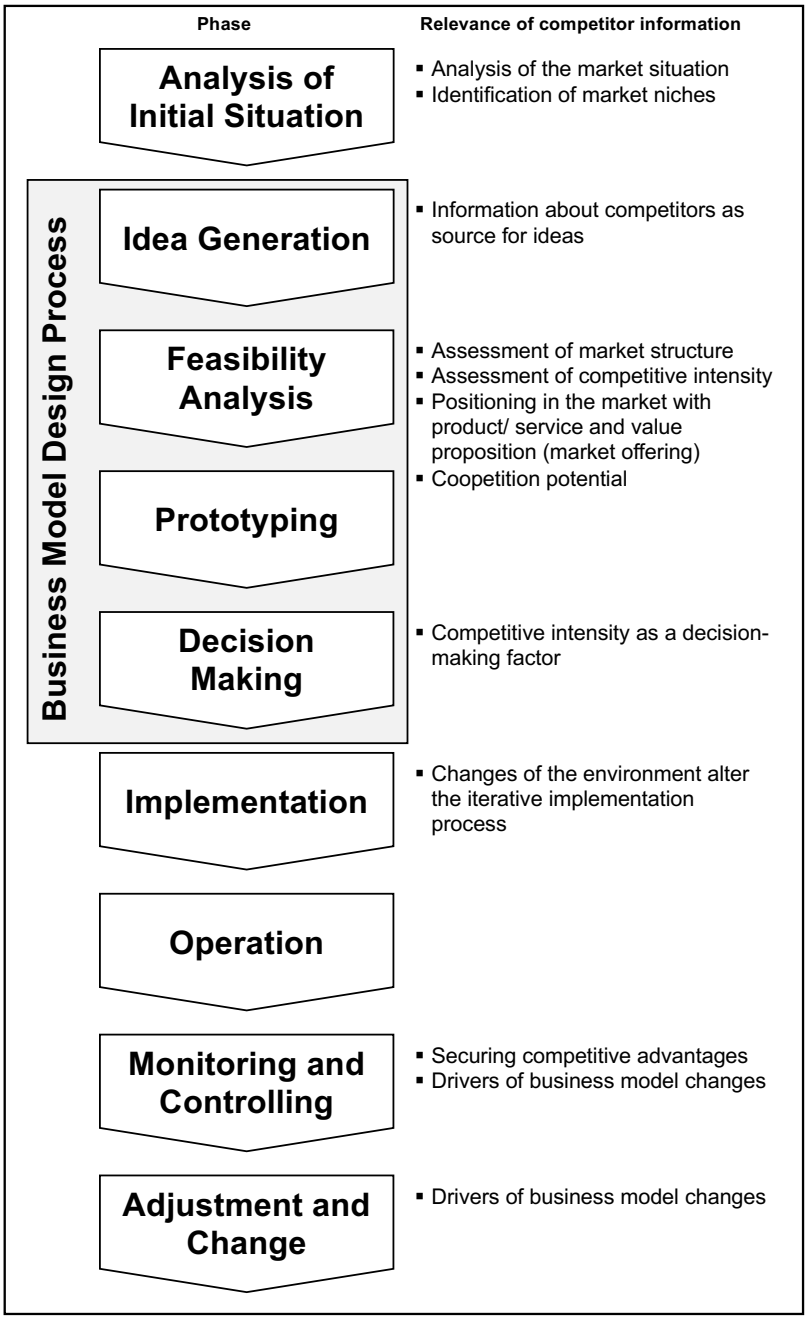


Figure 13: Business model development process and market information

2.2.7 Selected competitor analysis methods

As outlined, whenever a business decision needs to be made for any reason, any available information will reduce the amount of information asymmetry and subsequent risks resulting from wrong decisions (Prašnikar et al., 2005). It is the management's task to create a superior business strategy, implement the strategy and set targets to be met, perform evaluations of the strategy performance and execute adaptations if necessary (Thompson & Strickland, 2001).

It is said that the CA process includes different phases: planning, gathering, analysing, and disseminating intelligence about the external environment (Calof & Skinner, 1998). Often a two-step, linear process of CA is modelled whereby the identification of competitors leads to their analysis (Few, 2007). The identification should include a wide range of direct and indirect competitors from (latent) substitutors, potential entrants, and vertical differentiators (Peteraf & Bergen, 2003). In most instances, direct competitors are visible and easily identified. Coke competes with Pepsi and other cola brands. Deutsche Bank competes with Commerzbank, UBS, and other major banks. Boeing competes with Airbus. The identification of the different competitor groups should be done with great care and the analysis of each group with depth and insight. In many markets, however, customer priorities are changing, and indirect competitors offering product alternatives are strategically relevant. Understanding indirect competitors can be strategically and tactically important.

Research in the context of intelligence gathering has been performed under various different labels (Dishman & Calof, 2008). The literature has adopted several different definitions of the term CA (Bennett, 2003). For the purpose of this study, CA is defined as a process embodying the collection of data on rivals as well as their analysis and interpretation for managerial decision-making (Bennett, 2003; Zahra & Chaples, 1993).

Having identified CA as an instrument for assessing the situation of a company, selected CA instruments will be outlined.

2.2.7.1 Porter's industry structure analysis

With regard to the analysis of the task environment, the most famous analysis is Porter's five forces model to analyse the industry structure. Porter (1980) draws on industrial organization economics and is a representative of the market-based view (see chapter 2.1.3).

In order to create a superior competitive strategy, the goals of Porter's industry structure analysis are: the determination of the competitive rules, of strategies available, and of the ultimate profit potential in terms of long run return.

The profit potential depends on the strength of five basic forces (see Figure 14), which can range from intense to mild. A business units' goal achieved through a competitive strategy is to create a defendable position against the competitive forces or at least to influence them in its favor Porter (1980, p. 29). Porter's working definition of an industry is a "group of firms producing products that are close substitutes for each other" (ibid., p. 5). In this industry the five forces jointly determine the intensity of competition and profitability, are (see Porter, 1980):

Potential entrants: New entrants reduce profitability by bringing new capacity to the market and as a result reduced prices. The threat of entry depends on the barriers to entry and the reaction from existing competitors. Porter names six sources of entry barriers:

- economies of scale: new entrants would have a cost disadvantage if entering with a small scale
- product differentiation: Established firms developed brand identification and customer loyalties, which must be overcome by new entrants
- capital requirements: If capital is required, especially for risky R&D investments, to catch up with the established firms, this creates a barrier for new entrants
- switching costs: Costs that customers need to pay if they want to switch products. The promised improvement by the new entrant must, therefore, be strong.
- access to distribution channels: Distribution channels must be developed by new entrants.
- cost disadvantages independent of scale: Cost advantages independent of scale may be represented though intellectual property, location, or cumulated experience.
- government policy: The Government can set entry barriers through regulations with regard to import, export, or production standards.

Substitutes: Substitute products from other industries perform the same function as the industry's product, which leads to a price cap.

Buyers: Market attractiveness is also influenced by the bargaining power of buyers. A high bargaining power leads to lower industry profitability. The buyer's degree of concentration, the standardization level of the products, switching costs, share of the product in the buyer's total costs, significance of the product for the buyer's products quality, and market transparency influence the bargaining power of buyers. The factors either strengthen or weaken the position of the buyer in price negotiations.

Suppliers: The suppliers can have bargaining power, that influences the profitability of an industry. The factors influencing their power reflect those of the buyers. They are powerful, if the supplier's degree of concentration is high, substitutes are rare, the fraction of sales to this particular industry is small, the supplier's product is important to the industry, they sell a differentiated product (preferably with switching cost), forward integration is considered a threat.

Competitors: This force refers to the rivalry among existing competitors and their striving to improve their position through tactics, such as price competition, advertising, product introductions, customer services or warranties. Structural factors determine the intensity of rivalry:

- slow industry growth: under such circumstances growth of a competitor is only possible to the detriment of another's market share
- numerous or equally balanced competitors: creates instability, because a coordinative role by an industry leader is missing
- high fixed or storage costs: price cutting is highly probable and keeps profits low when fixed costs for production of for storage of the produced products are high
- lack of differentiation or switching costs: If the customer has no preferences or loyalties with regard to the product, price and service competition is likely.
- Capacity augmented in large increments: Overcapacity and price cutting can be the result if economies of scale dictate that capacity must be added in large increments.
- Diverse competitors: Differing goals and strategies of the competitors lead to different actions on the market, which may limit the profitability of others. This effect increases if some firms have high stakes in achieving success on that market, because they may be willing to sacrifice success in order to improve their position.
- High exit barriers: Exit barriers are factors that keep companies in an industry even though returns are unsatisfying.

Grant and Nippa (2006, p. 143) argue that a sixth force must be considered. Complementary products, whose producers can influence the value of the industry and exercise bargaining power.

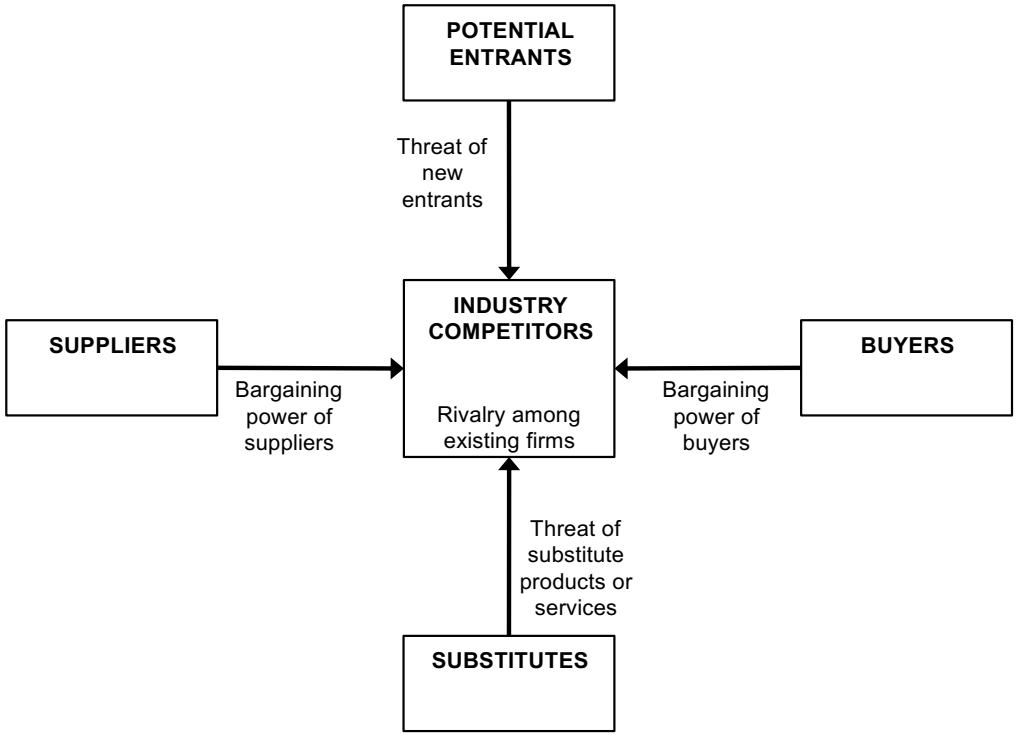


Figure 14: Porter's five forces driving industry competition, source: Porter (1980, p. 4)

The ultimate goal of Porter's strategic analysis is to create a defendable position in an attractive industry, cope with the forces successfully and in turn generate superior return.

Competitive advantages, that lead to supranormal rents are to be expected, if the company is in an attractive industry, e.g. protected by entry barriers, acts within a strategic group that is protected through mobility barriers, differentiate itself through the generic strategies (see chapter 2.2.4) from competitors, and/or reaches economies of scope through synergies (see Porter 1980, 1985). As can be seen, the five forces framework serves to analyse the attractiveness of a whole industry or to assess how a new technology influences the whole industry (see for example Porter, 2001). This framework is cited in many textbooks as standard framework for analysing the competition. However, Porter himself has proposed another framework for CA, which will be outlined in the next chapter.

2.2.7.2 Porter's framework for competitor analysis

Porter (1980, p. 47) formulates the objective of his CA framework as "develop a profile of the nature and success of the likely strategy changes each competitor might make, each competitor's probable response to the range of feasible strategic moves other firms could initiate, and each competitor's probable response to the array of industry changes and broader environmental shifts that might occur". Porter also emphasizes the need for systematic analysis of competitors. Four components need to be analyzed in order to derive a competitor's response profile (see Figure 15), these are (see Porter, 1980):

Present and future goals of the competitor need to be determined on the business unit and the corporate parent level. Financial goals, attitude towards risks, values and beliefs, organizational structure, control and incentive system, accounting system, kinds of managers, composition of the Board and contractual commitments are among the dimensions to be analyzed.

The *current strategy* is another diagnostic component. Statements about key operating policies within the key functional areas, such as R&D, marketing, sales, distribution, finance, and more need to be made.

Assumptions the competitor has about itself and about the industry and the companies are a third diagnostic component.

Capabilities of the competitor need to be assessed in order to determine the ability to initiate or react to strategic moves. Here the strengths and weaknesses of a competitor are being evaluated with regard to its position with respect to the five forces (see chapter 2.2.7.1). Porter also provides a list of areas for assessing these strengths and weaknesses. These areas

cover: Product, distribution, marketing and selling, operations, research and engineering, overall cost, financial strength, organization, managerial ability, corporate portfolio and other.

After assessing the four components a competitor's response profile can be established. Thereby potential offensive moves, as well as defensive capabilities, are considered.

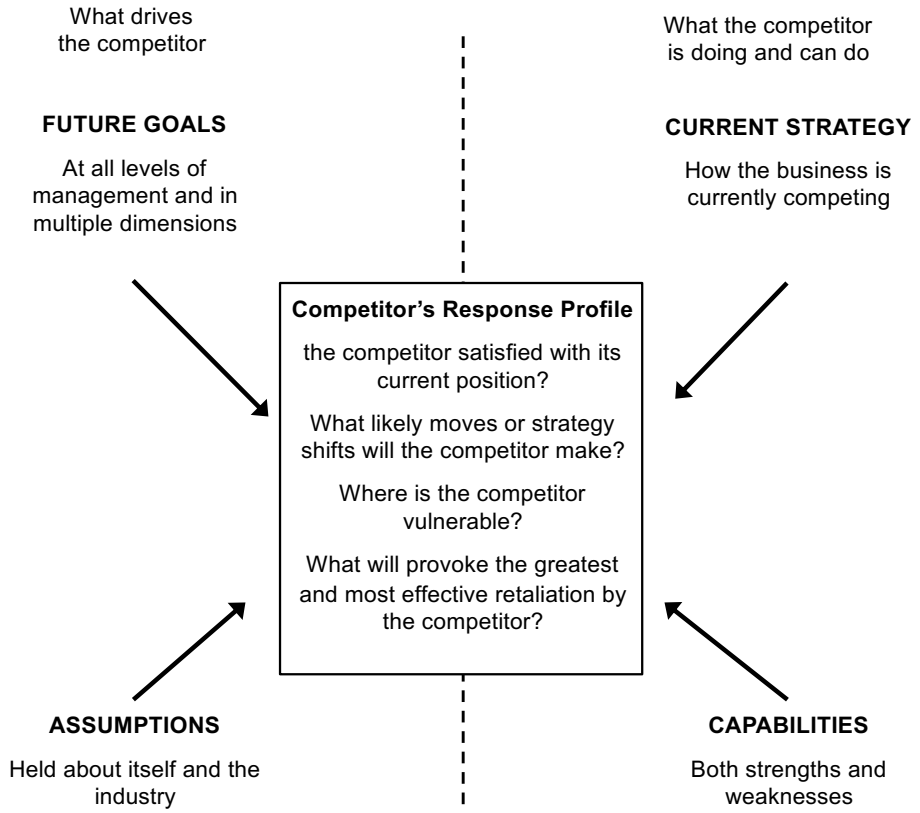


Figure 15: Porter's competitor analysis framework, source: Porter (1980, p. 49)

2.2.7.3 Blue ocean strategy

Another approach to analysing competitors that gained popularity in recent years is proposed by Kim & Mauborgne (2005) in their work "Blue Ocean Strategy". Already in the subtitle, they claim to make competition irrelevant. Markets are divided into red oceans, that are characterized by a highly competitive intensity and effort to exploit existing demand, and blue oceans, where demand is created, and new competitive standards are to be set. In order to conquer such uncontested market space by developing a blue ocean strategy, analytical tools are proposed. The "strategy canvas" (ibid, p. 25 ff.) is such a tool, to assess the current state of the industry and the competitors along the "factors that the industry competes on and invests in" (ibid, p. 25). Figure 16 displays the strategy canvas in a stylized form.

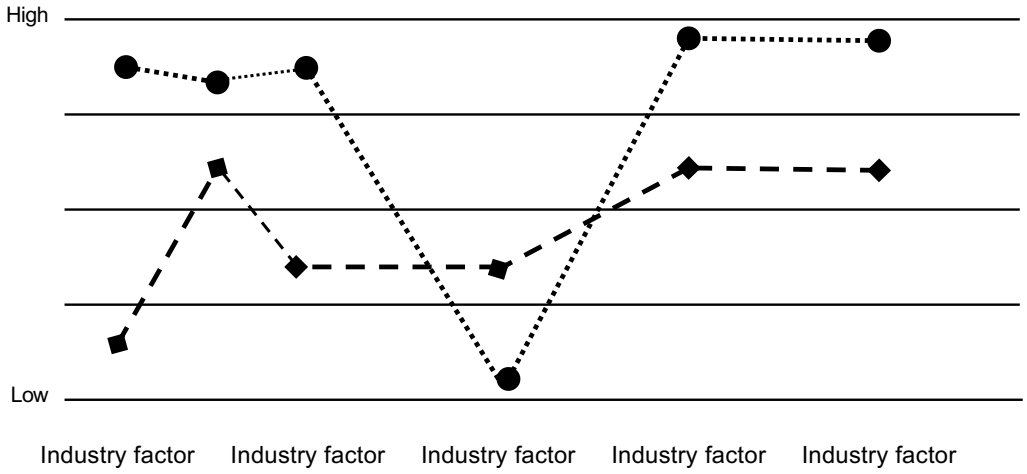


Figure 16: Strategy canvas - stylized, based on Kim & Mauborgne (2005)

By graphically placing a company (or groups of companies) or a product (or product groups) in the canvas a "value curve" evolves, which "is a graphic depiction of a company's relative performance across its industry's factors of competition" (ibid, p. 27).

Based on that evaluation they propose the "four actions framework" to discover uncontested market space (ibid, p. 29 ff.). The four actions framework strives to achieve a new value curve by reducing factors below the industry's standard, creating new factors, raises factor's above the industry's standard or eliminating factors.

However, even they claim to make competition irrelevant, they do analyse the competition in order to achieve that. The example of Nintendo's case mentioned in the introduction highlights that fact. Whereas the case is used as teaching material for the development of a successful blue ocean strategy (Kim et al., 2013), Aaker (2013, p. 49 f.) uses it as a success story of a good CA.

2.3 MARKETING LITERATURE

With regard to the business functions, CA is an integral part of the marketing and sales function.

The term "marketing" is derived from "market". Markets represent both reference and target objects of marketing: The view of markets as reference objects of marketing emphasizes that markets set the framework conditions for the marketing of companies. Marketing takes place in markets. Customers, competitors and other players appearing on a market have a decisive influence on the scope of action of marketing. The view of markets as target objects of marketing emphasizes that in the context of their marketing activities, companies strive to shape markets and influence actors in markets. The focus here is on trying to influence the behaviour of (potential) customers and competitors in a targeted manner to the benefit of their own company (Homburg, 2017, p. 2).

The American Marketing Association defines marketing in 2004 as “an organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders“ (see Gundlach & Wilkie, 2009).

With regard to this definition Meffert et al. (2015) state that nowadays, marketing is interpreted as an integrated, market-oriented management concept that combines both a functional and a cross-functional dimension. The former includes the development of specific competencies within a marketing department (e. g. brand management, market research, customer retention, etc.). The latter stands for marketing as a guiding concept of corporate management. This means market-oriented coordination of all operational functions. For this purpose, cross-functional processes (e. g. product development, quality, complaint management, etc.) must be defined in which marketing decision-makers share market and customer-oriented information and marketing knowledge with managers from other corporate functions.

The marketing activities are carried out in a strategic triangle, which is formed by the customers of the company, the company itself and the competitors of the company (see Figure 17).

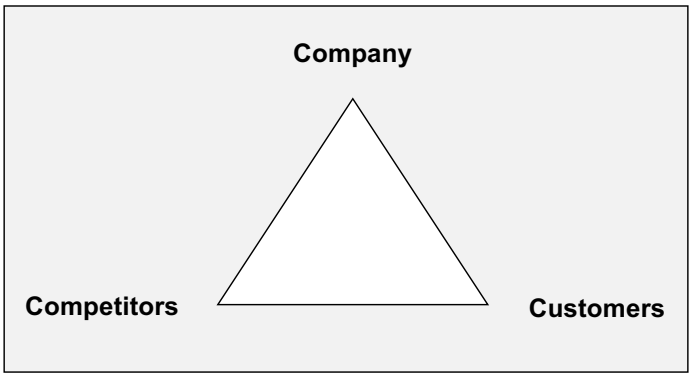


Figure 17: Strategic triangle of marketing, source: Homburg (2017, p. 24)

The characteristics of the marketing concept suggest an expanded understanding of the marketing concept, which is also called marketing management (Homburg, 2017).

Marketing management starts with a situational analysis to assess the current situation with regard to factors inside and outside the company (Meffert et al. 2015). Strategic analysis of the environment, the market and the situation of the company is the starting point for the formulation of alternative marketing strategies, their assessment, selection, implementation, as well as control (Homburg, 2017, p. 463), analogous to the strategic management process.

Marketing strategy answers questions related to (see Homburg, 2017, p. 506 ff.): Strategic marketing objectives and target groups, customer value and positioning in relation to the competition, innovation orientation, customer relationship management, competition and cooperation behaviour, marketing mix design, i.e. product, price, promotion and place policies.

Especially with regard to the price policy, CA plays an important role (Simon & Fassnacht, 2016, p. 103 f.), because in many markets, competitive prices have a strong influence on a company's own sales, competitors tend to react if they feel threatened by price measures, and competition can act quickly to price campaigns. For price-determining purposes relevant current and potential competitors need to be identified and analysed according to current prices and potential future price behavior.

As can already be seen the content of marketing strategy is partly overlapping with strategic management decision, such as the positioning. The position of the marketing strategy can, thus, be regarded as being subordinated to the corporate strategy (on one level with other functional strategies, on an equivalent basis to the corporate strategy or as dominating functional strategy, which plays a central role in corporate strategy and therefore has an exposed position compared to other functional strategies. The high strategic relevance of the marketing sector results in particular from its role as an interface to the corporate environment and as a supplier of information (see Homburg, 2017, p. 440; Mattsson & Carson, 2006; Varadarajan & Clark, 1994; Varadarajan & Jayachandran, 1999).

With regard to the analysis methods, within marketing literature the same analysis methods concerning competitors are being advertised as in strategic management. Having said this, Homburg (2017, p. 490 ff.) refers to Porter's Five Forces Model, the assessment of strengths and weaknesses in relation to competitors, and the disposition of a sustainable competitive advantage that is perceived by customers.

Notwithstanding, it can be stated that analysis of the corporate environment is a central fundamental requirement both in strategic management and in marketing management.

2.3.1 Markets and the environment

In general, a market can be defined as a place where a supply of products coincides with the demand for these products, through which prices are formed (Homburg, 2017, p. 2). On markets, suppliers and customers meet and shape their exchange processes. Markets are counted among the task environment of a company. The definition, delimitation and identification of markets has already been the subject of various research disciplines such as economics, law and business administration in general as well as marketing theory in particular. In macroeconomics, the market is viewed from a bird's eye-view, i.e. an objective and neutral perspective. The market is either understood as a process in which supply and demand meet and suppliers and customers exchange services embedded in a competitive process. Another focus is on the number of actors involved. The market is defined as the quantity of customers and suppliers for certain goods (monopoly, oligopoly, polypole). In business administration

and especially in marketing theory, the market is viewed from the point of view of a supplier perspective (Meffert et al., 2015, p. 43 ff.).

In order to include the environment in management and marketing tasks, it has been suggested to subdivide the environment into levels (see Figure 18) with regard to the proximity to the organization into the operating environment (also known as task environment) and the general environment (also known as macro or global environment). The operating environment consists of other entities such as customers, suppliers, competitors, investors, bankers, and more, with whom the company interacts with. This level of the environment substantially corresponds to the sector or industry in which the focal firm functions (Thomas, 1974).

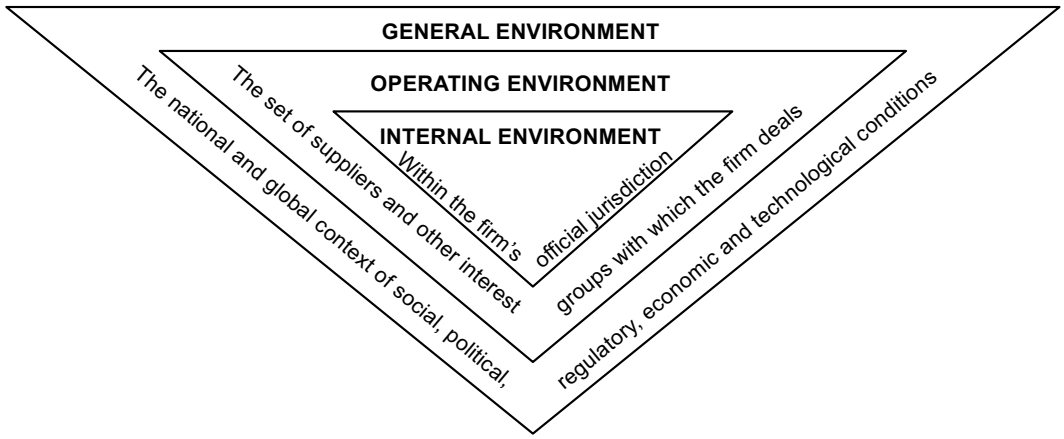


Figure 18: Environmental levels, source: Thomas (1974)

Superordinated to the operating environment is the general environment. It consists of background factors such as social, political, governmental (or regulatory), economic, and technological conditions (Thomas, 1974).

Fahey & Narayanan (1986, p. 25 f.) introduce another level of environment: the competitive or industry environment. They define the task environment as being specific to a firm, and is concerned with activities of day-to-day operations, which makes it distinct from that of competitors. The competitive or industry environment, on the other hand, affects all competitors in the same industry. They also introduce the concept of a relevant environment, which refers to the part of the environment needed for analytical purposes. A schematic presentation is shown in Figure 19.

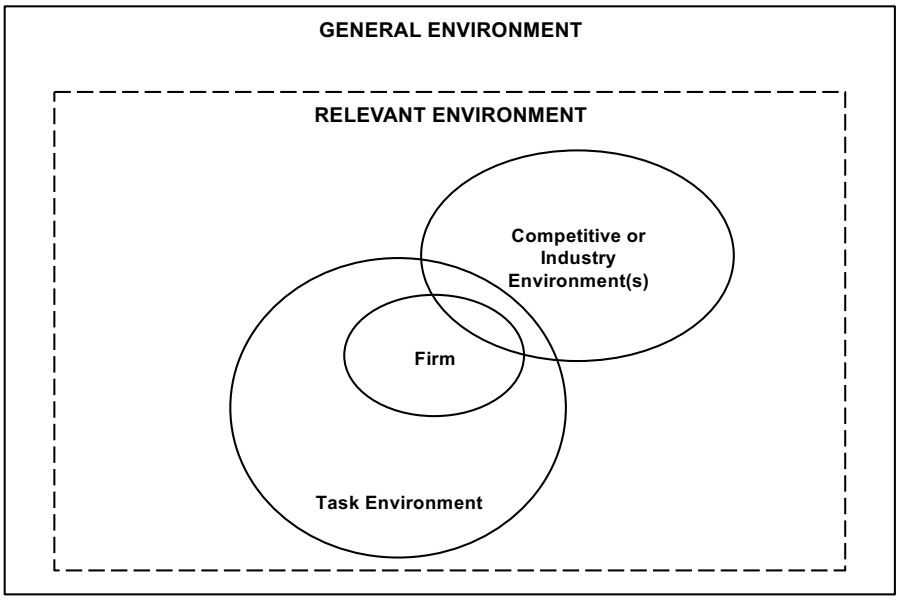


Figure 19: Environmental levels, source: Fahey and Naravayan (1986, p. 27)

Porter (1980, p. 32) finds a pragmatic approach to the question where to draw industry boundaries. The discussion about proper definition of an industry, according to Porter, is not necessary if the analysis focuses not only on existing rivals but also on substitute products and potential entrants. If they are recognized, then for strategy formulation it becomes irrelevant where the lines of the industry are actually drawn. He also distinguishes between where the firm wants to compete (the business) and the industry, which need to be decoupled, thus, making industry boundary definition irrelevant to strategy formulation.

2.3.2 Product positioning

In marketing science, the market is visualized as a cognitive map on which each product occupies a position. Consequently, one speaks of positioning (Simon & Fassnacht, 2016, p. 47). Positioning in the marketing literature is understood to mean "the company's endeavour to design its range of products and services in such a way that they occupy a special, highly regarded place in the customer's consciousness and a position that is separate from their competitors" (translated from Kotler et al., 2007, p. 423).

The positioning, however, should never refer to the price alone, but must always include the underlying value including the brand. In this sense, Simon & Fassnacht (2016) use the term positioning synonymously with price-value positioning or price-performance positioning. They also state that, the value and price position refers to the location of the object to be positioned in the customer's perception space with regard to the dimensions value and price. The reference object of the positioning can be an entire company, a brand, a product group or an individual product. Simon & Fassnacht (2016, p. 47 f.), thus, differentiate between five value

and price categories ranging from a luxury price position at the upper end of perceived relative performance and price to an ultra-low price level at the lower end of perceived relative performance and price. Gary & David (1982) propose in addition to the price-value dimensions five more not mutually exclusive product positioning strategies, such positioning through product attributes, by use or applications, by the product user, with respect to a product-class, and/ or with respect to the competitor.

2.3.3 Entrepreneurial marketing

In contrast to the marketing of established companies or products, the marketing of startup companies face a double challenge. At the same time, a new company and a new product must be introduced to the market. Additionally, innovative startup companies in particular operate in markets that are usually only just beginning to emerge or are only created by the innovative offer itself. As a result, the startups's marketing faces the particular challenge of being a new company and transporting a new product and thus a new idea into the marketplace. Thus, entrepreneurial marketing is defined as the marketing of a new product for a new company, taking into account the sales instruments for the creation of new markets or new competitive structures (Freiling & Kollmann, 2015a, p. 9 f.).

Hills et al. (2008) find distinctive differences between entrepreneurial marketing and marketing in established companies. Entrepreneurial firms lay their strategic focus on the creation of new value or demand for an innovation. These firms tend to be more tactically and strategically but are constrained by budgets. They also use less formal market research, are less driven by financial metrics, and rely more on intuition than planning.

Three different functions of entrepreneurial marketing are central (see Freiling & Kollmann (2015a, p. 10 f.): Reflection serves to test the idea or product in terms of market feasibility and value proposition. This includes whether the customer is willing to pay for the new product, reflections on technological feasibility and business viability. Second, a catalyst function is assumed, that focuses on adapting the idea or product to the requirements of the market, the competition and the customer. Aspects of the idea that are regarded by potential customers as uninteresting or that are not considered feasible by participating cooperation partners or investors should be rethought. This is an iterative process between internal and external review and subsequent adaptation. A third function is the communication, which refers primarily to the idea or product being presented to potential customers. As with the catalyst function, the process should not run unidirectionally from the startup to the outside but should also be multidirectional between the startup and customers as well as cooperation partners and investors.

With regard to market research activities, within entrepreneurial marketing the collection of any reliable information that serves to reduce uncertainty about an entrepreneurial project can be regarded as entrepreneurial market research (Kuckertz, 2015, p. 19).

2.4 ENTREPRENEURSHIP LITERATURE

According to Albert (1980), a theory is a web of hypotheses that makes generally valid, rational, verifiable and value-free statements about the object of the investigation. However, such a "grand theory" is not existent for entrepreneurship neither is it the goal nor is it necessarily possible (Fallgatter, 2002, p. 180). Initial reluctance to engage in economic discourse about entrepreneurship is mainly attributed by Fallgatter (2002, p. 76 f.) to the neoclassical paradigm that has dominated for a long time, according to which entrepreneurial activity depends solely on the availability of factors such as capital, labour and technology. In favourable constellations, a profit-maximising actor would automatically allocate resources to their efficient use. This initial reluctance is clearly no longer existent. Due to the enormous range of studies already carried out in combination with the lack of such a grand theory a clear fragmentation becomes evident for entrepreneurship research. Thus, a systematization of entrepreneurship research becomes necessary (Fallgatter, 2002, p. 81). Towards existing systematisation proposals, it can be argued that they either do not include the breadth of research or do not provide an appropriate reference point for this breadth (Fallgatter, 2002, p. 85).

Fallgatter (2002, p. 91 ff) therefore develops a scheme that is oriented to the studied research objects and distinguishes four levels of entrepreneurship research:

1. Level: The uppermost level, the "macroeconomic level", deals with the importance of entrepreneurs for different facets of macroeconomic developments. Scientific work at this level deals with the functions of entrepreneurs for the economy as a whole as well as contextual contingencies. These contingencies relate to the conditions of occurrence of entrepreneurs and are represented in situational conditions. They are necessary but not sufficient conditions for entrepreneurial activity. Macrosocial and economic theories provide the theoretical basis for work at this level.
2. Level: The second level, the personal level, contains work dealing with the examination of psychological and personal characteristics of successful entrepreneurs, such as motives, values or qualification, as well as their ontogenesis and demarcation from employed managers. The "Traits School" is a core of entrepreneurship research since early 1960s. It is theoretically based on personality theories.
3. The third level, the instrumental level, deals with the management of startups. Although the general management functions as well as the tasks of a leader should be implemented in a startup, the peculiarities of entrepreneurial action must be taken into

account. The vast majority of the studies at this level researches planning and organisation in startups, their networks, as well as success and failure factors. Personality and organizational theories provide the theoretical basis for research at this level.

4. The enterprise level deals with the question of how young companies change and the underlying reasons. The paradigmatic diversity of the organizational theoretical approaches that can be applied here is very large, which makes it difficult or impossible to compare the results. Structural changes in enterprises are explained through the theory of the firm, resource-based approaches, contingency theories, bioliogically inspired life-cycle models and industrial economics. Fallgatter (2002) states that the respectively underlying paradigms of the organizational theories can't be summarized and compared meaningfully.

CA is usually classified as being part of the classical management function 'planning' (Steinmann et al., 2013). Thus, the present study is to be classified into the instrumental level of the described scheme according to Fallgatter (2002), which deals with the management of startups, and takes into account their contextual peculiarities.

2.4.1 Entrepreneurship and entrepreneurs

Even if the term entrepreneurship is widely used in research and practice a generally accepted definition is missing. And although intuitively everyone knows or beliefs to know what entrepreneurship includes or who an entrepreneur is, a variety of definitions exist (Wickham, 2006). Entrepreneurship is a complex idea with many facets (Gartner, 1990). Thus, it is not surprising that there is no consensus about one definition of entrepreneurship. Morris (1998), for example, finds 77 different definitions in a five-year review of textbooks and journal articles. Gartner (1990, p. 16) explores the underlying meanings that researchers and practitioners have about entrepreneurship and finds that the nature of entrepreneurship is constituted along eight schemes: the entrepreneur, innovation, organization creation, creating value, profit/ non-profit, growth, uniqueness, and owner-manager. In the entrepreneur theme the idea is predominant that entrepreneurship involves individuals with unique personality characteristics and abilities. Creating a new product or service, market or technology is constituted in the innovation theme. The organization creation theme deals with behaviors involved in creating organizations. The creating value theme represents the idea that within entrepreneurship value is created. The profit/nonprofit theme is concerned with whether entrepreneurship involves profit-making organizations only. In the growth and uniqueness theme the importance of growth and uniqueness, respectively, are a characteristic of entrepreneurship. In

the owner-manager theme suggests that individuals who are owners and managers of their businesses are involved in entrepreneurship.

In a similar scheme, Shane (2003) extracts five key elements of entrepreneurship: the entrepreneur, an entrepreneurial opportunity, sufficient resources, a form of organisation and a favourable environment. The entrepreneur combines these five factors in order to create value (Fueglistaller et al., 2016, p. 7 f.)

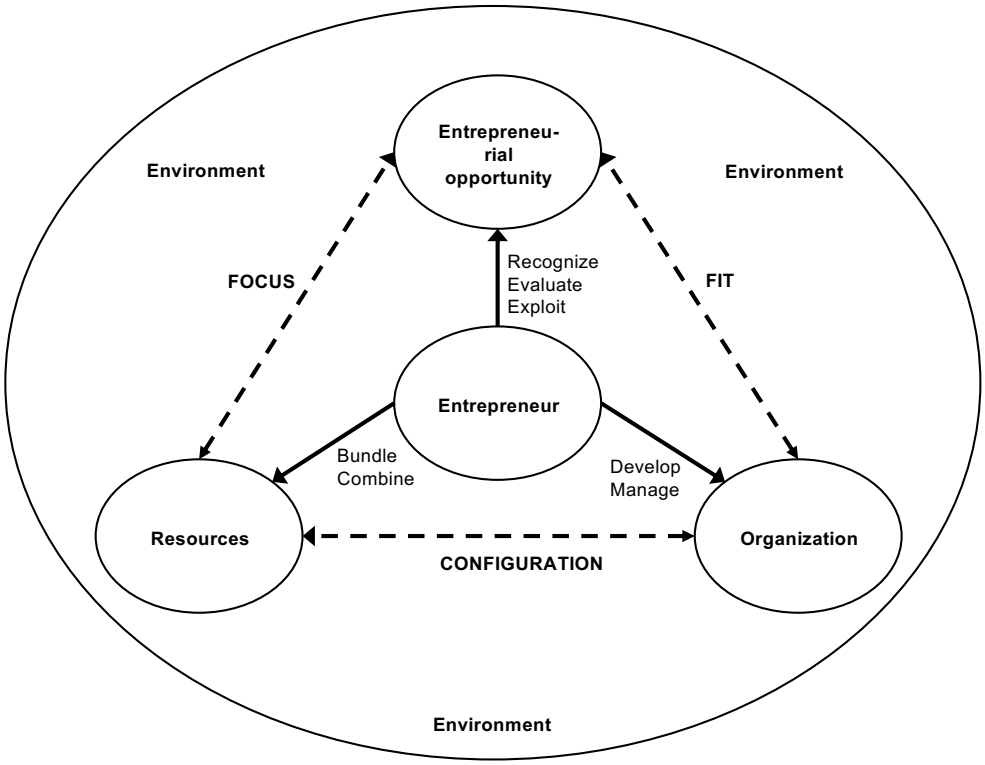


Figure 20: Key elements of entrepreneurship as defined by Shane (2003), visualization adapted from Fueglistaller et al. (2016)

With regard to the term "entrepreneur", the historical trace goes back to the seventeenth-century France, where an investor, who provided money, assigned an individual entrepreneur to undertake a commercial project (Wickham, 2006).

(Ripsas, 1997, p. 13) summarizes four main economic functions of the entrepreneur from a theoretical perspective (in brackets the most important representatives of the respective school of thought):

- Takeover of uncertainty (Knight)
- Push through innovations on the market (Schumpeter)
- Detection of price arbitrage (Kirzner)
- Coordination of resources (Casson)

Table 3 lists 13 selected definitions of entrepreneurship in order of appearance in the literature.

Author	Definition
(Schumpeter, 1934)	Entrepreneurship is seen as new combinations including the doing of new things or the doing of things that are already being done in a new way. New combinations include (1) introduction of a new good, (2) new method of production, (3) opening of a new market, (4) new source of supply, (5) new ogranizations.
(Kirzner, 1973)	Entrepreneurship is the ability to perceive new opportunities. This recognition and seizing of the opportunity will tend to "correct" the market and bring it back towards equilibrium.
(Drucker, 1985)	Entrepreneurship is an act of innovation that involves endowing existing resources with new wealth-producing capacity.
(Gartner, 1988)	Entrepreneurship is the creation of organizations, the process by which new organizations come into existence.
(Timmons, 1997)	Entrepreneurship is a way of thinking, reasoning, and acting that is opportunity obsessed, holistic in approach, and leadership balanced.
(Venkataraman, 1997)	Entrepreneurship research seeks to understand how opportunities to bring into existence future goods and services are discovered, created, and exploited, by whom, and with what consequences.
(Morris, 1998)	Entrepreneurship is the process through which individuals and teams create value by bringing together unique packages of resource inputs to exploit opportunities in the environment, It can occur in any organizationonal context and results in a variety of possible outcomes, including new ventures, products, services, processes, markets, and technologies.
(Sharma & Chrisman, 1999)	Entrepreneurship encompasses acts of organizational creation, renewal, or innovation that occur within or outside an existing organization.
(Stevenson et al., 1994)	Entrepreneurship is the pursuit of opportunity without regard to resources currently controlled.
(Ripsas et al., 2016)	Entrepreneurship can therefore be defined as the process of developing an innovative and value creating business model, of starting and leading a company to serve customers and users with new products or services, and of changing the way companies and people work and live.
(Byers et al., 2015)	The identification and exploitation of previously unexploited opportunities by enterprising individuals.
(Fueglistaller et al., 2016)	A process initiated and carried out by individuals to identify, evaluate and exploit entrepreneurial opportunities.
(Spinelli & Adams, 2016)	Entrepreneurship is a way of thinking, reasoning, and acting that is opportunity obsessed, holistic in approach, and leadership balanced for the purpose of value creation and capture.

Table 3: Selected definitions of entrepreneurship, adapted and extended from Meyer et al. (2002)

Fur the purpose of this study, entrepreneurship shall be defined according to a recent definition as "the process of developing an innovative and value creating business model, of starting and leading a company to serve customers and users with new products or services, and of changing the way companies and people work and live" (Ripsas et al., 2016, p. 266).

2.4.2 **Startups**

Since “startups are the result of entrepreneurial activity” (Ripsas et al., 2016, p. 266), and also the targeted main beneficiaries of the artefact to be developed within the course of this research project, they must be examined more closely. Startups, just like entrepreneurship, are not defined uniformly in literature. Throughout the literature there exist several terms that are used synonymously, such as new venture, entrepreneurial business or young company.

For the purpose of this work, a startup is defined as a “temporary organization in search of a scalable, repeatable, profitable business model” (Blank & Dorf, 2012, p. xvii). And following the more detailed definition given by the German Startup Monitor (Kollmann et al., 2018, p. 8) startups are “younger than 10 years and have (or strive for) a significant employee/ sales growth and/or are (highly) innovative in their products/ services, business models and/or technologies.” This definition highlights the importance of the business model design as core of the entrepreneurial process (Faltin & Ripsas, 2011).

However, a startup is not just a “little big business” (Welsh & White, 1981, p. 18) or a “small version of a big company” (Blank & Dorf, 2012, p. 1), and must be clearly distinguished from established companies as well as small companies (Achleitner & Bassen, 2002; Sutton, 2000). Several characteristics can be specifically assigned to startups such as a decision-making process, that is strongly influenced by the founders' personalities, a short existence, a dynamic environment, resource scarcity (Achleitner & Bassen, 2002), or changing organizational structures, and the lack of defined processes (Schoss, 2013).

Schoss (2013) follows the continuum approach and argues that startups develop over time into established companies (ibid, p. 60) and shows in a schematic comparison the differences between the two poles of a continuum. Table 4 summarizes the differences between startups and established companies along five dimensions.

Dimension	Established company	Startup
Rationale	Reliable satisfaction or overfulfilment of the expectations of existing customers	Bring the greatest possible innovation to market successfully
	Evolution	Revolution
	Much to lose	Little to lose
	Defend	Attack
	Preserve	Capture
	Follow the rules	Act flexibly
Dominant patterns of thought	Perform duties	Change the world
	Late recognition of new rules	Early recognition of new rules
	Perfecting efficiency in day-to-day business	Creativity in solving ever new challenges
	Accurate execution of plans	Trial and error
	Failure is failure and must be avoided	Failure is part of the learning process
	Market research	Market test
	Optimization of details	Focus on vision
	concrete idea of the company's development in the coming months	Relatively concrete idea of the company in ten years' time
	The company forms the employees	The employees form the company
	Self-confidence from the strength of the company	Self-confidence from the person of the founders
Leadership personalities	Preservationist	Revolutionary
	Classic manager	Master of effectuation
	Politically correct	Nonchalant
	Mostly clearly over 40 years old	Better under 30 than over 40 years old
	Earn comparatively a lot of money, but have little or no stake in the company.	Earn nothing or close to the existential minimum, but have high shares in the company.
	First priority: develop one's one career	First priority: develop the company as best as possible
Structures in the company	Fixed structures	Changing structures
	Standardized processes	No fixed processes yet
	Firmly embedded business model	Evolving business model
Expectations of company owners	Profit	Increasing company value
	Failure must be prevented by all possible means	The high probability of failure is offset by portfolio diversification.

Table 4: Guiding principles in startups and established companies, source: Schoss (2013)

The fact that startups are also different to small business owners and not just young companies is stressed by the definition of the German Startup Monitor. Small businesses are mostly started in established industries and are aiming at the generation of a steady stream of income, startup founders want to contribute to the change of an industry through innovation (Ripsas et al., 2016).

In the same sense, Aulet & Murray (2013, p. 6) distinguish between two types of creating a new business. They summarize the key distinctions between a small and medium enterprise (SME) and innovation-driven startup (see Table 5).

Small and medium enterprise entrepreneurship	Innovation-driven entrepreneurship
Focus on local and regional markets.	Focus on global markets.
Enterprise establishment and growth do not need innovation or competitive advantage.	Basis of the company is innovation (technology, process or business model) and a potential competitive advantage.
Jobs are performed locally, e.g. restaurants, cafés or hair salons.	Jobs do not have to be performed locally.
Little external capital or family business.	Diverse ownership base with diverse external capital providers.
Growth takes place linearly. Direct relationship between money put int the company and revenue, cash flow and jobs.	Growth takes place non-linearly, starting with a loss of money and if successful with exponential growth.

Table 5: SME entrepreneurship vs. innovation-driven entrepreneurship, adapted from Aulet & Murray (2013, p. 6)

The present research focuses on startups in the defined sense, and clearly distinguishes them from small and established businesses.

The aforementioned continuum of the transition from a startup to an established company, suggests that some kind of a life-cycle consisting of different phases exists, which a startup needs to pass on their way to an established company (Tsoukas, 1991). Since the conditions and requirements are likely to change over the development stages of a startup and its transition to an established company, a further limitation of targeted users of the artefact to be developed is necessary.

Having said this, Levie & Lichtenstein (2010) find 104 stage models published between 1962 and 2006. An early and widespread stage model is proposed by Kazanjian & Drazin (1990) for technology based new ventures that market a physical product and generate growth internally. Their stage of growth model consists of four stages reflecting the predominant problems startups face in the respective stage. The phases are conception and development, commercialization, growth, and stability and reach from development of a business idea, beginning manufacturing, produce and sell in volume to launching second generation products. The description of the phases is outlined in Table 6.

Phase	Conception and development	Commercialization	Growth	Stability
Description	• Prior to incorporation • development of the business idea, • construction of a prototype product • selling the business idea to financial backers	• beginning manufacturing • gearing up for first marketing • solving initial engineering difficulties • developing the nucleus of an administrative system.	• produce, sell, and distribute the product in volume, while avoiding the shakeout of less effective or efficient firms from the market • increasing sense of hierarchy	• maintain growth momentum • bureaucratic principles • launching a second generation product while simultaneously managing the efficiency of the existing product line

Table 6: Stage model by Kazanjian & Drazin (1989)

A groundwork for recent startup life-cycle models is formulated by Steve Blank's customer development model by criticising the predominant product-centric development models as ignoring the importance of customer and market development based on the wrong assumption "build it and the customers will come" (Blank, 2013, p. 18). In his proposed customer development model (Blank, 2013) that is based on iterative learning about customers and their problems and validating assumptions, he distinguishes between a search phase and an execution phase (see Figure 21). In the search phase an entrepreneur must find out who the customers for his product are, and if the customer's problem is worth solving (customer discovery) and then prove that the sales process is repeatable (customer validation). Going back to step one is necessary if not enough paying customers are found. The execution phase is about creating demand and scaling through marketing activities (customer creation) and about transition the startup from an informal, learning and discovery-oriented team into a formal organization. However, Blank (2013, p. 25) argues, that the customer development model should not replace the product development cycle but accompany it.

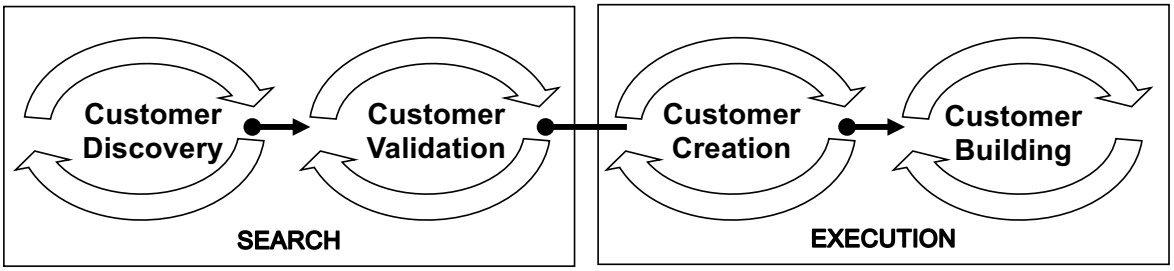


Figure 21: The customer development model from Blank (2013, p. 25)

Inspired by this model Maurya (2012) proposes a three stage startup life-cycle model (see Figure 22) with predefined thresholds. The startup processes through the stages of problem/ solution fit and explores whether the problem is worth solving, proceeds to

product/market fit exploring whether people want the product and starts to accelerate growth after having passed the first two stages by validated learning cycles.

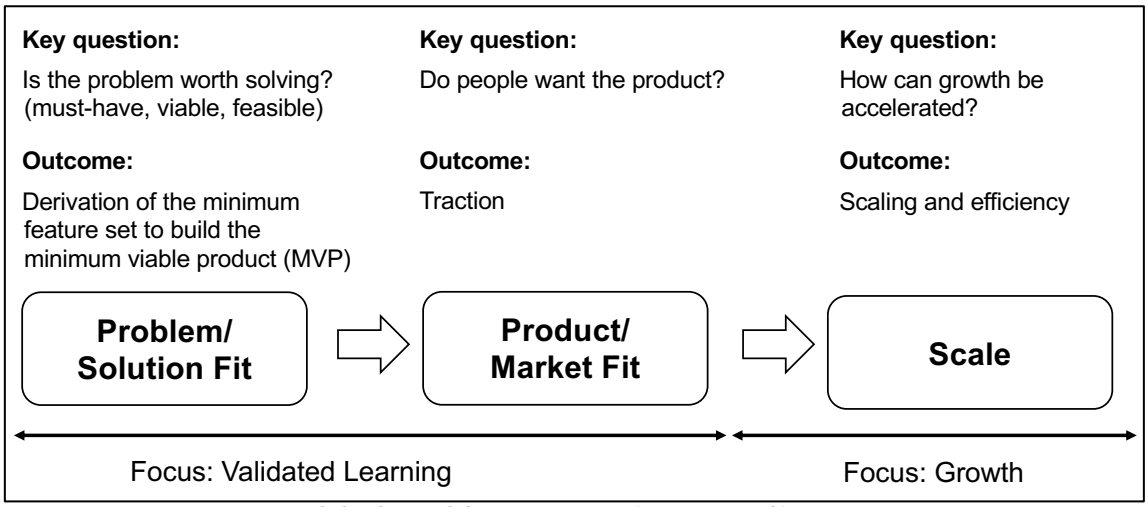


Figure 22: Startup stage model adapted from Maurya (2012, p. 8 f.)

Also based on the stage model by Steve Blank the Startup Genome Report (Marmer et al., 2011b) assumes that every startup evolves through stages of development. In each stage different challenges, milestones, and metrics are paramount. In their analysis of over 650 Internet startups from the Silicon Valley they distinguish between six product-centric stages of development:

1. Discovery,
2. Validation,
3. Efficiency,
4. Scale,
5. Profit maximization,
6. Renewal.

The stages end with thresholds which must be overcome. However, iteration plays a central role, especially in the validation stage and even if time specifications for each stage are made, startups that proceed to the next stage without completing the previous properly, have a higher chance of failure (Marmer et al., 2011). Phase 5 and 6 are not treated in detail by Marmer et al. (2011b) as they represent the phase where a startup has passed the threshold to an established company. Table 7 outlines the startup stages of development according to (Marmer et al., 2011b) along with their purposes, events, key challenges and top competitive advantages.

Stage (cycle time)	Purpose	Events	Top competitive advantage	Key challenges
Discovery (5-7 months)	Startups are focused on validating whether they are solving a meaningful problem and whether anybody would hypothetically be interested in their solution.	Founding team is formed, many customer interviews are conducted, value proposition is found, minimally viable products are created, team joins an accelerator or incubator, Friends and Family financing round, first mentors & advisors come on board.	IP Technology	Customer Acquisition Over Capacity
Validation (3–5 months)	Startups are looking to get early validation that people are interested in their product through the exchange of money or attention.	Refinement of core features, initial user growth, metrics and analytics implementation, seed funding, first key hires, pivots (if necessary), first paying customers, product market fit.	Partners Insider Info	Customer Acquisition Product/ Market Fit Problem Solution Fit
Efficiency (5-6 months)	Startups refine their business model and improve the efficiency of their customer acquisition process. Startups should be able to efficiently acquire customers in order to avoid scaling with a leaky bucket.	Value proposition refined, user experienced overhauled, conversion funnel optimized, viral growth achieved, repeatable sales process and/or scalable customer acquisition channels found.	Traction IP Insider Info	Customer Acquisition Teambuilding Fundraising
Scale (7-9 months)	Startups step on the gas pedal and try to drive growth very aggressively.	Large A Round, massive customer acquisition, back-end scalability improvements, first executive hires, process implementation, establishment of departments.	IP Traction Technology	Customer Acquisition Teambuilding

Table 7 : Startup stages of development according to Marmer et al. (2011)

Kollmann (2016, p. 120 ff.) proposes another similar stage model build along the question of what happens with the business idea over time. He differentiates between three company development stages: the early stage, in which the idea is generated, formulated and implemented, the expansion stage, in which the idea is intensified and the later stage, in which the idea is continued and even diversified.

Each stage is associated with particular characteristics, such as predominant activities and financing instruments (see Table 8). Kollmann (2016) associates the activity of performing CA within the early stage in particular with the formulation of the idea.

Building block	Early stage	Expansion stage	Later stage
Activities	Product / marketing concept Market / competitor analysis Basic development Business concept / business model Company foundation	Market launch Adjustment of the business model Creation of cooperations Establishment of internal processes Use of multipliers	Proven unique selling propositions High market penetration Stable customer relations Integrated controlling High efficiency in core processes Modifications of the business idea
Idea stages	Idea generation Idea formulation Idea implementation	Idea intensification	Idea continuation Idea diversification
Financing instruments	Own funds Public subsidies Venture capital	Venture capital External Financing Public subsidies	Venture capital External Financing IPO

Table 8: Building blocks and development phases for startups, adapted from Kollmann (2016, p. 121)

Even though, there is no consensus among researchers regarding the question what constitutes a stage or how many stages there actually are in stage models, thus, leading to "an illusion of certainty about the path ahead" (Levie & Lichtenstein, 2010, p. 336), it might make sense for the purpose of this work to classify the startups under examination with regard to a life-cycle stage. Since the purpose of this work is not to research the growth of entrepreneurial ventures itself, the classification serves to further narrowing down the object of investigation or rather the targeted users of the artefact. Following the presented life-cycle models the stage of a startup addressed as "early-stage" throughout this work will refer to the period during which a business idea is generated and converted into a viable solution. This includes from a product-centric point of view the stages conception and development (Kazanjian & Drazin, 1989), from a customer development point of view the phases discovery and validation (Blank, 2013; Marmer et al., 2011b) and from an idea stage point of view it covers the idea generation as well as formulation phase (Kollmann, 2016, p. 120 ff.). In that phase validated learning cycles are emphasized on the way to achieve problem/ solution and product/ market fit.

2.4.3 IT-associated entrepreneurship

Since "no single competitive analysis system is universally valid" (Zahra & Chaples, 1993, p. 8), CA needs to be matched with the specific situation of the company. It is, thus, necessary to further narrowing down the research object of this study with regard to the type of startups addressed.

Scholars are especially interested in startups with a technology focus due to the assumed higher impact on the economy. Examined are, for example, high-tech new ventures

(Gimmon & Levie, 2010; Kakati, 2003) or technology-based new ventures (Gao et al., 2010; Kazanjian & Drazin, 1990; Lee et al., 2001). Yet, under those terms a broad variety of industries is subsumed, such as software, biotechnology, and electric or electronic products, pharmaceuticals, industrial machinery, telecommunications, semiconductors and others. Even if all these startups do have the production of a product under uncertainty in common, it is clear is clear, however, that bringing a new software into the market is profoundly different from designing a new drug, e.g. in terms of financial resources, development time or skills needed. Thus, it makes sense to further specify the research object of this thesis.

Within the group of technology-driven startups, startups that are founded in the digital economy take a special position (Kollmann, 2016). As such, Schoss (2013) notes that the four companies that operate the world's most frequently used Internet sites, namely Google, Facebook, YouTube and Yahoo, have generated a combined market value of around 200 billion dollars in the average twelve years of their existence, which is more than the total value of renowned and well-established companies as Allianz, Daimler, Deutsche Bank, Deutsche Lufthansa, Deutsche Telekom and ThyssenKrupp. Kollmann (2016, p. V) also finds that Amazon, as the largest online retailer in Germany, together with the so-called "Digital Big 5" (Apple, Google, Microsoft, Amazon, Facebook), has a much higher market capitalization than all German DAX30 companies combined and that the top 10 Silicon Valley startups have a combined turnover of 588 billion euros, which corresponds to 27% of Germany's gross domestic product.

However, there is again no consensus about a definition of startups in the digital economy. To the contrary, “authors frequently do not define or distinguish among internet business models, e-commerce business models, online business models, internet start-ups, e-start-ups, e-ventures, digital start-ups, IT start-ups” (Steininger, 2018, p. 14). Kollmann (2016, p. 14), for example, defines an "e-venture" as a founded and, thus, young company with an innovative business idea within the digital economy, which offers its products and/or services on the basis of a purely electronic value creation via an electronic platform in data networks, whereby this offer was only made possible by the developments in information technology. Other authors, are specializing their research on software startups (Hilmola et al., 2003; Paternoster et al., 2014; Unterkalmsteiner et al., 2016) proposing that they have distinct features (Giardino et al., 2014) and should be of special interest to researchers.

For the purpose of this study, the classification of Steininger (2018) is consulted, which was developed in a systematic literature review analyzing 292 articles in the realm of information systems, entrepreneurship and general and strategic management. He distinguishes between four definitions of startups relating to the roles, that IT can play in an entrepreneurial venture: (1) IT-facilitated startups, that only use IT as substitute for formerly manually performed activities, which are, however, not related to the main value creating activities, i.e.

related to infrastructure; (2) IT-mediated startups, which use IT not only in their infrastructure but also as customer interface to produce and sell physical goods or services, such as e-commerce startups; (3) IT-bearing startups, that rely on IT-based infrastructure and also sell IT as a final product, as hardware, software or IT services; (4) digital startups use IT an all three layers from infrastructure, and customer interface, to the product itself. The focus of this study will be on It-mediated, IT-bearing and digital startups.

2.4.4 Particularities of competitor analysis in startups

Given the elaborated differences, one can assume that the conditions and particularities for performing CA vary for startups and incumbents respectively. Thus, differences may occur, that discern incumbents from startups with regard to CA activities. To begin with, in startups is usually no dedicated department for performing CA, they have limited connections to trade associations, and very limited lobbying power to change environmental factors (Smeltzer et al., 1988). Furthermore, the reasons why startups perform CA may differ from those of incumbents. As business model creation forms an essential element for the enactment of opportunities, the assessment of viable business models based on actions in the market, and the response to those models, play a crucial role (Ojala, 2016). CA can serve as an effective means for scanning and analyzing market information in a structured way. This market information helps the entrepreneur to develop or validate their business model with regard to its feasibility and identify potential needs for changing strategies (Wirtz, 2018, p. 270 ff.). Startups also need to carry out a CA if they prepare a business plan, which may be necessary, for example, to attract investors or acquire subsidies. A typical structure for a business plan includes an analysis of the competition (see Ripsas & Zumholz, 2011). Other purposes may address the selection of a market entry strategy (Ojala & Tyrväinen, 2006), or finding a position in the market (Byers et al., 2015). Established companies, on the other hand, may be more interested in assessing potential competitor's responses to market actions (Porter, 1980) or evaluating their strengths and weaknesses (Aaker, 2013).

A first indication, which challenges startups may face with regard to CA activities is provided by the discussion of Gruber (2004). The provided arguments can be adapted from the original marketing background to CA as shown in Table 9. Entrepreneurial teams might be unknown in the industry. As such, Ripsas & Zumholz (2011) find that 20% of the founders surveyed have no industry experience. This means that there is a lack of exchange relationships, experience and trust, which could make it difficult to gather information. The CA structure and processes as well as the necessary (industry) experience may also be lacking. In Germany, more than 50% of startups are founded by first-time founders (Kollmann et al., 2018),

for which the experience to carry out a CA may also be limited. Limited financial and personnel resources are an additional challenge in obtaining information. The general uncertainty and turbulence lead to little reliable information, and low predictability, thus, bearing the risk of making wrong decisions.

Characteristics of startups	Challenges for entrepreneurial CA activities
Newness of the firm	Unknown actor among customers and other stakeholders Lack of trust Lack of exchange relationships Lack of CA structures, processes/routines Lack of CA experience
Small size of the firm	Limited financial resources for CA Limited human resources for CA
Uncertainty and turbulence	Low predictability of the competitive environment Little reliable information The competitive structure of the industry is changing, relationships with suppliers, retailers, etc. are unstable. High risk of making the wrong decisions, which could have fatal consequences for a company with very limited resources.

Table 9: Challenges for CA in startups, adapted from Gruber (2004)

Hence, one can argue that the analysis of competitors might have different benefits and, thus, may vary in design at different life-cycle stages of a firm. Therefore, it is reasonable to assume that startups need CA tools, which are tailored to their needs.

2.5 SUMMARY OF KEY FINDINGS

The theoretic rationale of CA can be found in several management and organizational theories. According to open systems theory, an organization's ability to adapt to its environment is crucial for organizational survival and growth (Smeltzer et al., 1988). Thus, organizations need to understand the environments they are facing (Fahey & Christensen, 1986). CA can be an instrument for such an understanding. In a similar way, contingency theory justifies the necessity of conducting a CA as a prerequisite for a fit with the environment. Moreover, contingency theory suggests, that there is no universally appropriate CA method, and given the differences of startups and incumbents, it might be necessary to create a distinct instrument for the CA in startups. Strategy is the binding element between the environment and the company, and is usually formed by an internal and external analysis based on the theoretic rationale of market-based and resource-based view. Any information available thereby reduces uncertainty and the quality of decisions (Kuckertz, 2016). This applies to strategic management as well as marketing decisions.

The value of information, which can be obtained by CA, is highlighted not only in organizational learning theories, but also in the rationale of entrepreneurship itself. For the latter, dispersed information leads to arbitrage or innovation opportunities of entrepreneurship

(Picot et al., 2003, p. 36). Moreover, it is outlined how CA influences a business model development process, and is a mean to position a product or company in the market.

The study is classified as belonging to instrumental level of entrepreneurship research Fallgatter (2002), which deals with the management of startups, and takes into account their contextual peculiarities.

With regard to the object of investigation for this work, early-stage startups (ESS) are defined as:

- "temporary organization[s] in search of a scalable, repeatable, profitable business model" (Blank & Dorf, 2012, p. xvii)
- which are "younger than 10 years and have (or strive for) a significant employee/ sales growth and/or are (highly) innovative in their products/ services, business models and/or technologies" (Kollmann et al., 2018, p. 8)
- and are in the period during which a business idea is generated and converted into a viable solution.

A further delimitation is made with regard to the type of startup considered: The focus of this the will be on It-mediated, IT-bearing and digital startups according to Steininger (2018).

Even though the outlined particularities of CA in startups and the highlighted competitor analysis methods serve as first input for the DSR project, this chapter serves more as a context of the existing body of literature and frame for the thesis, rather than as a knowledge base on which an artefact can be rigorously build. Thus, in the course of this work, more literature will be reviewed.

3 METHODOLOGY

Anyone conducting scientific research is looking for reliable new findings using recognised scientific methods and methodologies based on the current state of research (i.e. existing theories and empirical findings), documents the research process and its results in a comprehensible manner and presents the findings in lectures and publications to the specialist public. Economics, as a scientific discipline, belongs to the social sciences or human sciences and is always based on empirical research. In contrast to non-empirical research, such as philosophy, theology, or language studies, the statements must be verifiable through experience or observable indicators (Döring & Bortz, 2016, p. 4 ff.). Thus, the aim of social science work is to explain and predict social events (Schnell et al., 2013, p. 199). Empirical social research is understood as a set of methods, techniques and instruments for the scientifically correct performance of studies of human behaviour and other social phenomena (Häder, 2015, p. 12). Empirical data are collected and analysed with the use of scientific methods. Empirical data are specifically selected and documented information about the reality of experience with regard to the research problem. They are collected using scientific data collection methods (observation, interview, questionnaire, psychological test, physiological measurement, document analysis) using appropriate standardised or non-standardised survey instruments (observation plan, information guide, questionnaire, measuring instrument, etc.) (Döring & Bortz, 2016, p. 5) and subsequently analysed using scientific data analysis methods (Dieckmann, 2011, p. 187 ff.).

3.1 POTENTIAL METHODOLOGIES

Various research approaches exist within empirical social research. A main distinction is made between quantitative and qualitative research and between basic and applied research (Döring & Bortz, 2016, p. 14 ff).

Quantitative social research is part of the scientific theoretical tradition of the natural sciences. In the course of a sequentially structured research process, it uses quantitative and structured methods of data collection (e.g. standardised questionnaire surveys, psychological test procedures, physiological measurements), from which quantitative or numerical data (measured values) result, which are subjected to statistical methods of data analysis.

Qualitative social research, on the other hand, is part of the scientific theory tradition of the humanities. In the course of a circularly or iteratively structured research process, it uses qualitative i.e. unstructured methods of data collection (e.g. participating field observation, narrative interview), from which qualitative or non-numerical data (i.e. text, image, video material) result, which are subjected to interpretative methods of data analysis.

Nowadays, the benefits of a "mixed methods methodology" are often pointed out, which links quantitative and qualitative research processes and integrates both processes in a complementary way.

Table 10 summarizes the distinguishing characteristics of quantitative and qualitative research.

Question	Quantitative	Qualitative
What is the purpose of a research?	To explain and predict To confirm and validate To test theory	To describe and explain To explore and interpret To build theory
What is the nature of the research process?	Focused Known variables Established guidelines Predetermined methods Somewhat context-free Detached view	Holistic Unknown variables Flexible guidelines Emergent methods Context-bound Personal view
What are the data like, and how are they collected?	Numeric data Representative, large samples Standardized instruments	Textual and/ or image-based data Informative, small sample Loosely structured or non-standardized observations and interviews
How are the data analyzed?	Statistical analysis Stress on objectivity Deductive reasoning	Search for themes and categories Acknowledgement that analysis is subjective and potentially biased Inductive reasoning
How are the findings communicated?	Numbers Statistics, aggregated data Formal voice, scientific style	Words Narratives, individual quotes Personal voice, literary style

Table 10: Distinguishing characteristics of quantitative and qualitative approaches, source: Leedy & Ormrod (2013, p. 96)

In general, a distinction can also be made between basic research and applied research (Bush, 1945). A study that is primarily aimed at contributing to the level of scientific knowledge in a particular research area is called basic research. Research activities include:

- testing an established theory, develop it further, or design a new theory
- confirming or refuting empirical findings.
- Identifying and closing research gaps by investigating previously neglected issues.
- Summarizing the results of different studies on the same research topic into one overall result.
- Developing further already known research methods or proposing innovative qualitative, quantitative or mixed-method methods

On the other hand, the aim of applied science is not to gain general scientific knowledge, but to answer practice-oriented questions. However, applied research is theoretically and methodologically based on basic research.

3.1.1 Data collection

Data collection is an essential part of every empirical study. In a certain period of time numerical and non-numerical data are collected using specific data collection methods (Döring & Bortz, 2016, p. 321). Döring & Bortz (2016, p. 321 ff.) distinguish between the following main data collection methods:

3.1.1.1 Observation

With the use of scientific observation human behaviour, statements, non-verbal reactions, and social characteristics are systematically recorded and documented at the time of their occurrence. Human sensory organs or technical sensors can be used to do so. An observation can be conducted in a non-reactive way, i.e. non-participating and concealed. Thus, natural processes are not interfered with and an external perspective can be adopted. Observation sites, times, objects, and units need to be defined. An observation can be conducted unstructured, semi-structured or structured with regard to the degree of structuring of the observation (Dieckmann, 2011, p. 548 ff.; Döring & Bortz, 2016, p. 323 ff.).

*3.1.1.2 **Survey***

The survey has two forms: oral, i.e. as in an interview and written, i.e. with a questionnaire. Kromrey (2009, p. 364) distinguishes the main survey forms as displayed in Figure 23. In general, a distinction can be made between oral and written surveys. An oral survey is usually referred to as an interview. Here, individual persons or groups can be interviewed. With regard to the standardisation, the survey can be fully structured, minimally structured or semi-structured. A fully structured survey leaves no discretion to the interviewer with regard to the design of their conversations. The questionnaire comprises closed questions and allows only for restricted possible responses. The correct construction of the questionnaire is crucial for the quality of the fully structured survey, because due to the limited freedom of action it is no longer possible to clarify e.g. questions of understanding during the survey itself. In a semi-structured interview, the interviewer follows a predefined guide, usually with open questions. Response options are not provided for the interviewee. This allows the interviewer to ask for more detailed information and in-depth understanding of specific subjects. Individual adaptions are possible. Unstructured interviews follow no questionnaire, use only keywords and topics as guide, and are comprised of open questions only (Atteslander, 2010, p. 131 ff.; Döring & Bortz, 2016, p. 358 ff.; Kromrey, 2009, p. 363 ff.).

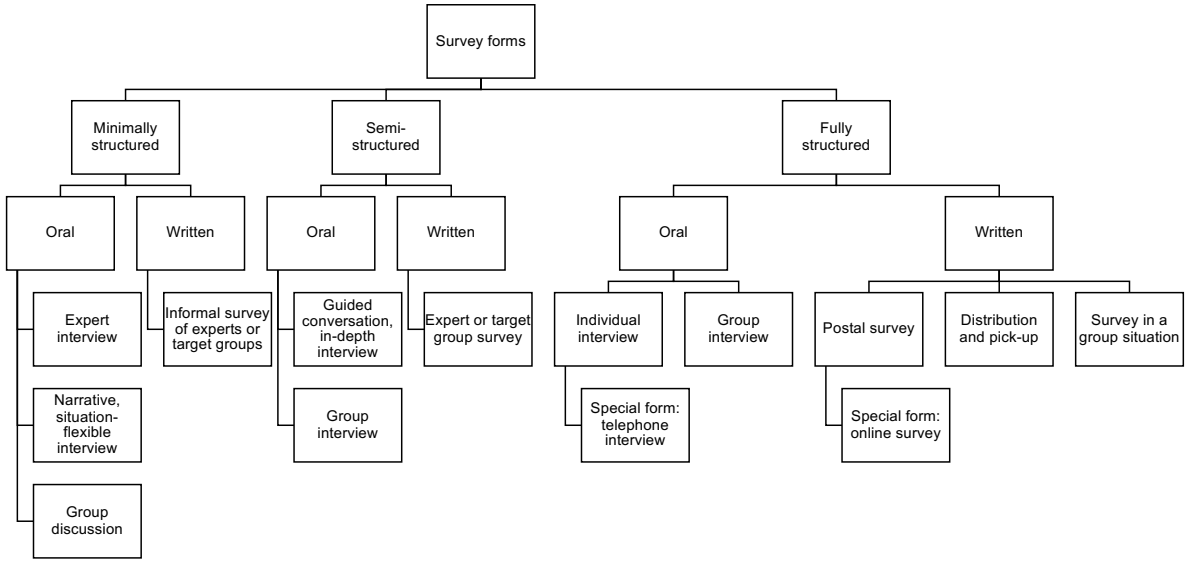


Figure 23: Survey forms, source: Kromrey (2009, p. 364)

3.1.1.3 Physiological measurements

Physiological measurements record and quantify the data of physiological processes in different organ systems of the body (physiological indicators or bio-signals, such as heart rate) in an objective way with the use of appropriate measuring devices. These can be linked to characteristics of behaviour and experience in a time-based way (Döring & Bortz, 2016, p. 499 ff.).

3.1.1.4 Document analysis (also named content analysis)

Another scientific data collection method is document analysis. Within document analysis documents, that are produced independently of and uninfluenced by the research process are collected and archived in a targeted and systematic way. Human experience and behaviour are manifested in personal or official documents, that can formally be textual or non-textual (Dieckmann, 2011, p. 576 ff.; Döring & Bortz, 2016, p. 533 ff.).

3.1.2 **Data analysis**

Before the data can be analysed it needs to be prepared. Data preparation activities prepare the data for the analysis and seek to increase the informative value, (re)usability and quality of the data. Data preparation includes above all (Döring & Bortz, 2016, p. 579 ff.):

- the creation of structured data sets from the raw data material, e.g. digitalisation of data, such as transcription of interviews, or formatting activities,
- commenting, e.g. addition of meta-information and obtaining data protection agreements,
- anonymisation,

- data cleansing, e.g. removal of unimportant information, error identification and correction, and
- data transformation, e.g. summarizing or weighting of data points.

On the basis of the prepared data, a proper analysis can be carried out. The aim of data analysis is to answer the formulated research questions systematically and comprehensibly, test hypotheses or formulate new ones. Depending on the type of data available, i.e. numerical or non-numerical data, the different data analysis methods exist, that can also be applied complementary (mixed-methods-approach)(Döring & Bortz, 2016, p. 597 ff.).

3.1.2.1 Qualitative data analysis

Qualitative data analysis evaluates non-numerical data. (Döring & Bortz, 2016, p. 601) distinguish between four general methods that can be used relatively broadly for different qualitative data material and for different content-related questions: objective hermeneutics, documentary method, qualitative content analysis, and grounded theory methodology.

Objective hermeneutics examines the latent objective meaning structure in contrast to the subjective experience. It is based essentially on the works of Ulrich Oevermann (Oevermann, 2001; Oevermann et al., 1979). [6]

The documentary method is based on the assumption that social aspects are understood neither as objective nor as subjective phenomena, but as results of constructions of meaning and of collective actions. The method to the qualitative material first a so-called formulating interpretation, then a reflective interpretation, and finally a case overlapping comparative analysis and type formation is performed (Döring & Bortz, 2016, p. 602 f.)

Qualitative content analysis is a targeted, systematic and rule-based evaluation of documents. In most cases, the interpretative evaluation of documents is based on a systematic process of coding, in which the material is segmented into small analysis units and the individual text passages are then assigned codes or categories which assign meanings to the respective text passage. Thereby, mainly data-driven induction is used - but also theory-based deductive - coding to identify the meanings of documents. It can be applied to all types of found (as well as research-generated) documents (Döring & Bortz, 2016, p. 541 ff.). Renowned qualitative content analyses approaches are established by Phillip Mayring (1995, 2015; 2010). The summarizing qualitative content analysis aims to reduce more or less extensive data material until a manageable short text is created. The explicit qualitative content analysis aims to make unclear text passages understandable or explain them (explication) by considering the direct text environment (narrow context analysis) as well as additional material that goes beyond the

[6] For an overview of the objective hermeneutics method see Reichertz (1995)

text (wide context analysis). While the summary content analysis reduces the source material, it is expanded in places in the course of an explicative content analysis. This is because the text passages considered are supplemented by context information from which explicatory paraphrases are derived. In the structuring qualitative content analysis, a previously defined category system is applied to the text.

The grounded theory method developed in sociology in the 1960s is by far the most popular in the field of qualitative data analysis. It represents a research strategy in its own right, goes beyond a qualitative data evaluation method and provides guidelines for the design of the entire research process (Döring & Bortz, 2016, p. 603). The method is based on the seminal works of Glaser & Strauss (1967) and has been further developed since then (Corbin & Strauss, 1990; Strauss, 1987; Strauss & Corbin, 1990). The method is based on the basic principle of theoretical sampling and is therefore subject to a constant process of data collection and evaluation (Przyborski & Wohlrab-Sahr, 2014, p. 200). Within theoretical sampling the case selection is deliberately controlled in a step by step way, so that a maximum theoretical knowledge value results. Data collection, evaluation, and sample selection are performed in a circular manner: Based on the results of the study to date, it is decided which further cases in terms of persons, groups, institutions, or events, are to be included next. The inclusion criteria can differ and change over time. In the ideal case, sampling is completed when further cases do not promise any new information content for theory formation (theoretical saturation). The underlying coding method is the method of constant comparison with the techniques of open coding, axial coding, i.e. linking the categories of open coding to main categories, and selective coding, i.e. development of core categories from the main categories of axial coding. Memo writing is also a key principle (Döring & Bortz, 2016, pp. 302, 546; Przyborski & Wohlrab-Sahr, 2014, p. 199 ff.). The Grounded Theory methodology provides a research strategy explicitly dedicated to the development of new theories (Döring & Bortz, 2016, p. 172).

However, there exist more content analysis approaches in the literature, for example Gläser & Laudel (2010). Kuckartz (2018, p. 26) summarizes the five characteristics of qualitative data analysis as follows:

- The category-based approach and centrality of categories for analysis
- The systematic approach with clearly defined rules for the individual steps
- The classification and categorization of all data and not just part of it
- the reflection inspired by hermeneutics on the data and the interactive form of their creation
- The recognition of quality criteria, the pursuit of the conformity of coders

Qualitative data analysis can be supported by the use of qualitative data analysis software (Kuckartz, 2010, 2018). Popular programs are MaxQDA and Atlas.ti. The latter will be used for the analysis within this thesis.

3.1.2.2 Quantitative data analysis

Quantitative data analysis is used for the analysis of numerical data. In general, a distinction can be made between descriptive and inference statistic. Sample characteristics are used to describe the data, such as median value, arithmetic mean, standard deviation, correlations and/ or frequencies and can be presented in tables and graphs. The inferential statistics conclude on population effects on the basis of random sample data and estimate population parameters (Döring & Bortz, 2016, p. 613).

3.1.3 **Research strategies**

A research strategy is a plan to conduct a research study (Johannesson & Perjons, 2014) and indicates how different scientific data collection and data analysis methods are to be integrated and what has to be taken into account in the course of the research process in order to ensure scientific rigour and high significance (Döring & Bortz, 2016, p. 9). Commonly used empirical research strategies are:

- Experiments
- Surveys
- Case studies
- Ethnography
- Grounded theory
- Action research
- Phenomenology
- Simulation
- Mathematical and logical proof

3.2 DESIGN SCIENCE RESEARCH

Choosing an appropriate research method was not easy since the goals of this research do not necessarily follow mainstream management or entrepreneurship research directions. (Blake, 1978, p. 3) defines research, both basic and applied, as a "systematic, intensive study directed toward fuller scientific knowledge of the subject studied." As already addressed above, traditional economic research as a basic research discipline pursues a core mission of understanding, describing, explaining, and possibly predicting the natural or social world (van Aken,

2005). However, with regard to the research question and goals of this study to support ESS in conducting a viable CA, this study is not content with understanding the problems of conducting CA in startups but is seeking to develop an artefact that meets the identified need. Thus, a design science approach is chosen to connect the retrospective and prospective perspective of research (Romme & Reymen, 2018) while turning the definition of and the way to solve a particular problem into an object of research (Dimov, 2016). A such, this design science project stands in line with recent entrepreneurship research at the design-science interface, such as the well-known Business Model Canvas (Osterwalder, 2004) or university spin-off creation guidelines (van Burg et al., 2008). Another benefit of applying a design science approach lies in reducing the gap between theory and practice, not by sacrificing rigor for the benefit of professional relevance, but by balancing them towards complementary, symbiotic activities (Dimov, 2016). This is achieved, by making the method a unit of analysis and evaluating research outcomes in a real organizational context (Arnott, 2006). By choosing to do research at the interface of design and science in the entrepreneurship field, this thesis also addresses the limited academic-practitioner knowledge transfer (Hughes et al., 2011) and the prevalent loose connection of experiential and academic knowledge (Romme, 2016), thus, mitigating "the relevance problem of academic management research" (van Aken, 2004, p. 241) . The paramount motivation is to do "work that matters" (Bell, 2009, p. 96), or at least has the potential to matter, and has a positive impact on the lives of entrepreneurs, their mentors, investors, coaches and other stakeholders involved. In that matter, Dimov (2016) proposes three meta-categories of design problems as pertaining to the entrepreneurial space: market desirability, operational or technical feasibility, and financial viability (see Figure 24).

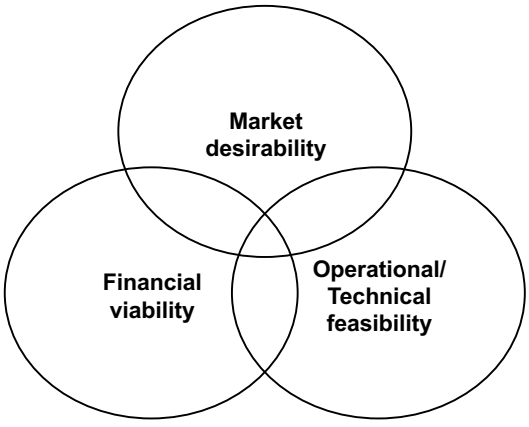


Figure 24: Archetypal design problems in entrepreneurship, source: Dimov (2016)

He derives specific research questions with regard to what to do in order to successfully realize a business idea: "1. What shall one do to establish market desirability? 2. What shall one do to establish operational/technical feasibility? 3. What shall one do to establish financial viability? 4. How (in what order) should the above design sub-problems be tackled" (Dimov,

2016, p. 21). CA as an input for strategy formulation, can support finding viable answers for these questions and is, thus, placed at the intersection of these design problems.

3.2.1 Philosophical underpinnings

Since design research is a young field in entrepreneurship literature (Dimov, 2016; Romme & Reymen, 2018), and the experienced scepticism about its academic nature is accordingly often high, I will briefly justify the classification of design research as science. For this, I will shortly discuss the philosophical underpinnings of design research (Döring & Bortz, 2016, p. 12). Dealing with the issue of philosophical underpinnings seems far-fetched, since the basic assumptions about reality, knowledge and value are implicit most of the time for most people, including researchers. However, since design science in entrepreneurship is a rather new field to operate in, it seems reasonable to clarify the classification of the study (Vaishnavi & Kuechler, 2004). The philosophy of science is the foundation of empirical-scientific work and deals with the cognitive process. To some extent, philosophy of science is normative and uses philosophical arguments to define how science should be conducted in order to provide valid insights. The major research paradigms, which are basic belief systems based on ontological, epistemological and methodological assumptions, prevalent in natural and social sciences are discussed by (Guba & Lincoln, 1994). Gregg et al. (2001) add another paradigm to research called 'socio-technologist/ developmentalist'. Complementing these or 'design' by Vaishnavi & Kuechler (2004). Table 11 summarizes these major research paradigms based on Gregg et al. (2001), Guba & Lincoln (1994) and Vaishnavi & Kuechler (2004).

	Research Paradigm		
Basic beliefs	**Positivist/ postpositivist**	**Interpretive/ constructivist**	**Socio-technologist/ developmentalist**
Ontology What is the nature of reality?	One reality; knowable with probability	Multiple socially constructed realities	Known context with multiple socially and technologically created realities
Epistemology What is the nature of knowledge?	Objectivity is important; researcher manipulates and observes in dispassionate, objective manner	Interactive link between researcher and participant; values are made explicit; created findings	Objective/interactive; Researcher creates the context and incorporates values that are deemed important; iterative development reveals meaning
Methodology What is the approach for obtaining the desired knowledge and understanding?	Quantitative (primarily); interventionist; decontextualized	Qualitative (primarily); hermeneutical; dialectical; contextual factors are described	Developmental (primarily); focus on technological augmentations to social and individual factors
Axiology What is value?	Truth: universal and beautiful; prediction	Understanding: situated and description	Control; creation; progress (i.e. improvement); understanding

Table 11: Major research paradigms, based on Vaishnavi & Kuechler (2004)

Gregg et al. (2001) argue that these three paradigms are indeed intertwined. Within the Interpretive/Constructivist paradigm the researcher gains familiarity with a new field, observes relationships, and identifies needs. New concepts are generated that feed the other two paradigms. The Positivist/Postpositivist paradigm supports dispassionate and objective evaluation of dependencies and relationships. The Socio-technologist/Developmentalist or Design paradigm allows the creation of new systems which then needs to be scientifically (within the other paradigms) for intended (and unintended) impacts.

In epistemology, three central paths of scientific reasoning (logic) between data and theories to gain knowledge are distinguished: induction, deduction and abduction (Döring & Bortz, 2016, p. 35):

Induction is a conclusion from the special to the general. Today, induction is mainly established in the qualitative paradigm of empirical social research.

Deduction is a conclusion from the general to the specific. In deductive reasoning, the cognitive process begins with a theory from which empirically verifiable hypotheses are derived and, in the case of their refutation on the basis of data, the theory is criticized or, in the case of their non-refutation, the theory is regarded as provisionally confirmed. The so-called deductive-nomological explanation model serves to test theory in the quantitative paradigm of empirical social research.

In abduction, as in induction, the cognitive process begins with the data, but unlike induction, the patterns recognizable in the data are not systematically worked out step by step, but rather the incomprehensible combinations of characteristics are considered and a new explanatory hypothesis is formed by a sudden mental leap. Abduction is therefore a creative process of generating new hypotheses from data, whereby the intellectual attitude of the researchers is decisive (for introduction to abduction, see Reichertz (2003).

The overall reasoning of the design paradigm thus follows the abduction logic (Dorst, 2011). However, as outlined above the research process might include quantitative and qualitative elements that rely on inductive and deductive reasoning.

3.2.2 Fundamentals of design science research

Design activities are central to most applied disciplines and have a long history in many research fields including building, engineering, and material science (Hevner & Chatterjee, 2010, p. 9). However, the discussion regarding the relationship between design and science reaches back to the 1920s (Cross, 2001). Rooting in the sciences of the artificial (Simon, 1996) design science "refers to an explicitly organised, rational and wholly systematic approach to design" (Cross, 2001, p. 51). Especially for the computing and information technology field design science research is highly relevant since it is composed of inherently mutable and adaptable hardware, software, and human interfaces (Hevner & Chatterjee, 2010).

Hevner & Chatterjee (2010, p. 5) define design science research as "a research paradigm in which a designer answers questions relevant to human problems via the creation of innovative artifacts, thereby contributing new knowledge to the body of scientific evidence. The designed artifacts are both useful and fundamental in understanding that problem."

The contributed knowledge does not only include the novel artefact itself, "but also knowledge about them, their use, and their environment" (Johannesson & Perjons, 2014, p. 1). In supplement to empirical research, design research is not content to describe, explain, and predict. "It also wants to change the world, to improve it, and to create new worlds. Design research does this by developing artefacts that can help people fulfil their needs, overcome their problems, and grasp new opportunities" (Johannesson & Perjons, 2014, p. 1).

3.2.2.1 The design science research framework

Such artefacts are not created independent of natural laws or behavioural theories. To the contrary, the design process as well as the design product must be based on kernel theories (Walls et al., 1992). Thus, the artefact's creation relies on these existing kernel theories "that are applied, tested, modified, and extended through the experience, creativity, intuition, and

problem solving capabilities of the researcher" (Hevner et al., 2004, p. 76). To explicate this prerequisite Hevner et al. (2004) propose a research framework (originally constructed for the field of information systems) in their seminal paper that integrates the behavioural science and design science paradigms and shows their complementary nature.

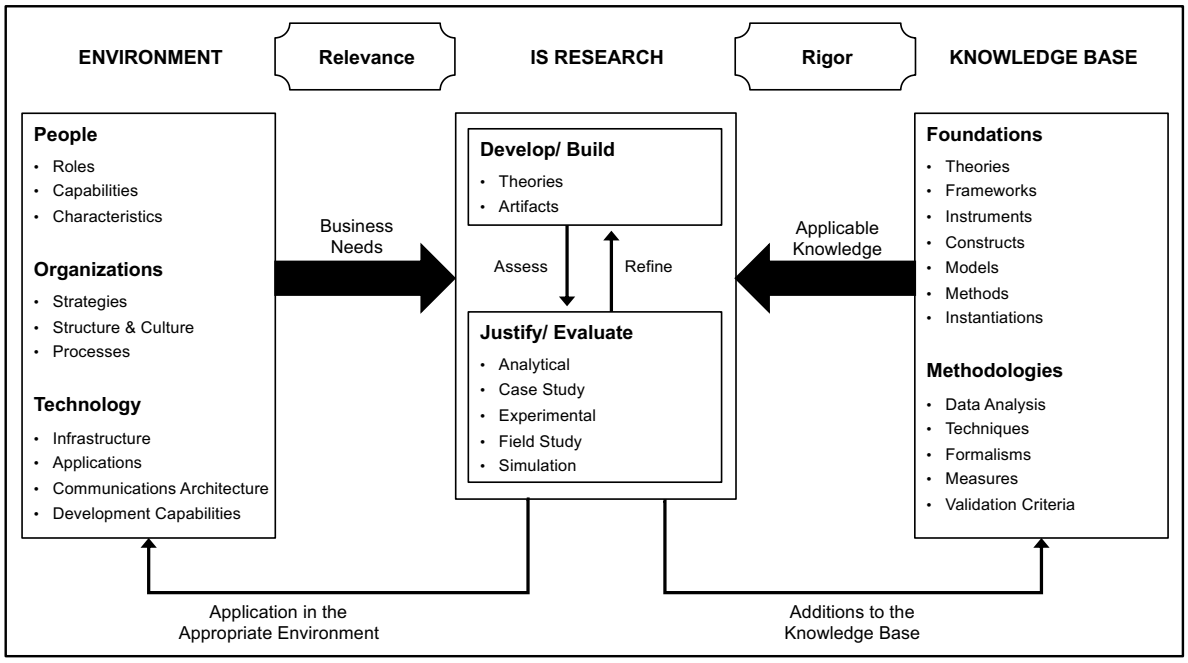


Figure 25: Design science research framework, source: Hevner et al. (2004, p. 80)

In this framework (see Figure 25) three design science research cycles are inherent: the relevance cycle, the design cycle, and the rigor cycle (Hevner, 2007; Hevner et al., 2004). The relevance cycle connects the research project with the contextual environment and ensures that the developed artefact improves it. Thus, it defines the problem space as well as the evaluation context. It consists of people, and organizational and technical systems. Relevance is assured by addressing business needs defined by goals, tasks, problems, and opportunities perceived by people within the organizational context and positioned relative to the existing technology. At the heart of the design science research project is the design cycle. Alternative designs are iteratively generated, evaluated and refined until a satisfactory artefact is achieved. The rigor cycle ensures that the artefact is designed upon the state-of-the-art knowledge within a specific research field and through the use of scientific theories and methods. Rigor is achieved by the appropriate application of existing foundations and methodologies.

Due to a by now extensive literature on the analysis of design science in the information systems field (see for example Iivari, 2007), design science research might be seen as an "equal companion" (Hevner, 2007, p. 87) to natural sciences there. However, in the management and entrepreneurship field design science research is still an uncommon and a rather unexplored research method (Dimov, 2016; Romme, 2016; Romme & Reymen, 2018). However, scholars

call for researching the "how" rather than the "why" and "what" of entrepreneurship (Stevenson & Jarillo, 1990, p. 21) and that this knowledge needs to be complementary in order to bridge the relevance gap of entrepreneurship research (Van Burg & Romme, 2014).

3.2.2.2 Design science research contributions

A design science research (DSR) project may have different types of knowledge contribution depending on the nature of the designed artefact (Gregor & Hevner, 2013). The knowledge contribution can be positioned along two dimensions: solution majority and application domain maturity. Figure 26 displays the four research contributions along these two dimensions as proposed by Gregor & Hevner (2013, p. 345), i.e. improvement, invention, routine design and exaptation. Apart from the research design, which applies known solutions to known problems, all other contribution forms provide a clear research opportunity and knowledge contribution.

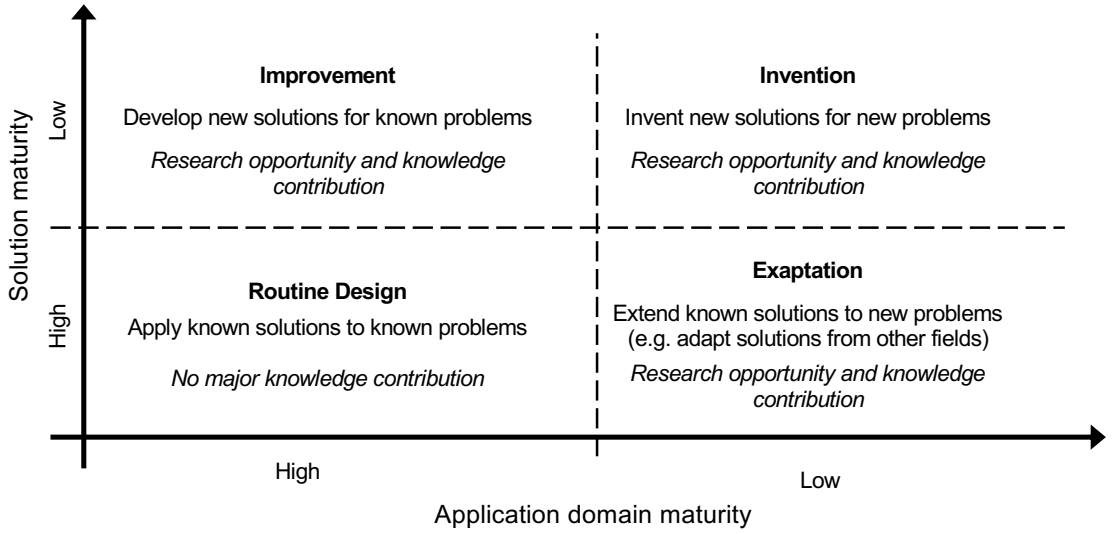


Figure 26: Design science research contribution framework, source: Gregor & Hevner (2013, p. 345)

The research outputs of DSR projects are artefacts. Artefacts can be defined as "an object made by humans with the intention to be used for addressing a practical problem" (Johannesson & Perjons, 2014, p. 7). In a widely accepted paper by March & Smith (1995) these artefacts are classified as (see also Johannesson & Perjons, 2014, p. 29):

- Construct: terms, notations, definitions, and concepts that are needed for formulating problems and their possible solutions.
- Model: a set of propositions or statements expressing relationships among constructs that can represent possible solutions to practical problems.
- Method: formalized or informal set of steps used to perform a task, i.e. guideline and process definitions. Methods also comprise what Vincenti (1993, p. 219 f.) refers to as

design instrumentalities. These include "procedures, ways of thinking, and judgment skills". Examples for methods or design instrumentalities of interest in an entrepreneurial context are building a minimum viable product, gathering customer feedback, running small product trials, building a financial model, resource planning, assessing total market size, or conducting a good business plan (Dimov, 2016).

- Instantiation: working system that can be used in practice. Instantiations can operationalize constructs, models, and methods or precede them.

Moreover, several authors propose to add design theory as a research output (Gregor, 2006; Gregor & Hevner, 2013; Gregor & Jones, 2007) that are in contrast to instantiations abstract instead of material artefacts.

Iivari (2007) proposes a function-oriented classification of artefacts differentiating between seven archetypes in terms of the role they play for their users (Table 12).

Role/ function	**Archetype**	**Examples**
To automate	Processor	Many embedded systems, many transaction processing systems
To augment	Tool	Many personal productivity systems, computer aided design, word processors, spreadsheets
To mediate	Medium	E-mail, instant messaging, chat rooms, blogs, electronic storage systems, social software
To inform	Information source	Information systems
To entertain	Game	Computer games, edutainment
To artisticize	Piece of Art	Compute art
To accompany	Pet	Digital (virtual and robotic) pets

Table 12: Archetypes of artefact functions, adapted from Iivari (2007) and Johannesson & Perjons (2014)

The classification of the knowledge contribution of this thesis will be discussed in chapter five.

3.2.2.3 The design science research process

With regard to an optimal structure for a DSR project different research methodologies exist to produce and present DSR (Johannesson & Perjons, 2014; Peffers et al., 2007), as well as a specific design science approach based on action research, namely Action Design Research proposed by Sein et al. (2011).

For entrepreneurship research at the interface of design and science (Romme & Reymen, 2018) propose a research framework, that includes design (creating, evaluating) and validation (justifying, theorizing) activities, that serves to address both rigor and relevance (see Figure 27).

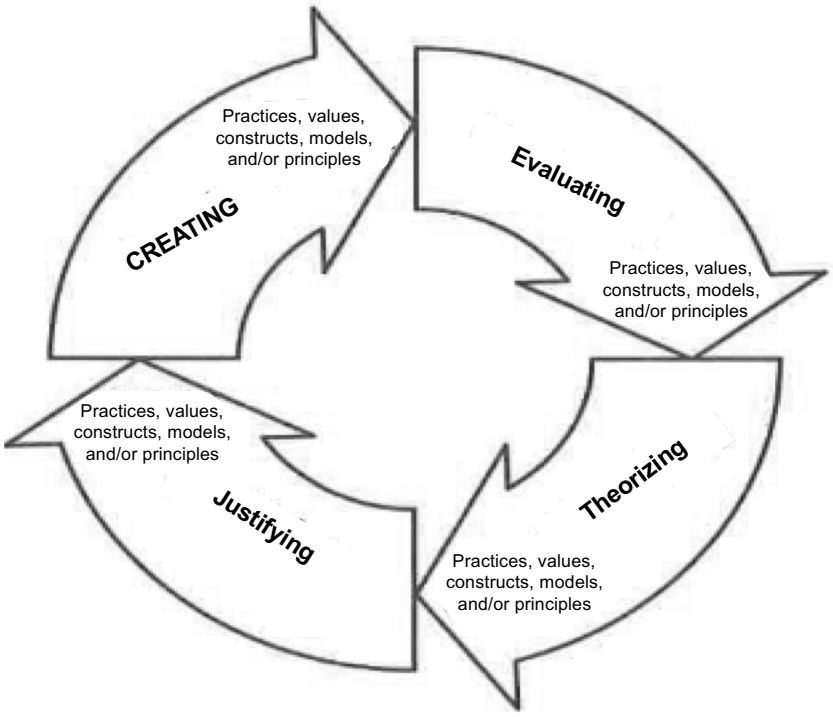


Figure 27: Inclusive framework for entrepreneurship research as design science, source Romme & Reymen (2018, p. 6)

However, even though this framework might be a novelty to entrepreneurship literature and is highly valuable for promoting the necessity and importance of design science for entrepreneurship research further, it lacks the necessary level of detail with regard to the research activities and process steps that the frameworks from the information system research already possess. Therefore, for the further proceeding of this project a more elaborated framework will be used. The action research based framework by (Sein et al., 2011) seems an appropriate choice, since it seeks to overcome the sequencing of building and evaluating by putting the organizational intervention at its core and by combining theory generation with researcher intervention. However, given this research project's main context and setting within the HPI business plan competition (see chapter 4.1.2.2) and its personnel capacity it is not feasible to conduct this research as action design research.

Therefore, another, no less suitable approach is selected. A commonly accepted, well elaborated framework is proposed by (Peffers et al., 2007). The process model includes six activities: problem identification and motivation; definition of the objectives for a solution, design and development; demonstration; evaluation; and communication (see Figure 28).

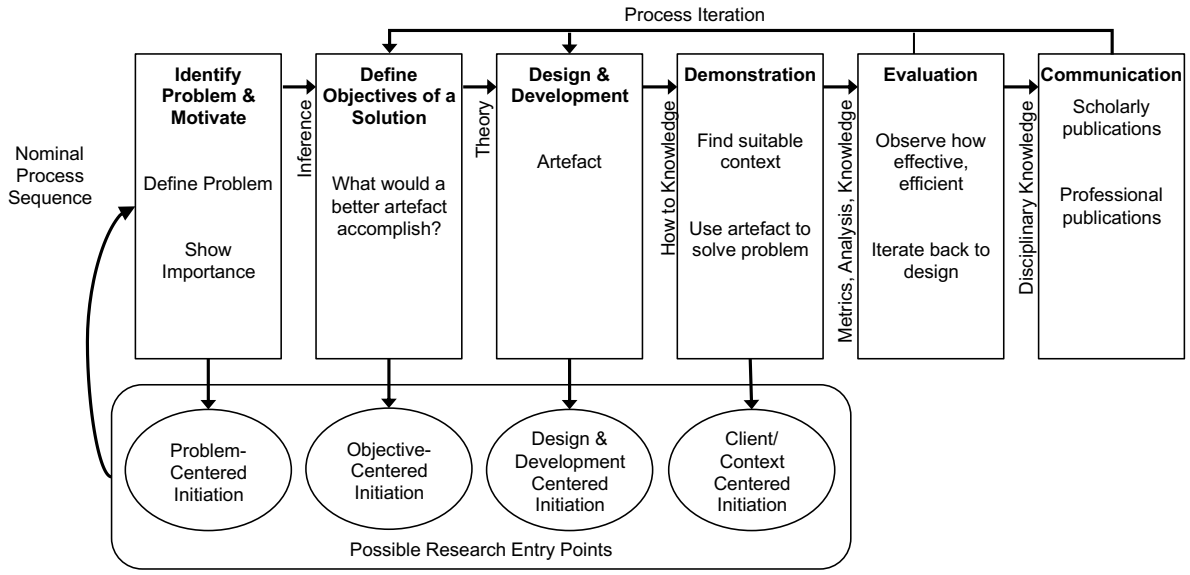


Figure 28: Design science research methodology process model, source: Peffers et al. (2007)

3.2.3 The selected research process

Since the proposed model by Peffers et al. (2007, p. 73) is only a "general methodological guideline for effective DS research" it needs to be adapted to the specific DSR project. Figure 29 gives an overview about the DSR project of this work based on the proposed model by Peffers et al. (2007) and Johannesson & Perjons (2014). The research process covers six activities. First, the problem is specified, and a knowledge base created. Next, the requirements are determined, and the artefact is created accordingly. In an iterative process of design, demonstration and evaluation the artefact is developed in four versions, namely Alpha, Beta, Gamma and Delta version. Thereby, new insights from reflection and learning (Sein et al., 2011) of evaluation activities as well as the created (and if needed enhanced) knowledge base are used to develop the next version of the artefact. Communication is an accompanying activity that is used as evaluation support in every process step. No research strategy or method is excluded in advance, since different research activities can be valuable depending on the goals or characteristics of the particular DSR activity (Johannesson & Perjons, 2014, p. 77).

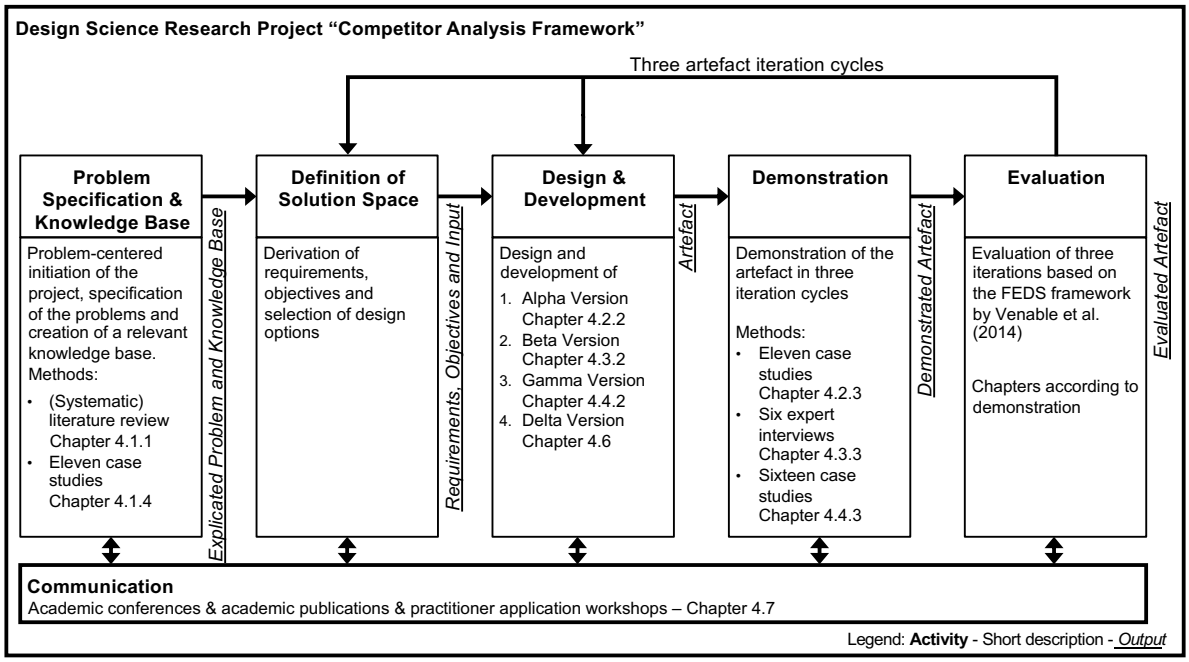


Figure 29: Design science research project "Competitor Analysis Framework"

In their seminal paper Hevner et al. (2004) define seven guidelines to conduct and evaluate good design science research. The design research must produce an artefact (Guideline 1). The produced Competitor Analysis Framework represents such an artefact which can be classified as a design instrument (Vincenti, 1993), method (March & Smith, 1995) or tool (Iivari, 2007). The problem relevance and importance (Guideline 2) will be rigorously elaborated through (systematic) literature analysis and case studies. The evaluation of the artefact is carried out along scientifically recognised methods and standards with regard to the derived requirements (Guideline 3). Clear research contributions can be highlighted (Guideline 4), including theoretical and practical implications and will be discussed in detail in chapter 5.2 and 5.3. These include the solution approach to an existing problem, the creation of an environment analysis tool, the creation of a knowledge base on the CA phenomenon in general and for startups in particular, the enrichment of methodological knowledge through the application of DSR in the entrepreneurship context and the support of startups and other stakeholders in the startup ecosystem through the improvement of CA quality, CA effort, effectiveness and productivity. The research rigor (Guideline 5) is ensured by the rigorous selection and application of scientific methods to reach an understanding of the problem and build the knowledge base, as well as to develop and evaluate the artefact. Guideline 6 is taken into account insofar as the design process extends over multiple iterations and further development is only interrupted at a point in time at which no further relevant improvement can be expected from renewed data collection and theoretical saturation has been reached (Glaser & Strauss, 1967). In the design process, the restrictions of the environment, specifically the particularities of startups such as

their resource limitations and their special requirements for CA, are considered. An artefact is created based on and built upon the derived knowledge base. Guideline 7 refers to the necessary communication of research. For this purpose, the research results, but also interim results, are presented at academic conferences and dicussed with relevant stakeholders and users, whereby the focus lies on management-oriented audiences.

Table 13 summarizes the proposed guidelines and their implementation in the context of this work.

Guideline	Guideline and Description	Implementation
Guideline 1: Design as an Artefact	Design science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation.	A method in the form of a framework is produced, that has the function of a tool (see chapter 4.2.1.1)
Guideline 2: Problem Relevance	The objective of design science research is to develop technology-based solutions to important and relevant business problems.	The relevance and importance of CA for startups is derived theoretically (see chapter 2 and 4.1.1) as well as through case studies (see chapter 4.1.2)
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods.	The evaluation will be performed following the FEDS framework (see chapter 4.2.3.1) along the derived requirements.
Guideline 4: Research Contributions	Effective design science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies.	The theoretical and practical contributions of this DSR project are outlined in chapter 5.2 and 5.3.
Guideline 5: Research Rigor	Design science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.	The methods used to understand the problem, developing and evaluating the artefact are chosen and applied in a rigorous way according to scientific principles.
Guideline 6: Design as a Search Process	The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.	The design of the artefact is based on and builds upon the current state of knowledge, taking into account the specific characteristics and requirements of startups with respect to CA. The DSR process is iterative, extends over three iterations and is only stopped when no further relevant improvement is to be expected from renewed data collection.
Guideline 7: Communication of Research	Design science research must be presented effectively to both technology-oriented and management-oriented audiences.	The research results, as well as interim results, are presented at academic conferences and to relevant stakeholders and users, whereby the audience addressed in the present case is primarily management-oriented, since the implementation was not IT, but a pen- and paper-based solution.

Table 13: Design science research guidelines and their implementation

The further structure of the work will follow the six DSR project activities based on Peffers et al. (2007) and are explained in detail in the following chapters.

4 APPLICATION AND RESULTS

4.1 PROBLEM SPECIFICATION AND KNOWLEDGE BASE

From the possible four research entry points identified by Peffers et al. (2007), namely problem-centered initiation, objective-centered initiation, a design- and development-centered initiation, and a client-/context-centered initiation, the research entry point of this DSR project is problem-centered as outlined in the introduction (see chapter 1). To position the research in the current literature, frame the thesis and define the terminologies a general literature review was conducted at the beginning of the thesis (see chapter 2).

A DSR project, however, needs to build upon an existing knowledge base in a rigorous way (Hevner et al., 2004). The existing knowledge base must be used for the construction and evaluation of the artefact and serves as the basis to build new knowledge upon (Baskerville et al., 2018; Gregor & Hevner, 2013). This process also ensures the balance of rigor of the research (Dimov, 2016; Hevner et al., 2004). The objectives of the solution should be inferred "from the problem definition and knowledge of what is possible and feasible" (Peffers et al., 2007, p. 55). Required resources for the definition of objectives for a solution are "knowledge of the state of problems and current solutions, if any, and their efficacy" (Peffers et al., 2007, p. 55).

For the first iteration cycle three research activities are therefore necessary:

(1) A systematic literature review (SLR) on CA to set the knowledge base on which the artefact is developed and evaluated
(2) A review of textbooks to supplement the SLR with regard to CA methods. Due to the fact that the SLR includes only journal articles, but CA knowledge in particular with regard to CA methods might be embedded in textbooks, an extended literature review with regard to CA methods is used to complement the solution space.
(3) To understand the problem further, validate the author's first impression, and consider the founders' point of view, i.e. the artefacts future users' point of view, case studies are conducted. Thus, a problem space is defined further in order to pursue the DSR project's goal to develop an artefact to support entrepreneurs to perform a viable CA taking into account their perceived problems, given resources and other limitations.

4.1.1 Status quo in competitor analysis

A systematic literature review (SLR) is chosen as a rigorous method for the derivation of a knowledge base to construct a design science artefact based on the "review and synthesis of prior research findings" (Dimov, 2016, p. 25) as it is a suitable method to summarize and

categorize knowledge (Fisch & Block, 2018), thus, providing a comprehensive review of the field of CA. The aim is to comprehensively review the field of CA in the current body of research with a special focus on startup relevant literature. Having in mind the aim of laying the fundament to design an artefact that supports CA in startups, five research questions are derived: *What is the scientific state of the art with respect to CA processes and methods? (RQ1)* Because "no single competitive analysis system is universally valid" (Zahra & Chaples, 1993, p. 8), CA needs to be matched with specific situations of the industry and the company. Hence, of special interest is the question: *Which purposes for conducting CA are mentioned in the literature? (RQ2)* To ensure the quality of the artefact to be developed, it is also necessary to know what constitutes or influences the quality of a certain CA method or process. Hence, the question *Which quality criteria for conducting CA are mentioned in the literature? (RQ3)* is explored. As the artefact to be designed is for ESS, a fourth research question is: *Are there CA approaches that are specific and relevant for startups? (RQ4)* The fifth research question aims at concluding upon the review in a comprehensive overview of the field: *How can the different aspects appearing in the CA literature be compiled into an integrated framework? (RQ5)*[7]

4.1.1.1 Systematic literature review methodology

This study is performed as an SLR according to Kitchenham & Charters (2007) and Kitchenham et al. (2009). Based on the taxonomy of Cooper (1988) this SLR is organized conceptually, with representative coverage and focus on research outcomes. It addresses the general scholar as its audience and takes a neutral representation perspective.

To begin with, the keywords of the SLR are conceptualized based on the core concepts occurring in the research questions (see Table 14). In order to cover a wide range of potentially relevant terms, an additional synonym search for the core con- cepts is performed using a thesaurus to complement the keywords.

Core Concepts	**Keywords**
Competition	Compet*, Rival
Analysis	Analy*, Synthesis, Evaluation, Intelligence, Assessment, Mapping
Process/ Method	Process*, Step*, Guide, Procedure, Technique, Framework, Model, Method, Principal, Rule, Review
Quality	Validity, Factor*, Element*, Component*, Criteria, Evaluation, Test*, Approach
Objective	Objective, Reason, Purpose, Goal, Target, Aim

Table 14: Core concepts of the research questions and derived keywords for search query

On this basis, the following combination of keywords in the article's title, abstract, keywords, or subject term is used:

[7] Main parts of this SLR are copied from Hatzijordanou et al. (2019).

Any of the words competition, competitor, competition, rival, competitive, competitive landscape, competitive environment, AND analysis, analyses, synthesis, assessment, evaluation, intelligence AND process*, step*, guide, procedure, technique, framework, model, method, principal, rule, review OR validity, factor*, element*, component*, criteria, quality, evaluation, test* OR objective, reason, purpose, goal, target, aim (see Table 15 for the search formula).

Query
FIND (competitor OR competition OR rival OR competitive OR competitive landscape OR competitive environment) AND (analysis OR analyses OR synthesis OR assessment OR evaluation OR intelligence) AND ((process* OR step* OR guide OR procedure OR technique OR framework OR model OR method OR principal OR rule OR review) OR (Validity OR factor* OR element* OR component* OR criteria OR quality OR evaluation OR test*) OR (Objective OR reason OR purpose OR goal OR target OR aim)) IN (Abstract OR Title OR Subject OR Keywords)

Table 15: Search query (for database Scopus)

The journals were selected according to the internationally recognized German VHB-JOURQUAL 3 ranking by the German Academic Association for Business Research. This ranking is published by the association of business professors from German-speaking countries (Germany, Austria, Switzerland, Liechtenstein). Identified relevant research areas cover the following categories: Business Economics, Entrepreneurship, Marketing, and Strategic Management. For the initial search query only A+, A, and B rated journals, according to VHB JOURQUAL 3 are selected. The search was not limited to a specific date range in order to avoid a too narrow result in the initial search and given the fact that the already known controbutions of Porter in this field were published in the 1980s. Hence, the initial search query covers 43 academic journals published until March 2017.

The SLR is initiated by applying a composed search query to the search engine Scopus (see Table 15). The Scopus coverage is reviewed and an additional manual search for missing years is performed in Google Scholar. This initial search led to a total of 4,243 primary articles.

Before the search process, study selection criteria (see Table 16) were defined based on the research questions and refined during the search process (Kitchenham & Charters 2007).

After the initial query, each study is first analyzed based on the relevance with regard to the selection criteria of its title and, if not dismissed, of its abstract to refine the search results. The conclusion was also taken into account in cases where title and abstract provided insufficient information, as suggested by Brereton et al. (2007). Within this process step studies are excluded either due to the irrelevance of their title or abstract (4,144), access to the full

paper not being available (4) or duplicates being detected (12), which results in 83 remaining studies. Those 83 papers are analysed on a full text basis, inclusion and exclusion criteria further applied, as well as quality assessment criteria assessed. Articles were included if they cover a specific area related to the research questions. They must cover contents related to the creation or application of CA methods, systems, information requirements, quality criteria or purposes. Articles were excluded if they were not available in English, cover mathematical models or if their main focus is on specific factors that create competitive advantage (see Table 16)

Inclusion criteria	Exclusion criteria
• Research study creates or covers CA methods or systems, information requirements, CA quality criteria or purposes • Aims at the application of a CA through a business	• Not available in English • Mathematical models • Focus is on factors that create competitive advantage • Acquiring, analyzing or using information about competitors plays only a minor role in the respective study • Access to full paper not available • Fulfills none of the quality criteria

Table 16: Inclusion and exclusion criteria applied in this SLR

Additionally, the articles must at least fulfill one of the predefined quality criteria developed according to Kitchenham & Charters (2007). Five quality criteria are defined, that ensure that one of the research questions is answered or provides additional quality information with regard to bias or validity of the study. The applied quality questions are:

- Q1: Does the research study create or extend a CA method or process and describes it clearly?
- Q2: Does the research study provide a purpose, reason or objective for why CA is conducted?
- Q3: Does the research paper critically reflect existing CA methods or processes?
- Q4: Does the study provide quality aspects for conducting CA?
- Q5: Was the suggested CA method or process applied in a real-life scenario?

To address the issue of inaccurate inclusion or exclusion, each article was analyzed by two researchers who discussed and clarified their classification to reach an agreement whenever a discrepancy arose. This process led to 32 primary studies. In 83% of the cases the researchers gave a consistent opinion on the selection of the study. That means, that in 15 out of the 83 primary studies a discussion among the two researchers was necessary to decide about inclusion or exclusion of the respective study, achieving an acceptable interrater reliability (Cohens Kappa) of over 65% (Cohen, 1960).

As it is likely that not all of the relevant literature may be published in high-ranked publications, a forward and backward search was also performed. The rationale for this extended search is that relevant research has been previously identified and, thus, referenced by

authors in high-ranked journals (see Frehe & Teuteberg, 2017) or is based on high-ranked journals. Thus, relevant but not high-ranked papers (i.e. not necessarily from A-or B- ranked journals) are also included in our research. The forward and backward search was performed in the months after the initial search query and ended in May 2017. Google Scholar was used as a search engine for the forward search. The forward and backward search led to another 3,711 articles to be assessed with regard to relevance, inclusion/ exclusion, and quality criteria. The selection process was performed according to the aforementioned inclusion/ exclusion and quality criteria application process. Additionally, non-peer reviewed journals were excluded. 46 articles of the forward and backward search set were added to the set of studies to be included in the further analysis. The overall search process led to 78 studies (i.e. 32 from the primary search and 46 through the forward and backward search), which is refered to as the final set.

On the final set, data extraction is performed by two researchers. Again, discrepancies and ambiguities were discussed, whenever they arose. The data extracted are:

- Author, title, year, journal
- Research area, research focus, research method, sample (if applicable)
- Research contribution
- CA method type / name / objective – if applicable
- CA purpose
- CA quality element
- Considered start-up needs / resources
- Main findings

The overall process of the SLR is visualized in Figure 30.

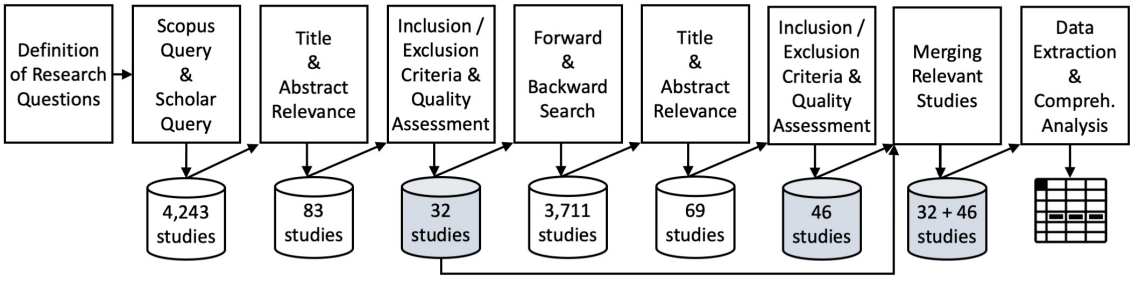


Figure 30: SLR process, visualization adapted from Petersen et al. (2008)

4.1.1.2 Systematic literature review results

The 78 relevant studies of the final set originate from 43 different journals. The distribution across journals reflects the importance of CA across research fields. Long Range Planning holds the most matches with 15 studies, followed by the Strategic Management Journal (seven studies), Journal of Small Business Management (five studies), and the Journal of Marketing (four studies). All other journals represent between one to three studies respectively. The earliest study in the final set was published in 1964 and the latest in 2014. In 1998 the

highest number of relevant studies was identified (seven studies). In the majority of years, one (in eight years) or two studies (in 12 years) were published per year.

The following analysis process was conducted by two researchers in close exchange. Each categorization was discussed in detail among each other and in cases of ambiguity also discussed with the third researcher until agreement was reached. With the use of content analysis over the extracted data, and especially the main findings of the studies, the studies were analyzed with regard to the research questions to discover classes. Parsons & Wand (2008, p. 839) state that "classification holds that classes do not exist independently but are constructed as useful abstractions of the similarities of the classified phenomena". Following the evaluation function of Al-Debei & Avison (2010, p. 364) to discover clusters or classes, the following criteria are applied:

1. Covered topics are "thematically similar to each other, that is, they communicate same or very similar semantics and ideas."
2. Covered topics "have contextual relationships that complement each other, thus they become more useful if clustered."
3. The clustered topics "as a whole articulate a unique compositional aspect" of the CA theme.

In the following sections the contents will be analyzed according to the research questions. At the end, a conceptual framework integrating the findings and giving a holistic view of the field will be deduced.

4.1.1.2.1 Methods and processes

To explore the scientific state of the art with respect to CA methods (RQ1), in Table 17 provides an overview of competitor identification and analysis methods explained, extended or created. 22 identification or analysis approaches are discussed in the literature of the final set.

Analyzing and synthesizing the main findings with regard to the process of CA, one can find that CA includes planning, implementing and concluding activity elements (Bernhardt, 1994; Dishman & Calof, 2008; Prescott & Smith, 1987). Within the implementation phase, an iterative procedure of identification, collection of information and their analysis takes place. Competitors can be identified by means of market definition (Patterson & McCullough, 1980), demand-side approaches, i.e. consumer perceptions (Shocker et al., 1990), supply-side approaches, including competences (Gorman & Howard, 1997) and resource similarity concepts (Bergen & Peteraf, 2002), or managerial perceptions (Mohammed et al., 2014). Thereby, direct, indirect, potential and historical competitors are of interest (Bergen & Peteraf, 2002; Chen, 1996; Clark & Montgomery, 1999; Peteraf & Bergen, 2003; Zahra & Chaples, 1993). In a next step, the required information is collected through specific methods and sources. This obtained information can then be analyzed with the use of a specific CA method.

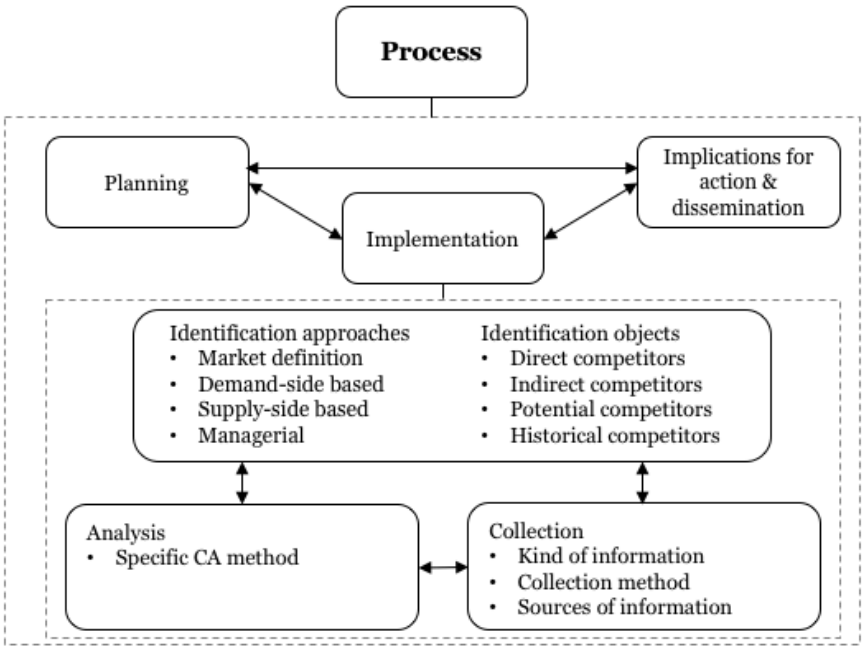


Figure 31: The process of CA - stylized representation

Throughout the process of collecting information, e.g. when talking to customers, more competitors can be revealed which were not identified in the first step, thus requiring more research to be conducted. Also, different CA methods may require different types of information, thus influencing the collection process. Outcomes of the analysis may also reveal insights which necessitate a restart of the process. The CA process then concludes with implications derived for actions and/ or a dissemination of results. Figure 31 displays this process in a stylized form.

	Name of method or approach	Main findings/ contribution	Contribution	Start-up
(Porter, 1979)	Forces governing competition in an industry	Identification of the five forces that drive the competition in an industry. The state of competition depends on five forces: the threat of new entrants, the bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services, and the jockeying for position among current contestants.	-	no
(Day, 1981)	Multidimensional market analysis model	Definition of market along four dimensions: 1. Technology, 2. Customer Functions, 3. Customer Segment, 4. Level of Production-Distribution. A multidimensional market definition and analysis model that integrates the common top-down and bottom-up approaches is discussed.	Model	no open
(Weihrich, 1982)	TOWS (threats opportunities weaknesses strengths) matrix	The TOWS matrix is a tool for situational analysis and matching the environmental threats and opportunities with the company's weaknesses and strengths. A key step for using the matrix is inter alia an assessment of the competitive situation taking into account key success factors (such as price, quality, cost, service, innovation, distribution, facilities, locations) to evaluate the position of the firm. The competition needs to be identified and analyzed with regard to their strengths and weaknesses to find out how to compete with them.	Matrix	no open
(McNamee, 1984)	Three types of matrices	Describes three types of matrices (the directional policy, the Hofer, and the Patel and Younger matrix) and discusses how each can contribute to strategic planning. Advantages and disadvantages of matrices displays are outlined.	Discussion	no open
(Prescott & Grant, 1988)	Utilization profiles of 21 competitive analysis techniques	21 techniques (political and country risk analysis, industry scenarios, the economists' model of industry attractiveness, BCG industry matrix, industry segmentation, PIMS, technological assessment, multipoint competition analysis, critical success factor analysis, strategic group analysis, experience curves, stakeholder analysis, market signaling, portfolio analysis, strength and weakness analysis, synergy analysis, financial statement analysis, value-based planning, value chain analysis and field maps, management profiles, reverse engineering) are evaluated along 11 dimensions (time, financial resources, managerial skills, sources, availability, timeliness, accuracy constraints, updating requirements, advantages, limitations, references).	Reference guide	no open
(Day & Wensley, 1988)	Framework for diagnosing competitive superiority	The framework for diagnosing competitive advantage takes into account competitor centered as well as customer focused methods for diagnosing points of superiority. The competitor centered approach includes analysis of strengths and weaknesses, relative size of resources and value chain comparison.	Framework	no open
(Shocker et al., 1990)	Taxonomy of market definitions/ structure method	A taxonomy of market definitions/ structure methods is elaborated by analyzing competitive relationships analysis tools. Market structure analysis is separated in two stages: definition of competition and assessment of the nature and strength of competitive relationships. The methods for market definition and structure are distinguished into behavioral (brand switching, similar interpurchase time, similar price elasticity, variety-seeking, cross-elasticity) and judgmental (attribute similarity, similarity of evoked/ consideration sets, product deletion, overall similarity, substitution-in-use). Representations of the market structure (spatial and non-spatial) techniques are outlined.	Taxonomy	no open

Table 17: Competitor identification and analysis approaches

	Name of method or approach	Main findings/ contribution	Contribution	Start-up
(Singer & Brodie, 1990)	Evaluation of alternative ways of analyzing business competition and forecasting competitors' actions	22 theories and methods for analyzing competition are identified and grouped into five source disciplines Microeconomics, industrial economics, strategic management and business policy, behavioral decision-making, other social-psychological considerations and competition models in other fields. Those are evaluated along six criteria: information about competitors, nature of competitors, nature of competitive behavior analyzed, participant perspective, decision content, decision process. Established forecasting techniques for each approach are identified. Expert opinion, intentions surveys, role playing and expert systems are recommended	Evaluation	no open
(Shetty, 1993)	Benchmarking	Distinguishes three types of benchmarking: strategic (involves the comparison of different business strategies to identify key elements in a successful strategy), operational (competitive cost and competitive differentiation), management benchmarking (benchmarking support functions). Benchmarking is comprised of five basic steps: (1) Identification of the function to be benchmarked, (2) Selection of the superior performers, (3) Collection and analysis of data, (4) Establishing performance goals, and (5) Implementing plans, and monitoring results.	Process	no
(Chen, 1996)	Framework for competitor analysis: Market commonality and resource similarity	In a four quadrants matrix the two dimensions market commonality and resources similarity are mapped and can be either manifested as high or low to illustrate a focal firm's relationship with a competitor based on a firm-specific and pair-wise analysis.	Framework	no open
(Gorman & Howard, 1997)	Theory of competence-based competition	The theory suggests not to look only at direct product market competitors, but to use competences as unit of analysis for the identify and analysis of current, potential and desired competitors. An analysis process is suggested.	Theory	no open
(Fong et al., 1998)	Benchmarking process model	Provide a classification of benchmarking: nature of referent other (internal, competitor, industry, generic, global), the content of benchmarking (process, functional, performance, strategic) or the purpose for the relationship (competitive, collaborative). A benchmarking process model is developed with 5 phases and 10 steps.	Process	no open
(Stabell & Fjeldstad, 1998)	Value chain analysis framework	Three alternative value configurations (the value chain, the value shop and the value network) are analyzed along eight dimensions, i.e. value creation logic, primary technology, primary activity categories, main interactivity relationship logic, primary activity interdependence, key cost and value drivers and business value system structure. The activities and the cost/ value drivers are the means to turn the configuration analysis into a competitive strategy. The configurations have different focuses in terms of cost or value.	Framework	no open
(Lemos & Porto, 1998)	Technological forecasting techniques	Five technological forecasting techniques (such as consensus method, Delphi method, structural models, scenarios, technological vigil) are seen as competitive intelligence. Their advantages and disadvantages are discussed.	Techniques	no
(Radder & Louw, 1998)	SPACE (Strategic Position and Action Evaluation) Matrix	The strategic posture of a firm (aggressive, competitive, conservative and defensive) is determined by two internal dimensions (financial strength and competitive advantage) and two external dimensions (industry strength and environmental stability).	Tool	no

Table 17: Competitor identification and analysis approaches - continued

Author (s), year	Name of method or approach	Main findings/ contribution	Contribution	Start-up
(Shay & Rothaermel, 1999)	Multi-perspective and dynamic competitive strategy model	An integrated model for understanding the competitive environment is developed by overlaying existing strategic analysis models (i.e. as the Boston Consulting Group's Growth Share Matrix, D'Aveni's Hypercompetition Model, Ohmae's Four Routes to Competitive Advantage, and Hamel and Prahalad's Core Competency Agenda Matrix). The unit of analysis is a firm's product or service. The model distinguishes between for stages (introduction, growth, maturity, decline) along a sigmoid curve.	Model	yes
(Bergen & Peteraf, 2002)	Two-stage framework for competitor identification and analysis	Competitor identification requires the simultaneous consideration of both demand side and supply side attributes and a clear consideration of customer needs in the analysis. The first stage identifies direct, indirect and potential competitor according to market commonality and resource similarity. In the second stage the competition is evaluated and rivalry predicted according to resource equivalence.	Framework	no open
(Peteraf & Bergen, 2003)	Framework for competitor identification	The framework assigns competitors in a 2x2 matrix, by comparing market needs served and existing capabilities, into different groups, e.g. vertical differentiators, direct rivals, weak competitors, potential direct rivals.	Framework	no open
(Anand & Kodali, 2008)	12-phase, 54-step benchmarking process	The authors propose a simple classification scheme of benchmarking: external and internal benchmarking. There are different models of benchmarking. The models are highly dissimilar in terms of number of steps, number of phases and application. The models can be categorized into academic/research-based, consultant/expert-based, and organization-based, extended by industry-based models. The Xerox benchmarking model is reviewed and used as basis for benchmarking the other models. The authors identified 18 best practices and 40 unique practices steps for benchmarking and propose a universal 12-phase, 54-step benchmarking process.	Process	no open
(Rugman et al., 2012)	Modified CSA and FSA matrix	The CSA and FSA matrix: Is a 2x2 matrix combining weak and strong country-specific (CSA) and firm-specific advantages (FSA).	Matrix	no
(Mohammed et al., 2014)	Framework for managerial competitor identification	A three-step process for competitor identification is observed: (1) defining the corporate identity (including the actual, communicated identity, ideal and desired identity) (2) scanning the market for potential competitors, that resemble the own identity and (3) matching and choosing firms with similar corporate identities.	Framework	no
(Sohel et al., 2014)	Competitive Profile Matrix (CPM)	Review of the CPM technique: Internal and external key success factors are identified and weighed according to their relative importance. Competitors and the focal firm are rated along these factors. Strengths and weaknesses of CPM as a CA tool are discussed.	Matrix	no open

start-up= start-up context considered; open = no particular application specified

Table 17: Competitor identification and analysis approaches - continued

4.1.1.2.2 Purposes

With regard to the second research question *Which purposes for conducting CA are mentioned in the literature? (RQ2)* a variety of purposes for conducting CA is found. After extracting, reviewing and content-analyzing all of the mentioned objectives of CA in the final set studies, the purposes are categorized and the following clustering into four main purpose categories is suggested:

Understanding of current situation The understanding of the current situation comprises purposes, that are static and anchored in the present. The motive is to understand, define or identify market and competitors and does, at this point, not aim at reacting to this understanding or deriving strategies.

Definition of strategy This purpose category, on the other hand, comprises all future-oriented decisions based on the understanding.

Legitimation, motivation and communication CA may also serve to confirm deci- sions. Thereby, it supports the communication of these decisions and evokes the motivation and commitment of executives and staff.

Inspiration and learning The fourth category comprises objectives related to the generation of new ideas gained through the analysis process, either through a learning process or through inspiration.

Purpose category	Subcategories	Main references
(1) Understanding of current situation	• Understand and define market & competitors	(Chen, 1996; Deshpandé & Gatignon, 1994; Goshal & Westney, 1991; Singer & Brodie, 1990; Yasin, 2002)
	• Benchmarking	(Bennett, 2003; Pirttilä, 1998)
	• Identification of competitive advantage	(Bennett, 2003; Deshpandé & Gatignon, 1994)
	• Assess and/or define strengths, weaknesses, opportunities & threats	(Babbar & Rai, 1993; Bergen & Peteraf, 2002; Gorman & Howard, 1997).
(2) Definition of strategy	• Exploit & react to strengths, weaknesses, opportunities & threats	(Babbar & Rai, 1993; Bergen & Peteraf, 2002; Gorman & Howard, 1997).
	• Concrete strategies	(Bergen & Peteraf, 2002; Gelb et al., 1991; Lemos & Porto, 1998; Wright et al., 2002).
	• Allocation of resources	(Rothman, 1964; P. R. Varadarajan, 1985)
(3) Legitimation, motivation & communication	• Legitimation	(Gelb et al., 1991; Pirttilä, 1998; Zahra & Chaples, 1993)
	• Motivation	(Pirttilä, 1998; Shetty, 1993; Zahra & Chaples, 1993)
(4) Inspiration & learning	• Problem-solving & learning	(McEwen, 2008; Zahra & Chaples, 1993)
	• Inspiration	(Bennett, 2003; Pirttilä, 1998)

Table 18: CA purpose categories

On closer examination, further subcategories within the main purpose categories are iedntified, which are listed in Table 18 with the respective main references.

The subcategories are constituted as follows (the number of mentions is given in brackets):

Understand and define market and competitors (26) A main purpose of CA is to understand and define the market and competitors the firm is competing with (Deshpandé & Gatignon, 1994), as well as to predict rivals' actions (Singer & Brodie, 1990). Representative statements are "Competitive analysis is useful in assessing one's position relative to competition" (Yasin, 2002, p. 217) or "A primary objective of competitor analysis is to understand and predict the rivalry, or interactive market behaviour,.." (Chen, 1996, p. 100). CA information is typically obtained in order to understand "the structure of the market (which brands compete against each other in a market) and competitive behavior (how do competitors make their decisions)" (Deshpandé & Gatignon, 1994, p. 272). Organizations can also benefit from CA through sensitization, i.e. "making people aware that the company faced significant and formidable competitors to whom it must respond" (Goshal & Westney, 1991, p. 24).

Benchmarking (3) Another mentioned purpose of CA is benchmarking, i.e. the comparison of performance, behavior, strengths, and weaknesses against external criteria and competitors (Bennett, 2003, p. 341). Benchmarking can also include comparing other aspects to competitors, such as competencies (Pirttilä, 1998).

Identification of competitive advantage (10) Competing firms need to be known "so that competitive advantages can be assessed" (Deshpandé & Gatignon, 1994, p. 273). CA information is used for "identifying sources of competitive advantage" (Bennett, 2003, p. 341).

Assess and define/exploit and react to strengths, weaknesses, opportunities and threats (18) The second most frequently mentioned motive for CA activities are reasons relating to strengths, weaknesses, opportunities and/or threats. These need to be defined, exploited, assessed, or reacted to. For example, Babbar & Rai (1993, p. 103) frame the purpose for scanning the environment as enabling "timely identification and quick response to 'windows of opportunity' ". Other examples summarized in this category are statements such as "One important objective of competitor identification is to increase managerial awareness of competitive threats and opportunities" (Bergen & Peteraf, 2002, p. 158) or "Knowing your own organization's resources and capabilities and identifying those of other organizations [...] is a necessary component in defining actual and potential competitive threats" (Gorman & Howard, 1997, p. 617). With regard to the main categories we subdivided this category into the static part of assessing and defining and the dynamic part of exploiting and reacting.

Concrete strategies (10) Several studies refer to the creation of concrete strate- gies with the support of information obtained through CA. These can be "pricing policies, product

design, development and positioning, communications strategy, and channels of distribution" (Bergen & Peteraf, 2002, p. 32). New product development decisions, the change of type or mix of marketing activities or pricing adaptions are also depicted as the most relevant tactical and strategical activities with the use of CA information by Wright et al. (2002, p. 356). Moreover, strategic decisions have to be made along the compete versus cooperate dimension (Lemos & Porto, 1998, p. 330). Another strategy that can be pursued and is included in this purpose category is the strategy of imitating competitors "in areas where they are successful" (Gelb et al., 1991, p. 44).

Allocation of resources (5) Conducting a CA helps to allocate resources effectively. As Varadarajan (1985, p. 373) states: "An assessment of the relative competitive position [...] can aid in the resource allocation process". The information obtained by CA "should indicate where and how firms can best apply their resources and energies among customers, retailers, and middlemen" (Rothman, 1964, p. 15).

Legitimation (7) CA can serve as a means to legitimate decisions. Pirttilä (1998, p. 82) frames it as "legitimation of proposals and decision and getting personnel committed to decisions and solutions made". Also, Gelb et al. (1991, p. 45) argue that CA information is "useful in confirming decisions already made". Zahra & Chaples (1993, p. 8) put more emphasis on the commitment and consensus building component, stating that "the analysis aids in building consensus among executives on the company's goals and capabilities, thus increasing their commitment to the chosen strategy". For building consensus internal communication is necessary. Thus, communication is an immanent part of the legitimation purpose, because the findings of the analysis itself need to be communicated and also support the communication of other decisions to be legitimated.

Motivation (3) Motivating personnel is also a motive for conducting CA activi- ties (Pirttilä, 1998). The awareness of the competitive challenge (Zahra & Chaples, 1993) as well as the findings of a CA (Shetty, 1993) may also serve as motivation for employees to become better than the competitors. For the motivation of employees, just as for the legitimation of decisions, the communication of CA findings is necessary.

Problem-solving and learning (5) This category includes purposes with regard to problem-solving and learning abilities through CA. It comprises statements such as "Competitive analysis enables companies to learn from rivals" (Zahra and Chaples 1993, p. 8) and "Entrepreneurs' environmental scanning can enhance the entrepreneurs' knowledge and lead to improved problem solving" (McEwen, 2008, p. 5).

Inspiration (6) Assessing competition has the potential to serve as a source of inspiration. CA information is used as "source of ideation and innovation" (Pirttilä, 1998, p. 82) and for "generating new ideas" (Bennett, 2003, p. 341).

It seems obvious that the purposes cannot always be clearly distinguished from each other but are often overlapping and intertwined. Also, it seems obvious that not always only one goal is pursued at a time. The purposes may complement each other.

For the sake of completeness, however, it should be noted that also rather abstract explanations of CA objectives were found. The first category of general objectives is related to the general improvement of a company, its success or survival. For example, McEwen (2008, p. 10) points out "a positive influence on the firm's performance". Another overarching objective, that was mentioned by several authors, is that of the CA support for informed decision-making displayed for example as "interpretation of the data for managerial decision making" (Zahra & Chaples, 1993, p. 8). Likewise, strategy and planning, in general, was mentioned as objective, as for example by Goshal & Westney (1991, p. 23) as "contribution of formal competitor analysis to strategic, operational, and tactical decision-making" or by Prescott & Smith (1987, p. 411) with "the use of competitive information as an essential input to strategy formulation and implementation". However, one can argue that these overarching objectives do not provide additional insights into the question of why CA should be conducted. As for improvement, success and survival should be a main goal of every business activity and is also the main goal of strategy formulation itself, it can be summarized under the 'definition of strategy' category. The same applies to strategy and planning in general statements. Informed decision-making can be seen as part of the 'understanding of current situation' or 'definition of strategy' category as it constitutes the underlying rationale. It is also worth noting, that no paper mentions startup specific purposes.

4.1.1.2.3 Quality criteria

After having analyzed the CA purposes the next research question concerning quality criteria for conducting a CA (RQ3) will be answered. Quality refers to the degree to which the CA method provides best possible and valuable results. A variety of CA quality elements were discussed within the studies of the final set. These can be clustered into four categories concerning the design of a method, its selection, the organizational and cultural setting and CA output-related elements.

Method design. Several authors define quality criteria that are related to the design of the respective CA method. With regard to the design of a method, we find notions on:

The scope of a method. The scope of the analysis needs to be defined (Jennings & Jones, 1999), including for example clear objectives (Prescott & Smith, 1987), the product-market scope (Shocker et al., 1990) or the level of analysis, such as firm, group, market, industry, or competitive move (Chen, 1996).

The source of information used for collecting the CA information. For a high-quality CA different sources of information should be used, such as competitors itself (Jaworski et al.,

2002), customers and suppliers (Zahra & Chaples, 1993). Informal sources, in contrast to open sources, yield a higher information value and should be considered more (Bernhardt, 1994; Jennings & Jones, 1999).

The format of CA. Prescott & Smith (1987) advice to avoid an overconcern for style. The chosen format needs to be effective with regard to the presentation of data (Gelb et al., 1991) and actionable (Cartwright et al., 1995) for the respective planning function. Too much volume is to be avoided (King, 1978) and an appropriate dissemination method is to be set (Goshal & Westney, 1991)

The point of view for analyzing CA information. The point of view for analyzing information needs to be changed and must take into account either individually or both the customer's view (Day & Wensley, 1988), or the competitor's view (Tsai et al., 2011; Zahra & Chaples, 1993).

The content to be analyzed. As such Zahra & Chaples (1993) suggest to analyze reasons for an entrant's failure and, on the other hand, how rivals intend to compete and to position themselves. The analysis should include financial as well as non-financial (i.e. customer-focused processes) measures (Phillips & Appiah-adu, 1998) and tangible and intangible resources (Babbar & Rai, 1993). In Table 19 the research dealing with information requirements for a CA are compiled.

Author(s), year	Type of contribution	Information requirement
(Rothman, 1964)	Checklist	Competitive Marketing Audit
(King & Cleland, 1974)	System	Competitive Information Subsystem
(Patterson & McCullough, 1980)	Procedure	A market study methodology for small businesses
(Moyer, 1982)	List	Competitor analysis information list
(Farmer, 1984)	Framework	Approach to competitive analysis in supply markets
(Carpenter & Lehmann, 1985)	Model	Model of brand switching
(Varadarajan, 1985)	Classification	Two-factor classification of competitive strategy variables
(Ball, 1987)	Outline	Competitor profiles of human factors
(Press, 1990)	Framework	Management philosophies. Goal orientation by type of measurement
(Dillon et al., 2001)	Model	Decompositional model for analyzing brand ratings

Table 19: Research dealing with competitor information requirements

The frequency of the analysis. CA can be either performed as a continuous process (Zahra & Chaples, 1993) or as a project (Prescott & Smith, 1987).

Method selection. The quality- influencing variables with regard to the selection of a method are either related to:

The selection of the method itself. The selection of an appropriate method influences the quality of the CA result. The decision for a specific CA method should be made consciously and according to the objective of the assignment (Prescott & Grant, 1988). Prescott & Smith (1987) encounter methodological inertia as a pitfall in CA, meaning that an inflexible pursuit of known methods leads to invalid outcomes.

The combination of methods. The combination of methods can be beneficial (Lenz & Engledow, 1986; Prescott & Grant, 1988; Shocker et al., 1990).

The determination of one method. In contrast to the preceding emphasis on the need to combine methods, several authors suggest that the usage of the proposed method itself grants CA quality (Bernhardt, 1994; Dishman & Calof, 2008; Gilad et al., 1993).

Setting. Elements in the area of how the setting within the organization is designed are mentioned as having an impact on the quality of CA activities. These elements can be structured into the following two spheres:

The cultural sphere. The appropriate culture to establish within the organization should allow for continuous improvement and learning and promotes engagement from the employees (Babbar & Rai, 1993). The organizational culture should also allow for the acknowledgment that there is competition in the market rather than neglecting its existence (Zahra & Chaples, 1993). Open-mindedness helps to overcome possible faulty assumptions (Zahra & Chaples, 1993). Criticalness, as well as creativity are identified as necessary traits for a valuable analysis (Gorman & Howard, 1997). The culture should encourage "trust, facilitate communication and encourage the easy flow of information" (Wright et al., 2002). Jaworski et al. (2002) also stress the importance of building awareness among internal sources about the significance of the knowledge they possess.

The organizational sphere. The organizational setting is essential for CA activities (Bernhardt, 1994; Jain, 1984). Organization-wise several suggestions exist to ensure CA quality. Zahra & Chaples (1993) suggest to include different groups in the CA process, teach employees about competition and integrate CA with the managerial decision-making process. A proximity to the decision-making process (Cartwright et al., 1995; Day & Wensley, 1988; Jennings & Jones, 1999; King, 1978) and top management involvement is suggested (Babbar & Rai, 1993; Francis & Holloway, 2007). Staffing of the CA function is crucial for the provided analysis quality (Goshal & Westney, 1991). Suggested are heterogeneous groups with regard to their hierarchy level, opinions and views (Goshal & Kim, 1986; Jaworski et al., 2002; Zahra & Chaples, 1993). Intraorganisational communication networks should be established (Jaworski et al., 2002; Pirttilä, 1998). Wright et al. (2002) find that a designated location, i.e. a specific competitive intelligence function with full-time staff, rather than an ad hoc location, in combination with management support for this function and the realization that additional,

sustained effort is required for the collection and analysis of information, has the most positive impact. However, other organizational settings exist, such as special project teams, joint theme-related presentations, and CA support groups (Goshal & Westney, 1991).

Output. Referring to the output of CA, criteria for ensuring or defining quality are defined in the areas of:

Review of results and learning. The knowledge created through the use of CA has to accumulate and the creation of a "knowledge bank" is necessary to ensure future use of the information (Prescott & Smith, 1989, p. 13). The current system needs to adapt and allow for learning and development (Day & Wensley, 1988; Goshal & Westney, 1991).

Result characteristics. CA results can be assessed according to their relevance and usefulness (King, 1978), as well as to their comprehensiveness, accuracy, timeliness, confidence (Jaworski et al., 2002).

Table 20 summarizes the identified quality elements according to the suggested four categories.

Quality Categories	Quality Elements	
(1) Method design	• Scope • Source of information • Format	• Point of view • Content • Frequency
(2) Method selection	• Selection • Combination	• Determination of one method
(3) Setting	• Cultural • Organizational	
(4) Output	• Review results/ learning • Result characteristics	

Table 20: Identified quality elements for CA in four categories

4.1.1.2.4 Startup related contributions

With regard to CA methods and processes which consider the resources and needs of start-ups (see RQ4), there is no clear focus on this subject in research apparent yet. Only four out of 78 studies provide startup specific information in their CA research. The earliest paper was published in 1992 the latest in 2008.

The latest study is from McEwen (2008), which discusses a model explaining how environmental scanning enhances knowledge, leads to improved problem-solving, strategic planning and finally new venture success. Implications for entrepreneurs and entrepreneurial education are derived. Entrepreneurs should be continuously learning from the environment and the knowledge base should be growing on an individual and on an organizational basis. Entrepreneurship programs should include environmental scanning training. A second study performs a case study on a biotechnology services new venture. In this study, Evans & Varaiya (2003) conduct a market opportunity assessment, including a CA. The applied method is to

list sources of competitive advantage and determine key strengths and weaknesses of potential competitors. Zahra et al. (2002) use survey data from 228 new manufacturing ventures aged up to 8 years to conclude that inter- and intra-industry comprehensiveness, formality, and user orientation are positively related to new venture performance. The fourth and earliest study by Brush (1992) reports on the marketplace scanning activities in a sample of 66 manufacturing ventures aged between three and six years. The used sources, e.g. customers and competitors, used information collection methods, gathered information type, e.g. competitors' products, customer needs, market growth, and the frequency of scanning activities, were studied.

Of these four contributions specifically assigned to startups, none dealt with a CA method or competitor identification approach. No study dealt with any startup life-cycle related CA specifications. Out of the 22 studies that deal with competitor identification and analysis approaches only the model of Shay & Rothaermel (1999) integrates four competitive strategy analysis models and is constructed along the life-cycle of a product, which starts with the offering of a new product. This life-cycle stage might be comparable to a start-up beginning. Although the early stage of a start-up is more dedicated to the conception and development of idea and prototype and finding financial backers (Kazanjian & Drazin, 1989). Also discovering whether they are solving a meaningful problem and whether anybody would hypothetically be interested in the developed solution is conceptualized as early stage (Marmer et al., 2011a). The offering of the product is not necessarily the start of a new venture. 15 out of the 22 studies specify no particular use case for the presented approach (indicated as "open" in Table 17). It remains unclear whether these approaches meet the requirements of an entrepreneurial setting. However, the research on evaluation and selection of methods (Prescott & Grant, 1988; Singer & Brodie, 1990) can also be consulted by startup teams to select the appropriate methods. In the remaining studies, the approaches are applied or derived from different samples ranging from Fortune 500 firms (Rugman et al., 2012) to a hotel in Hong Kong (Mohammed et al., 2014), none of them having an entrepreneurial setting.

4.1.1.2.5 Conceptual framework

One can notice that research with regard to CA is vast and manifold. One aim of this SLR is to provide a cohesive understanding of the CA concept (RQ5), thus, supplying a solid and complete foundation for (future) researchers and practitioners. To this aim, the studies of the final set are analyzed and a synthesis of their findings related to the CA concept is reflected in a conceptual, integrated framework (see Figure 32). Thus, the following fundamental issues can be provided in a simple, but tight and comprehensive form (see Al-Debei & Avison, 2010):

(1) The dimensions and elements of the CA concept, that is, what constitutes CA, or what aspects need examining when designing, evaluating, and performing a CA.
(2) The relationships between these CA dimensions.

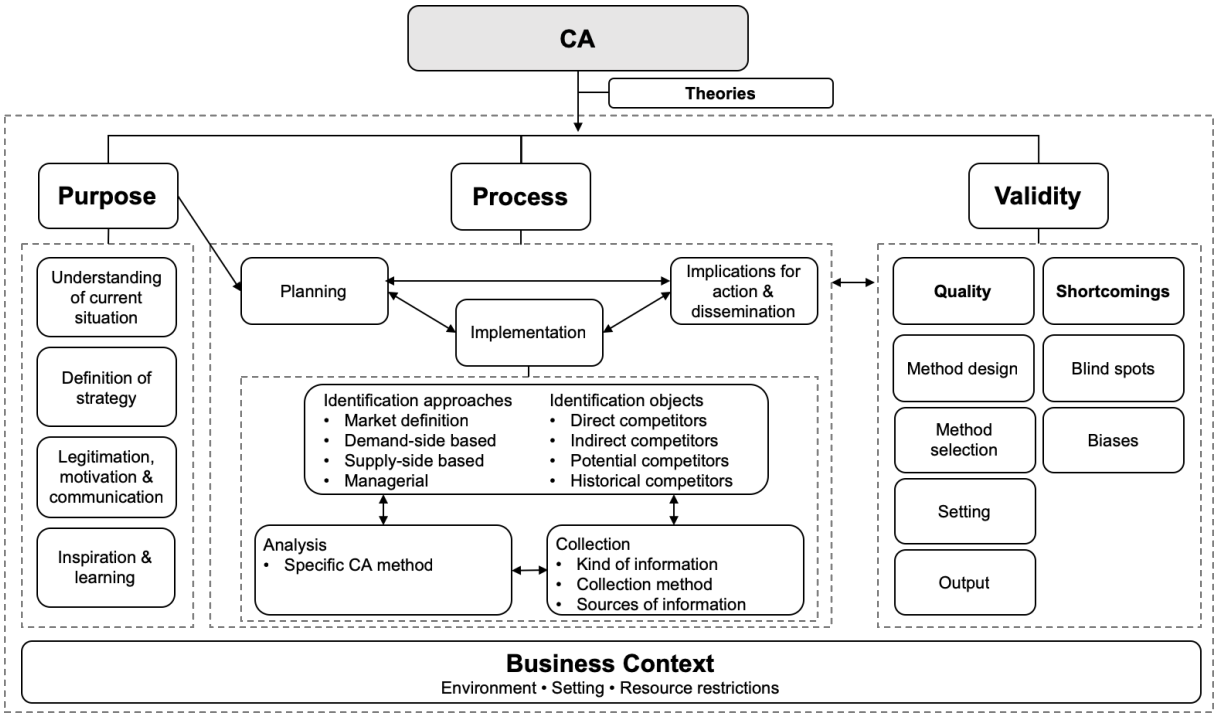


Figure 32: Conceptual framework of CA

The conceptual framework of CA as displayed in Figure 32 comprises five mutually exclusive but complementary CA facets, i.e. the lens through which CA is studied as well as underlying assumptions (Theories), the purposes for conducting CA (Purpose), the process of conducting CA (Process), the validity of CA based on quality criteria or recognition and remedy of shortcomings (Validity), as well as the contextual factors influencing the purpose, process, or validity (Business Context). The analysis conducted in this paper suggests that the five facets contain 19 subclasses that emerge from the data, also revealing important interrelationships. This hierarchical classification of components describes the CA theme comprehensively.

The purposes are clustered into four categories as suggested earlier (see Table 18). The process of CA is displayed as derived in Figure 31. The quality categories and its elements were discussed in detail in a previous section and displayed as proposed in Table 20. However, shortcomings of CA and its quality are two sides of the same coin. The validity of CA can be either assessed through the lens of increasing quality or identifying and decreasing shortcomings, such as biases and blind spots. Such biases and blind spots, e.g. through the poor design of the CA system, or faulty assumptions about the competitors (Zahra & Chaples, 1993) can be reduced through the effective implementation of the quality elements and vice versa. We categorize quality and shortcomings under the concept of validity. Moreover, the attitude towards CA, the organizational culture, as well as the location of CA within the organization (i.e. the setting), the environment and the resource restrictions of the focal firm potentially impinge on the purpose, process, and quality. The literature analyzed in this SLR emphasize one or more facets of the CA theme.

4.1.1.3 Supplementing literature review

As outlined, the SLR includes only journal articles, but CA knowledge in particular with regard to CA methods might be embedded in textbooks. Thus, an extended literature review with regard to CA methods is used to complement the solution space. Table 21 gives an overview of additional CA methods that are found in textbooks, if they are not already captured in chapter 4.1.1.2.1)

Method name (source)	**Short description**
Analysis of Competing Hypothesis (Fleisher & Bensoussan, 2015, p. 123 ff.)	The method develops hypotheses for identified key intelligence questions, and assesess these hypotheses on the basis of gathered information to make judgements and offer conclusions.
Business Model Analysis (Fleisher & Bensoussan, 2015, p. 159 ff.)	Determining the superiority of one business model concept over another through the comparison of business model components.
Competitive Positioning Analysis (Fleisher & Bensoussan, 2015, p. 183 ff.)	Gives an understanding about the competitive position in a market or in an industry in relation to competing firms in order to develop strategic plans in relation (preserve an advantage, attempt an improvement, or withdraw from a market).
Competitor Cash Flow Analysis (Fleisher & Bensoussan, 2015, p. 202 ff.)	Takes into account quantitative and qualitative information about the current and historic cash flow to analyse sustainability and operating flexibility of a firm flexibility. It is used in addition to other CA methods.
Critical Success Factors Analysis (Fleisher & Bensoussan, 2015, p. 221 ff.)	Key factors are identified, that have to be performed well in order to achieve a superior performance in an industry. A comparative assessment of these factors to the industry leader is conducted.
Driving Forces Analysis (Fleisher & Bensoussan, 2015, p. 243 ff.)	Driving Forces Analysis strives to understand and account for factors that influence the current industry structure. These can be societal and demographic, technological, economic, ecological, or political.
Event and Timeline Analysis (Fleisher & Bensoussan, 2015, p. 263 ff.)	This method supports to discover trends or unusual behaviour of competitors by analyzing events and data in a chronological and evolutionary context.
Historiographical Analysis (Fleisher & Bensoussan, 2015, p. 282 ff.)	The method serves to learn from prior actions from competitors taking into account their aims and results of actions in order to derive and derive insights for own plans and actions.
Indications and Warning Analysis (Fleisher & Bensoussan, 2015, p. 296 ff.)	This analysis is a technique for systematically tracking key indicators about the task environment and rivals in order to alert decision makers about significant and risky changes.
Linchpin Analysis (Fleisher & Bensoussan, 2015, p. 354 ff.)	Linchpin Analysis identifies and assesses key assumptions underlying the assessment of a current competitive situation. The seven elements that need to be aligned are strategy, systems, structure, staff, style, skills and shared value.
Product Line Analysis (Fleisher & Bensoussan, 2015, p. 385 ff.)	The process of examines a product line in comparison to rivals‘ products taking into account product-related perspectives as well as customer-related factors.
Shadowing (Fleisher & Bensoussan, 2015, p. 447 ff.)	While Shadowing specific competitors are monitored with a high degree of detail to learn how a specific competitor might think, reason, and react.

Strategic Relationship Analysis (Fleisher & Bensoussan, 2015, p. 466 ff.)	This method studies the focal firms‘ and competitors‘ strategic inter-firm relationships to determine their present and potential future competitive impacts.
War Gaming (Fleisher & Bensoussan, 2015, p. 539 ff.)	A role-playing simulation to simulate the dynamics of a marketplace.
Win/Loss Analysis (Fleisher & Bensoussan, 2015, p. 555 ff.)	Is aimed at customer's perceptions of a specific sales situation and assesses why a customer is buying or not buying focal firms‘/ competitors‘ products and/or services.
BCG Growth/ Share Portfolio Matrix (Fleisher & Bensoussan, 2003, p. 30 ff.)	The growth/share portfolio matrix is designed to design market strategies of diversified multiproduct, multimarket, and multinational businesses by determining the optimal product or business portfolio. Evaluation takes place with regard tot he attractiveness oft he industry (market growth) and relative competitive position (market share).
GE Business Screen Matrix (Fleisher & Bensoussan, 2003, p. 47 ff.)	The matrix combines internal analysis of business strength with external industry analysis in order to assess the competitive situation of strategic business units.
Strategic Group Analysis Matrix (Fleisher & Bensoussan, 2003, p. 74 ff.)	Strategic group analysis analyses groups of competitors sharing similar competitive approaches and positions.
Competitor Analysis (synonym: competitor profiling) (Fleisher & Bensoussan, 2003, p. 144 ff.; Porter, 1980, p. 47 ff.)	The goal is to gain a comprehensive picture of a specific rival in order to predict a competitor’s response profile. The diagnostic components are: future goals, current strategy, assumptions, and capabilities to asses what drives the competitor and what he is doing and can do.
Customer Segmentation Analysis (Fleisher & Bensoussan, 2003, p. 162 ff.)	Maps a path to potential competitive advantage by matching the value embedded in the firm's products and services with customer groups most attracted to that value and derives a strategic positioning with regard to the product, price, promotion and place questions of the marketing mix.
Customer Value Analysis (Fleisher & Bensoussan, 2003, p. 180 ff.)	Is used for market segmentation (central criteria for selecting profitable market segments) and to monitor the customer value as the firm's most important source of competitive advantage
Functional Capability and Resource Analysis/ VRIO Framework (Barney, 1991; Fleisher & Bensoussan, 2003, p. 205 ff.)	Determine if available resources (tangible and intangible and organizational capabilities, core competencies) are able to drive the firm's competitive advantage. The resources must be valuable, rare, inimitable and exploitable by the organization.
Management Profiling (Fleisher & Bensoussan, 2003, p. 225 ff.)	A tool to understand rival decisions makers taking into account their backgrounds, goals, personalities, and psychological.
Checklists, e.g. (Aaker, 2013, p. 53; Aeberhard, 1996, p. 145; Buchele, 1962; Porter, 1980, p. 64 f.; Simon & Fassnacht, 2016, p. 193 f.)	Give an overview about which information to gather about the competitor covering different aspects of the competitor’s business and resources
Competitor Actions Assessment (Aaker, 2013)	Analysis competitors along eight dimensions: (1) Size, Growth, and Profitability, (2) Image and Positioning Strategy, (3) Objectives and Commitment, (4) Current and Past Strategies, (5) Organization and Culture, (6) Cost Structure, (7) Exit Barriers, (8) Strengths and Weaknesses

Table 21: Additional CA methods in textbooks

None of the outlined 25 additional CA methods are specifically dedicated to the startup context. To the contrary, some of the methods are explicitly developed for big, multinational, multi-product companies, like the BCG Growth/ Share Portfolio Matrix. Also in their comprehensive books compiling CA methods Fleisher & Bensoussan (2003, 2015) usually assume that analyst and decision-maker are different persons or even entities. Thus, additional entrepreneurship literature is consulted.

Surprisingly often Porter's CA tools are mentioned as the tool to analyse competition even in the entrepreneurship literature (Adler & Klein, 2015; Byers et al., 2015, p. 74; Kollmann, 2016; Kuckertz, 2015, p. 66; Mullins, 2018, p. 75 ff.; Pöppelbuß & Orde, 2015; Wirtz, 2018, p. 273). Other CA methods described in entrepreneurship literature are CA in the digital economy (Kollmann, 2016, p. 263 ff.), competitive positioning (Bill Aulet, 2013, p. 131 ff.) and the context canvas (Pijl et al., 2016, p. 110 ff.). These are summarized in Table 22).

Method name (source)	Short description
CA in the digital economy (Kollmann, 2016, p. 263 ff.)	Assessment of relevant competitors with regard to their objectives, strategies, reaction behaviour, strengths, weaknesses and value proposition. A strengths-weakness analysis along success criteria is proposed.
Competitive Positioning Chart (Bill Aulet, 2013, p. 131 ff.)	A diagram with two axes ranging from high to low, that show the top two priorities of the targeted customer. A positioning of the business along the two dimensions is possible.
Context Canvas (Pijl et al., 2016, p. 110 ff.)	The context canvas helps to understand the context of the business. Competition is one of seven included factors.

Table 22: Additional CA methods in entrepreneurship literature

4.1.1.4 Implications

CA seems to be of great interest to researchers as can be seen from the sheer number of search hits. Within the strategic management and marketing literature, gaining a competitive advantage or being successful in relation to competitors constitutes a fundamental part. The importance of knowing your competitors and the necessity to analyze them is widely accepted. However, when looking in detail, CA itself was not the main focus of many studies. A possible explanation for the high number of primary search hits seems to be more the subsumption of CA within the broad literature of strategic management or marketing, rather than the substance of the matter itself. The overarching high presence of the search for competitive advantage in many studies without focusing on CA as a process or method also contributes to this phenomenon. In total, 78 studies explicitly dealt with CA.

Of these relevant studies, 22 studies create, extend and/or evaluate a competitor identification and/or analysis approach. Yet several questions with regard to their practical usefulness remain unanswered. Most of these studies do not provide indications on which kind of firms, in which industry, in which life-cycle stage it makes sense to apply the approaches, i.e. which one is appropriate in which situation, which goals are being pursued, and how they can

be combined. However, two studies strive to support the decision on which method to choose. Prescott & Grant (1988) evaluate 21 techniques along 11 dimensions including resource and data needs. Singer & Brodie (1990) evaluate theories and methods with six criteria that are important when rivalry among a few major competitors is analyzed. However, given the date of these publications, one can doubt the practical usefulness of these tools in today's economy (Sheehan, 2005).

From a startup's point of view, the results are even more sobering. In the analyzed literature CA is scarcely examined in a startup context. Only 4 out of the 78 studies are specifically dedicated to startups. None of the identified CA methods were designed for startups, none of the studies examining how CA is done in practice had startups as the object of investigation. Therefore, startups' purposes for conducting CA, their specific needs, quality aspects for CA in startups might be underrepresented in the results. Keeping in mind the differences of startups and incumbents as outlined in the theoretical background, e.g. the limited resources or potentially divergent CA goals, there is no indication as to what extent the methods and processes are applicable in a startup context.

In light of the Lean Startup and effectuation approach and the supposedly complementary properties of these two approaches in entrepreneurial settings (Chandler et al., 2011), the literature review indicates that CA (as a typical causational activity) is indeed useful in a startup context (McEwen, 2008; Zahra et al., 2002). Moreover, since CA is a typical section of a business plan it is not surprising to find it as part of a standard procedure to assess a market opportunity (Evans & Varaiya, 2003). This observation is in line with recent business planning literature, which suggests that business planning in general enhances firm performance for new and established firms (Brinckmann et al., 2010).

Moreover, the lean startup and effectuation approaches are dynamic and mostly hypothesis-driven. Thus, pivots might be performed and, therefore, adaptions of the business model and the market positioning might occur during the early startup stages. As a consequence, more or other competitors are revealed or become relevant over time, making repeated CA cycles necessary. Hence, an eventual change of the starting point of the analysis might require an iterative analysis approach, that allows for validated learning cycles. Even though, in the reviewed papers learning is mentioned as a purpose of CA, it is indeed not a prominent goal. Here, it might be an interesting line of thought for the following research to consider the high-priority of learning as a goal in the startup context as a more prominent dimension for CA. With this in mind, one should be careful about the suitability of traditional CA methods for entrepreneurs or rather have in mind this priority when adapting these methods to the startup context.

In the supplementary literature review, additional methods were found and added to the archival knowledge base. However, even in the entrepreneurship literature in many cases Porter's five forces analysis is recommended to analyse competition.

To sum up the implications for the further course of this project, there is evidence supporting the hypothesis, that CA is equally important in startups. Also, an initial archival knowledge base has been created that covers not only a comprehensive view of the CA field, but also processes and methods, purposes, and validity criteria and considers context-specific factors. However, given the time of origin and targeted users, namely larger established companies, of most of the identified CA methods and processes, one can doubt their practical usefulness in today's economy (Sheehan, 2005) and for the specific situation of entrepreneurial teams (Freiling & Kollmann, 2015a, p. 5). Thus, for the further course of this DSR project it is necessary to further explore in-depth how startups currently perform CA, and what their specific problems are when conducting CA.

4.1.2 **Status quo of CA in startups**

In order to understand the status quo of CA in ESS, the following research questions are posed: *What are the antecedents and effects of CA in ESS?* (RQ1) and *How do ESS conduct CA?* (RQ2). To develop an artefact that answers relevant human problems (Hevner & Chatterjee, 2010, p. 5) and overcome these problems, thus, improving the status quo (Johannesson & Perjons, 2014, p. 1), it is necessary to explore further the perceived problems. Thus, the third research question is formulated as follows: *Which problems do ESS face when conducting CA?* (RQ3)

This chapter is separated into six parts. After explaining the research design that was chosen to gain further knowledge of the current status of CA in ESS, the participants of this study are introduced, as well as the data points, the data collection and data analysis method. The chapter ends with the findings and their implications for the further course of this project.

4.1.2.1 Research design

As the research on CA in startups is a scarcely researched topic in the literature (see chapter 4.1) an explorative research approach was chosen. Explorative studies are useful if the social field to be explored is relatively unknown and there is little prior knowledge or assumptions about reality (Dieckmann, 2011, p. 33 f.). Qualitative research methods allow for exploring and understanding personal experiences with CA, the practices, and the perceived problems. Quantitative research on the other hand seeks to isolate causes and effects,

operationalize theoretical relations, and to measure and quantify phenomena, allowing for the generalization of findings (Flick, 2014, p. 12 ff.).

Subsequently, as the purpose is to explore how CA in startups performed and a holistic view of the phenomena CA in a specific context, i.e. in ESS, case study research as an inductive research approach is chosen. This type of method is suitable in an exploratory research context, where open-ended question can be asked to gain in-depth understanding of the subject. A case study approach is relevant when the research questions seek to explain some present, real-life circumstance in a holistic and meaningful way (Yin, 2014, p. 3 ff.).

Each startup constitutes a case in a specific context. Within these cases different units of analysis are of interest, such as the antecedents, effects, procedure and problems of CA. Thus, the research design is performed as an embedded multiple-case study according to (Yin, 2014, p. 31 ff.).

Within the case study process semi-structured interviews are conducted, which are then transcribed and coded. Based on this, a content analysis using the "Gioia-Method" (Gioia et al., 2012; Gioia & Pitre, 1990) will be performed. The planning process is based on (Yin, 2014).

4.1.2.2 Selection of cases

Within the activities of the HPI School of Entrepreneurship (E-School) the organization and implementation of a business plan competition is included. The competition focuses on giving ESS or entrepreneurial teams the opportunity to present their business ideas and get feedback to systematically develop these business ideas further. Participants receive targeted input over three phases in order to work intensively on the development of their business model and prototype. The three input and feedback sessions are divided into three phases:

- In the first phase, the teams hand in pitch deck slides with the following content: Problem, solution, target group, value proposition, and team. This submission serves as application document for the registration to the competition. After the application deadline, all registered teams receive feedback from the startup coaches of the E-School on their first submission. After these feedback sessions about the top ten teams are selected and proceed to the next stage. Only these selected teams then go through the second and third phase.
- In the second phase, the slides from the first phase need to be revised and content with regard to the business model and minimum viable product need to be added. The teams receive an input session before they hand in their slides, and a feedback session afterwards.

- In the third phase again, the slides from the preceding phases need to be updated and supplemented with slides containing the following content: Business model environment, including market and competitors and go-to-market strategy. Again, the teams receive an input session before they hand in their slides, and a feedback session afterwards. After the third stage, three finalists are chosen to pitch in front of an expert jury, which determines the winner of the competition.

The selected case study participants are the selected teams, that proceeded to the second phase of the business plan competition 2017. Table 23 gives an overview of the eleven selected startup teams that proceeded to the second phase and are thus case study participants. Due to anonymity reasons each startup team is given a code name. A short description of the business, the business type (B2B or B2C), the number of team members, founding time, prior funding information, type of startup (according to Steininger, 2018) and industry classification is provided. Although according to German Classification of Economic Activities of the Federal Statistical Office (edition 2008) would lead to a classification of all of the eleven teams as "other software development", thus, classified among the "information and communication" section, this information doesn't seem valuable. Accordingly, the industry classification in Table 23 aims at providing information for which industry the respective software is build, if possible.

Team code name	Short description of business	B2B/ B2C	Team member	Founding month/year (working on idea since)	Prior funding	Type	Industry
Startup 1	Mobile application for practicing English speaking for Chinese users.	B2C	2	Not incorporated (3 months)	no	Digital	Education
Startup 2	Management system for educational institutions that optimizes the workflow and collaboration between teachers and students.	B2C	4	Not incorporated (1 year)	no	Digital	Education
Startup 3	Customer relationship management for cinemas	B2B	5	04/2017 (1,5 years)	scholarship	Digital	Motion picture
Startup 4	Blockchain-based management system to uniform loyalty and reward programs	B2B	3	Not incorporated (5 months)	no	Digital	Software
Startup 5	Mobile application for analyzing food purchases according to diets and nutritional restrictions	B2C	4	Not incorporated (3 months)	no	Digital	Food and beverage
Startup 6	Task management and messaging software to improve hospital stuff communication	B2B	2	Not incorporated (2 months)	no	IT-bearing	Health
Startup 7	Web-based ERP-system for IoT devices	B2B	3	Not incorporated (2 months)	no	IT-bearing	Software
Startup 8	Software to automatically test and assure the quality of iOS apps in the development process	B2B	4	Not incorporated (6 months)	no	Digital	Software
Startup 9	Software tool to simplify the preparation of study material for students	B2C	2	Not incorporated (2 months)	no	Digital	Education
Startup 10	Software platform that uses machine learning to generate optimal dialysis plans.	B2B	5	Not incorporated (2 months)	no	IT-bearing	Health
Startup 11	Web-based software solution to help scientists capture, search and structure large amounts of scientific information in order to facilitate intellectual innovations.	B2C and B2B	3	Not incorporated (2 months)	no	Digital	Education

Table 23: Characteristics of case studies

In summary, it can be stated that the eleven startup teams produce software for various purposes, four times aiming at consumers, six times aiming at other business, one time a mixed approach is chosen. The startups can be classified as IT-bearing or digital startups according to Steininger (2018). On average the teams have 3 team members and work on their idea for 5,2 months. Five different industries are chosen by the teams to enter: education, health, software, food and beverage and motion picture. Only one team received prior funding via a governmental grant.

As it is customary in qualitative research the sampling and selection of cases is done consciously and deliberately (so called "purposive/purposeful sampling") (Glaser & Strauss, 1999; Marshall, 1996). On the basis of prior knowledge such cases are specifically included in the sample which are particularly meaningful for the research question. Three different sampling strategies can be distinguished in the qualitative approach: The theoretical sample, case selection according to a qualitative sampling plan and the targeted selection of certain types of cases (Flick, 2016, p. 154 ff.; Glaser & Strauss, 1999, p. 244 ff.).

The selection of cases here is done on a basis of targeted selection of certain types of cases as the research questions focus on a very specific target group. That means that the cases from the target group are addressed via one recruitment channel, i.e. the HPI business plan competition, and a relatively small sample is compiled, i.e. eleven startups (see Döring & Bortz (2016, p. 304).

The business plan competition is a suitable research environment due to several reasons. To begin with, it represents a rather controlled research environment, that allows for easy access to entrepreneurial teams within a short period of time, that are comparable on several levels with regard to their team constellation, life-cycle stage and current challenges. Through the structured program some external factors can be kept constant. Multiple teams are simultaneously taking part in the competition, which is designed as iterative process, where significant changes to the business model and idea are possible. Through the first selection after the first phase of the competition, it is ensured that only teams with a certain growth potential or with high-tech focus remain in the sample, whereas less promising ideas lacking seriousness are excluded.

4.1.2.3 Data points

As data sources the following data are collected and analysed:

- A submitted CA before the third phase input session on CA per team. The teams were asked to submit a CA before the third phase, i.e. together with the slides of the second phase. That equals a CA uninfluenced by the E-School coaches' input session or the

exposure to the artefact to be developed. The participants' CAs were handed in between 19.06. and 01.08.2017.

- One interview per team after the submission of the uninfluenced CA, but before the input session, is conducted. In the interviews up to three team members per team participated in the interview. Table 24 summarizes the conducted eleven interviews. In sum 18 team members have been interviewed in nearly 3 hours interview length time. On average more than one team member per team has been interviewed in 16 minutes.

The interviews were conducted on the 27th and 28th of June 2017. The interview process is described in the next chapter. The interviews were conducted by two researchers. Two interviews were conducted by the two researchers together and discussed afterwards to get a common understanding of foci and improve the interview process. The remaining interviews were then conducted by one of the researchers alone.

Team code name	Team members interviewed	Interview length (hh:mm:ss)
Startup 1 (SU1)	1	00:14:44
Startup 2 (SU2)	2	00:13:38
Startup 3 (SU3)	2	00:15:34
Startup 4 (SU4)	3	00:18:08
Startup 5 (SU5)	1	00:12:35
Startup 6 (SU6)	2	00:13:40
Startup 7 (SU7)	2	00:15:33
Startup 8 (SU8)	1	00:16:54
Startup 9 (SU9)	2	00:16:05
Startup 10 (SU10)	1	00:21:31
Startup 11 (SU11)	1	00:18:07
Sum	**18**	**02:56:29**
Average	**1,64**	**00:16:03**

Table 24: Interviews case study part 1 overview

4.1.2.4 Data collection method

The uninfluenced CA was submitted by the business plan competition participants via email as a powerpoint or pdf slide with note section. The interview process is explained in the following sections. A qualitative interview is suitable for asking open-ended questions, pursuing a flexible interview structure, including upcoming questions spontaneously during the interview, and individual in-depth investigation of addressed issues (Döring & Bortz, 2016, p. 365; Flick, 2014, p. 217 ff.; Schnell et al., 2013, p. 379 f.).

4.1.2.4.1 Interview process

According to (Döring & Bortz, 2016, p. 365) a qualitative interview needs to follow a ten-step process:

- Contents preparation: The survey topic and the research questions are defined above and a semi-structured interview chosen as the appropriate research technique. The interview questions are compiled.
- Organizational preparation: The sampling of cases is conducted on a basis of targeted selection of certain types of cases (see chapter 4.1.2.2). The interviewers trained in advance and rehearsed interviews. Contact to the interviewees has been established through the business plan competition's organizational activities. The interview material is carefully compiled (audio recorder, storage media, spare batteries, interview guidelines, information material on the research project, consent form (see appendix for an example of a used consent form).
- Beginning of conversation: The interviewees are greeted and the course o the interview is explained. Anonymity is assured and the consent form is signed by the interviewee.
- Implementation and recording: During the interview the interviewer steers the course of the interview, and closely monitors his own reactions and the non-verbal behaviour of the interviewees. The interview follows the interview guideline. The interview is recorded.
- End of conversation: The conversation is officially ended, but the interviewer pays particular attention to information the interviewees are providing after the official end. The audio recorder is turned off.
- Farewell: The interviewers say goodbye to the participants, thanked for the support and offer to be available for upcoming questions and/ or results of the study.
- Memos: Notes of the interviews are made, when necessary.
- Transcription: The interviews are fully transcribed. The transcription includes the complete literal transcription of what has been said, but without delay words. There is a slight linguistic smoothing (for example in case of wrong articles as well as word and grammar errors). Word doublings, word breaks, stuttering and printing, word finding problems are omitted, as are permanently repeated phrases or questions about drinks, interruptions due to telephone calls or other persons. Marking of stress, pauses for thought, emotional/non-verbal expressions are not transcribed, since this information does not seem to provide additional insights with regard to the research questions.
- Analysis of transcripts: The transcribed interviews are analysed (see chapter 4.1.2.5) with the help of the qualitative data analysis software Atlas.ti Version 8.
- Archiving the material: The material of the interviews is stored carefully and inaccessible to unauthorized persons. It includes the audio file, the transcript, the consent form, available notes.

4.1.2.4.2 Interview guideline

The format of a semi-structured interview is chosen for the interviews, which is based on an interview guide as a list of open-ended questions. The guideline serves as a basic framework to ensures that interviews can be compared. It offers on the other hand a flexible handling of the interview situation with regard to word choice, order of questions, and/ or additional questions. The interviewer can ask so many questions until they understand the meaning of the answers. The order of the questions is, thus, determined in advance, but can be adapted to the course of the discussion if necessary (Döring & Bortz, 2016, p. 372; Schnell et al., 2013, p. 379).

The interview guideline is developed according to the content topics and research questions (Döring & Bortz, 2016, p. 372). Usually, an interview guide includes 8-15 questions on a maximum of two pages (Gläser & Laudel, 2010, p. 144). When developing the interview guideline the four criteria for productive interview material are taken into account: range/openness, i.e. maximizing the reaction and memory of the interviewee through open questions, specificity, i.e. the addressing of specific aspects mentioned by the interviewee, depth, i.e. the support of the interviewee to describe aspects in detail, and personal context, i.e. the capture of personal, social and situational context (Hopf, 1978; Merton et al., 1956; Przyborski & Wohlrab-Sahr, 2014).

The guide on the basis of which the interviews are conducted consists of six parts, and includes key questions that will be asked in any case and possible questions that will only be asked if the conversation process allows it or makes it necessary (Friedrichs, 1990, p. 227). The first part consists of an introduction or a warm-up (Gläser & Laudel, 2010, p. 148 f.), which ensures a relaxed atmosphere and provides background information about the interview partners (Döring & Bortz, 2016, p. 372). The following four parts relate directly to the research questions (Döring & Bortz, 2016, p. 372; Leedy & Ormrod, 2013, p. 154 f.). The last part consists of an open question that asks the interviewee, if there are important aspects of the topic that haven't been considered before. This increases the openness of the interview (Gläser & Laudel, 2010, p. 149). Table 25 displays the interview guideline.

The questions are pretested with entrepreneurs and fellow researchers to ensure comprehensibility, completeness and test the duration (Berger-Grabner, 2016, p. 142; Döring & Bortz, 2016, p. 372; Friedrichs, 1990, p. 221 f.). Analysis of the pretests led to changes in the wording of the questions.

Part	Interview Questions
Introduction General: (2 min) CA specific: (2 min)	What is your current team size at the moment? Since how long are you pursuing this business idea? Are you incorporated? If so, when? Who conducted the CA? Why did this person/s conduct the CA? How much time did you invest in conducting a CA?
RQ1 – part 1: What are the antecedents of CA in ESS? (2 min)	Why did you conduct a CA? If only because of BPC requirements, would you have done so yourself? If yes when and why?
RQ2: How do ESS conduct CA? (8 min)	Planning & Focus • Have you conducted any planning activities before starting your CA? If so, please describe. Identification • How did you identify your competitors? Collection • How did you collect information? • What kind of information did you collect? • Which sources did you use? • Which methods did you use? Analysis • How did you analyse this information? • Did you use specific methods for analysis?
RQ1- part 2: What are the effects of CA in ESS? (3 min)	What have been the effects of conducting the CA? Which new insights did you gain? Have you changed something because of your insights? Have you come to a decision based on your CA insights?
RQ3: Which problems do ESS face conducting CA? (2 min)	Have you had any problems while conducting your CA? What has been difficult for you? What has been easy for you?
Closing remarks (2 min)	Do you have any additional remarks concerning CA in your case?

Table 25: Interview guideline problem identification

4.1.2.5 Data analysis method

Taking into account case-specific documents and the transcripts of the interviews the data analysis was performed based on pattern matching as proposed by Yin (2014, p. 133 ff.) using the Gioia Method. The Gioia Method in a "systematic inductive approach to concept development" (Gioia et al., 2012, p. 16) and is based on grounded theory works (Glaser & Strauss, 1967; Lincoln & Guba, 1985; Strauss & Corbin, 1990).[8]

The Gioia Method is based on the following main assumption of knowledgeable agents. Prior constructs or theories are avoided in order to avoid a priori explanations, so that the participants' experience is represented prominently. This is possible due to the assumption that "people know what they are trying to do and can explain their thoughts, intentions, and

[8] For grounded theory see also chapter 3.1.2.1.

actions" (Gioia et al., 2012, p. 17). Not only the participants of a study, but also the researcher are knowledgeable agents, who are able to "figure out patterns in the data, enabling [the researcher] to surface concepts and relationships that might escape the awareness of the informants" (Gioia et al., 2012, p. 17).

The procedure of data analysis and theory articulation through the use of the Gioia Method contains the following steps (Clark et al., 2010; Corley & Gioia, 2004; Gioia & Chittipeddi, 1991; Gioia et al., 2012):

- First-order analysis: Initial data coding using informant-centric terms and codes and development of a compendium of first-order categories. At this step, key elements of the informants' meaning systems are unveiled but not the deeper patterns or relationships in the data (Gioia & Chittipeddi, 1991).
- Second-order analysis: Distilling of categories by seeking similarities and differences, labelling the emergent themes using researcher-centric concepts, themes, and dimensions. If appropriate, the second-order themes are further distilled into overarching theoretical dimensions in so called aggregate dimensions.
- Assembly of terms, themes, and dimensions into a "data structure", including first-order concepts, second-order themes and an aggregated dimension.
- Formulation of dynamic relationships among the second-order concepts in the data structure, thereby the static data structure is transformed into a dynamic model. Additional literature consultation might be necessary to refine the articulation of emerging concepts and relationships.

The approach is similar to the open, axial, and selective coding procedure of (Corbin & Strauss, 1990). The labelling of 1st and 2nd order themes is inspired by van Maanen (1979). The method has been used in a variety of studies published in renowned journals (Gioia et al., 2012).

A computer-based qualitative software application, namely Atlas.ti 8, is used to support in coding and analyzing the transcripts and documents throughout the entire research process. It facilitates the described multiple waves of coding, identify nestings and overlaps among codes and enables to efficiently search and consolidate quotes (Gioia & Chittipeddi, 1991).

4.1.2.6 Findings

Figure 33 shows the data structure of the findings. The five main dimensions of the analysis are depicted (aggregate dimension), as well as the representative second-order themes and first-order categories that constituted these themes. In Table 26 representative supporting data for the second-order themes are provided. Moreover, the findings are reported in a descriptive findings narrative structured by the research questions. For the findings narrative

additional quotes are provided. However, to ensure a smooth reading flow quotes were translated to English, if necessary.

Second-order themes	**Representative first-order data**
intrinsic motivation	"mein großes Motiv war die Positionierung" "also es war die Motivation mich abzugrenzen" "And the first goal of course was to try to find: Are there competitors actually in the German market"
extrinsic motivation	"Das war irgendeine Präsentation, die der Anlass war." "Ich glaube, der Businessplan war wirklich der Anlass, also irgendein Wettbewerb oder irgendeine Präsentation, wo es auf einmal eine Notwendigkeit gab, das [CA] in eine Form zu gießen"
demand-side perspective	"der Gedanke war, wie würde jemand losgehen, der sozusagen eine Lösung für sein Problem hat [...], wie stößt er auf diese Apps" "Und dann [...], waren [...] Kundeninterviews auch nochmal ganz wichtig, weil wir immer die Leute eigentlich gefragt haben, wie lösen sie das heute"
supply-side perspective	"Leute, die generell mit Blockchain was machen" "Leute oder Unternehmen, die Expertise in dem Bereich haben und tendenziell sowas relativ schnell [...] aufsetzen können“
market integration perspective	"Supplier von [potentiellen Kunden]" "dann schaut man nochmal, die [Wettbewerber] wurden ja auch gekauft, das heißt, die gehören jetzt zu einer größeren Firma"
time perspective	"Häufig ist es ja auch so, dass es Unternehmen gab, die das mal probiert haben und es hat vielleicht nicht funktioniert." "wer ist in dem Bereich aktiv potenziell und also auch gerade dabei, was zu entwickeln"
resemblance perspective	"there are however three products which are similar to [product name] and should be considered as competition" "es gibt auch noch einen anderen Wettbewerber, der nicht direkt im Wettbewerb von uns steht"
analysis level	"was bieten die anderen an und was sind die Stärken und Schwächen davon" "Also wenn wir [...] gesehen haben, dass bei einer Konkurrenz, dass die auf andere Blockchain-Technologien [...] setzen"
analysis display	The display of the CA is assessed via the submitted slides. Here are no quotes available.
collection method	"im Appstore nach Schlagwörtern zu suchen" "Wir waren auf Messen, wir haben mit Leuten gesprochen. Wir haben natürlich im Internet mal ein bisschen gegoogelt"
information source	"wir waren ja auch auf Kongressen und Veranstaltungen unterwegs" " also aus meiner Erfahrung her ist es so Wissen von außen auch essentiell, also auch dann, dass die Competitor-Analyse natürlich nicht vor dem Rechner stattfinden sollte"
information type	"wie alt, wie etabliert [...], wie viele Mitarbeiter" “wie funktioniert denen ihr Pricing Model"
infrastructure	"man baut sich selbst eine Datenbank" "Kriterien ..., die dann [...] in diesem großen Excel-Sheet gelandet"
procedure	"das ist immer so ein bisschen nebenher mitgelaufen" "Ich würde unstrukturiert sagen, einfach angefangen [...] zu suchen"
time	"So ist es dann aus Zeitgründen halt einfach gelaufen" "man kann immer noch deutlich mehr Zeit investieren"
involvement	"Er hat vorrecherchiert und ich habe ausgewertet" "Verstreut im Team"

receptiveness	"Das Thema ist von zentraler Bedeutung" “ich will nicht sagen, das ist überflüssig, ganz im Gegenteil, aber man kann es auch übertreiben"
culture	"Solche Strukturen zwingen einen aber dazu, sich mit Sachen auseinanderzusetzen, die man sonst so einfach übergangen hätte" "weil man sich und seine Ideen, seine Überzeugungen oft in Frage stellen muss"
perception	"Kommunikation ist halt wirklich außerhalb der Komfortzone" "auf einem empathischen Level ist das sehr schwer"
increased market understanding	"zu verstehen, was ist überhaupt auf dem Markt vorhanden, wie können wir uns abgrenzen" "wie groß ist eine Zahlungsbereitschaft und was sind existierende Alternativen schon"
evaluated business idea	"Wir haben unsere Premiumpreistabelle angepasst" "Wir haben die Entwicklungspläne angepasst"
Supported decision-making	"aber es sind viele Ideen da, dass man gesagt hat, oh, das ist spannend, wie die das in der App XY gemacht haben" "indem man sagt, oh, guck mal, das finde ich spannend oder so würde ich es auf keinen Fall machen"
altered entrepreneurial self-consciousness	"ich lasse mich eigentlich relativ schnell von sowas abschrecken" "Aber es war natürlich so dann einfach nochmal viel klarer, okay, also wer sind wir als Unternehmen"

Table 26: Representative supporting data for each second-order theme

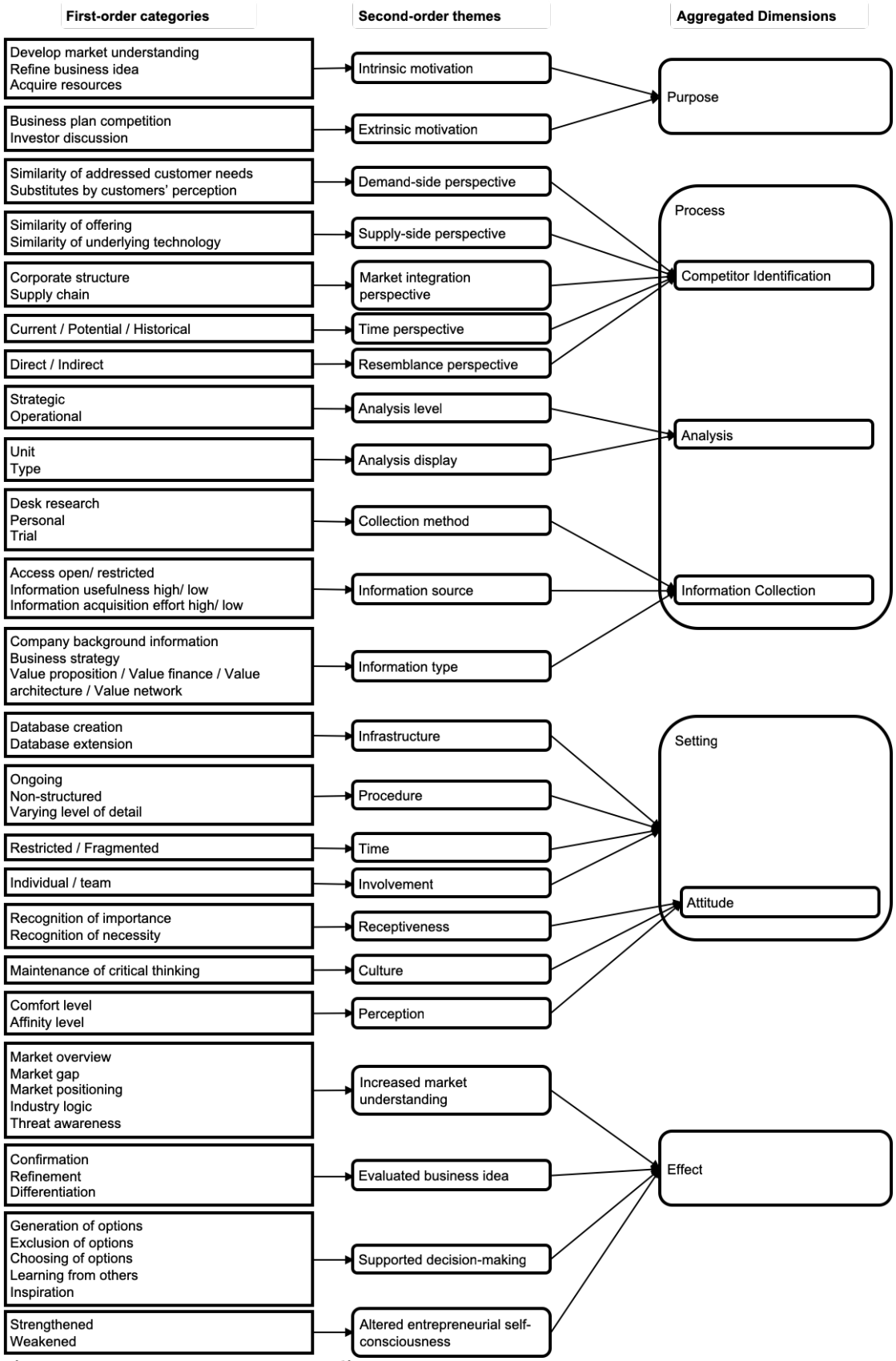


Figure 33: Data structure case studies part 1

4.1.2.6.1 Purposes of CA

With regard to the antecedents of conducting CA two types of motivation can be found in the data: intrinsic and extrinsic motivation. Intrinsic motivations are reasons for performing CA that arise from within the founding team. There are reasons that relate to the wish of understanding the market, including identifying competitors, position the own startup in the market, assess market attractiveness, get a market overview. Also, a refinement of the business idea, e.g. "to design the usability of our app, to get inspired by the other apps, to see what was obviously important" and especially the differentiation of other products ("so it was the motivation to differentiate ") or the acquisition of resources, by recruiting people from similar projects are mentioned. Extrinsic motivations for performing CA are also mentioned. One of these reasons is some kind of business plan competition requirement - either the ones the startups are taking part in at that time or another ("we have completely prepared it for the business plan") or other presentations for investors ("To become fit for investor discussions").

4.1.2.6.2 Process of CA

In line with CA literature (Dishman & Calof, 2008; Prescott & Smith, 1987) different activities can be distinguished with regard to the actual performance of CA: Competitor identification, information collection and analysis.

With regard to **competitor identification** five different perspectives emerge that are used to become aware of and search for competitors. The most prominent one is the demand-side perspective that suggests that firms with products that provide similar benefits or fulfil similar needs are considered competitors (Peteraf & Bergen, 2003). Representative quotes include phrases as "similar solution", "products that do something similar" or "similar in idea". The supply-side perspective, i.e. firms that share similar characteristics (Peteraf & Bergen, 2003), is only used once. The startup tried to find out who is able to use the same technology. Another seldom used approach to identify competitors were to look at the competitor's company structure, e.g. to see who owns the competitors, or have a look at the supply chain (labelled market integration perspective). The identification also has two dimensions in terms of time and resemblance. Startups tend to look at current, potential and historical competitors. However, a historical competitor, i.e. a competitor who tried to serve the same need and failed, was only identified once. The current perspective is the most prominent one. Potential competitors are also considered ("who is potentially active in the field and therefore in the process of developing something"). The startups also tend to differentiate between direct and indirect competitors with regard to how similar the product is ("three products which are similar [...] and should be considered as competition").

The activity of **information collection** contains is analysed according to three dimensions, that can also be found in the literature: information sources (Bennett, 2003),

collection methods (Brush, 1992), and kind of information collected (Subramanian & Ishak, 1998). The collection method the informants most often referred to is not surprisingly desk research, including internet search. But also personal collection methods such as 1:1 conversations or interviews and the visit of conferences were mentioned. Representative quotes are "We conducted a few user-interviews of these apps" or "We went to fairs, we talked to people." The self-testing of competing products also belongs to the collection methods mentioned ("we [...] sat down and looked first, what tools are there, which are also downloaded, tried out").

Thereby the used information source is attributed several characteristics. The access is either open, such as the internet, or restricted, such as industry expert, the information usefulness differs, as well as the acquisition effort. It is observed by several of the informants, that the information value of restricted sources, connected with a higher acquisition effort provides usually a higher information value. That is stated for example by this team member: "to get to the right people in any company through any contacts [is] in my experience [...] a typical channel where you can get valuable information" or "from my experience knowledge from the outside is essential, so that the competitor analysis should not take place in front of the computer".

A third dimension is the type of information, that is collected through these methods from these sources. The kind of information collected can be categorized into background information, strategy information and information according to the business model components, namely value proposition, value finance, value architecture and value network (see Al-Debei & Avison, 2010). Thereof background information about the competitor such as size, age, and headquarter as well as pricing information, revenue model, value proposition were the most interesting information for the informants.

With regard to **the analysis** two kinds of analysis level can be distinguished. On a strategic level an assessment of success and failure reasons ("you obviously want to look at something that's doing a good job in being successful in the market place"), strengths and weaknesses, threats ("We consider their industry network to be their most threatening asset") and of the technology ("They are more experienced in the leading automation technologies than other companies") took place. On an operational level a comparison of offerings, supported the definition of product development plans. From the submitted CA pitch slides the display of the analysis includes either individual firms or groups of competitors. Four of the eleven startups presented a kind of product feature matrix with different characteristics, indicating which of these characteristics are fulfilled by the focal startup versus their competitors. Also, a radar chart, a petal diagram, an x/y diagram, a strengths and weakness analysis, as well as the pure listing of information was used as presentation format.

4.1.2.6.3 Effects of CA

The declared effects of conducting a CA are grouped into four categories. The first category contains effects that are related to an **increased market understanding**. Informants reported to have gained a market overview ("in the beginning it was generally a way of creating an overview"), identified the market gap ("We noticed [...] there are big gaps"), defined a market positioning ("where is the own place [...] in the landscape"), understood the industry logic further ("to better understand [...] the business model [of the customers], the processes and how it is done"), or become aware of threats ("We said, which one is closest to us or most dangerous to us"). Within market positioning the identification of solutions or competitors' products which might be complementary to the own solution is also an output of the analysis. A second effect is an **evaluated business idea**. The business idea gets either confirmed, because no comparable solution is identified, or refined, for example the pricing or product features to be developed. A differentiation of the offering is a main effect of the CA ("I believe that the competitor analysis has also made us more aware of what our offering actually is or what our offering should be, so that we also have a certain differentiation"). Performing the CA also led to **supported decision-making**. This effect is perceptible when CA generated options and the collected information inspired the informants ("where we can see maybe what revenue model they are using. And then see what we want to use maybe from that". Also, the concrete decision against a specific option is a reported effect ("I wouldn't do it that way [the way a competitor is acting]"). CA information also supported to choose concrete options, such as the decision to "to switch to a modular system, because most of the providers make their money with add-ons and that's how we want to do it". Another big scheme is the learning from competitors, reported for example by one informant as "the learning is actually quite important, you can already see some patterns that something works well or doesn't work well, in order to avoid that for yourself". A fourth effect of performing CA is, that it **alters the entrepreneurial self-consciousness**. In some cases, the identified information led to a strengthened confidence in the business idea or, in other cases, to a weakened confidence in the idea ("I let myself be scared off by something that like [the existence of comeptitors] relatively quickly").

4.1.2.6.4 Setting

With regard to the settings of CA five categories emerged. First, with regard to the procedure of CA, the informants report that CA is performed as an "ongoing process", in a rather unstructured way ("we were very naive about it or didn't make a big head out of it to make a plan "), and with varying levels of detail, mostly starting with creating a general overview and in a second step collecting more detailed information ("in the first step we got such an overview [...] after we have determined there is apparently really no one who does exactly that [...] we went back to the details and did a more detailed competitive analysis again, where we then

considered various criteria"). With regard to the involvement of team members, either one dedicated person is responsible for performing the CA, or the task is divided among the team members. Three cases reported that they created a formal database that was extended over time. The time that is taken to perform the CA is restricted ("That's how it went for lack of time") and fragmented.

Through analyzing the interviews another category emerged from the data, which seemed to play a role in the CA process. The themes of this category relate to the attitude the informants have towards CA in general and while performing it. With regard to their receptiveness towards CA, the recognition of the necessity and importance influence the behavior. CA as "topic of central importance" or the attitude that "it's not about the competitors" or that competitors are "not so interesting for us". In a similar way the affinity towards the CA task, e.g. "for me personally it is always a very annoying topic", and the personal wellbeing when performing CA tasks effects the CA process. For example, participants reported that personal communication as integral part of CA is "outside the comfort zone". Also reported is that the maintenance of critical thinking is important "to approach the matter impartially and [...] not just pat yourself on the back".

4.1.2.6.5 Comprehensive overview of CA in startups

While the data structure only captures the findings in a static manner, Figure 34 illustrates the CA phenomenon in ESS with the dynamic relationship between the key dimensions. What becomes evident is that the key dimensions influence each other. The setting impacts not only the purpose of why CA is conducted, but also the performed activities and the effects.

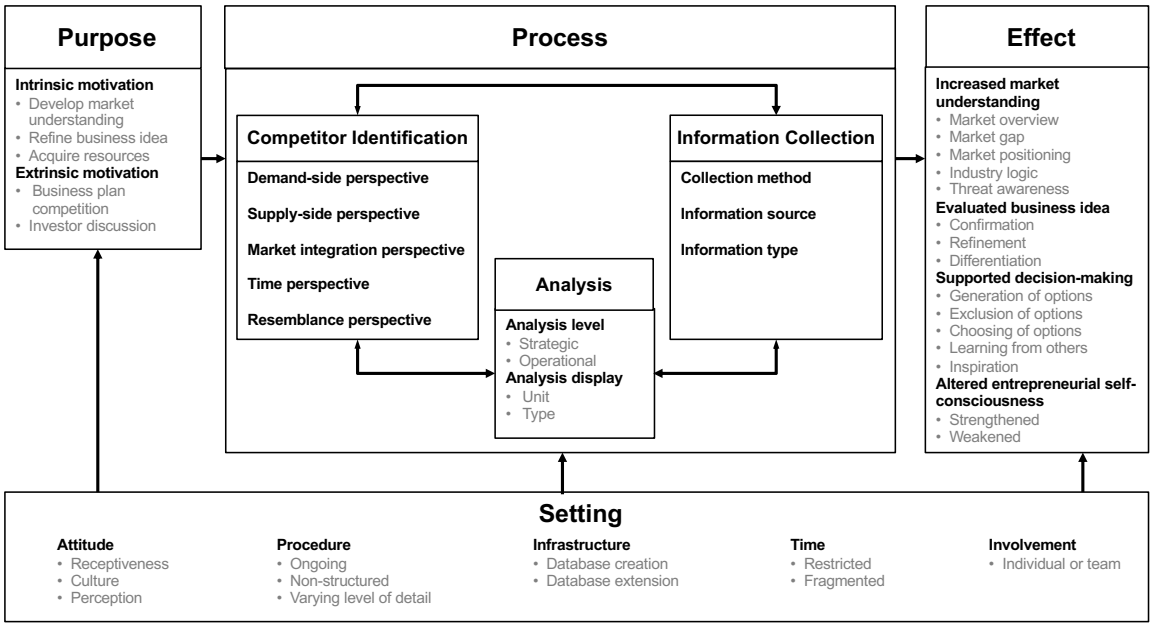


Figure 34: Comprehensive overview of CA in ESS

The attitude in particular may also influence the CA motivation, activities, as well as effects and also other settings structure. For example, if the necessity for CA is not recognized, the time invested might be low, the motivation being rather extrinsic, the collection method and source of a kind that requires only low acquisition effort. The CA activities are performed in an iterative way, in which the in- and output from competitor identification, information collection and analysis respectively trigger new activities. For example, while collecting information about a specific competitor, another competitor may emerge, that was unrecognized before. The display of the holistic overview is inspired by (Dishman & Calof, 2008; Prescott & Smith, 1987).

After having understood the antecedents and effects of CA (RQ1) and how ESS perform CA (RQ2), the third RQ related to the problems ESS face or perceive when performing CA will be examined.

4.1.2.6.6 Problems of CA

In general, several of the informants stated a bad feeling with regard to the quality of their CA. They stated concerns as “It may be that we simply didn't come across apps or products because we either googled wrongly or simply weren't in contact with [the right] people at all” or “even now at the end I have the feeling I have not [mentally] penetrated the market 100 percent”. Also, the impressions of the author as stated in the introduction, that CA is conducted superficially is confirmed with statements such as “I didn't really think much about that”, “a more extensive analysis must be executed” or “you could probably have gone a little deeper”. It turns out that Porter ‘s (1980) declaration that most firms do not conduct competitor analysis explicitly or comprehensively enough holds also true for startups. Rather, they operate on what he calls "informal impressions, conjectures, and intuition gained through the tidbits of information about competitors every manager continually receives." (Porter, 1980, p. 48). More specifically the following seven problem categories emerged.

ESS conduct CA in an unstructured way. None of the participants reported to have pursued a systematic process of conducting the CA. On the contrary, they have proceeded rather “unstructured” and “from the gut”, collecting information in an opportunistic approach. However, Zahra et al. (2002) find evidence that a systematic, formal process enhances the effectiveness of CA activities in new ventures.

ESS lack a guideline about how to conduct CA. On the other hand, the participants also didn’t know how to conduct a CA. The wish for a “guideline”, a “framework” or a “tool” is expressed. One could argue that a reason for not applying existing methods or processes is that the CA performer simply does not know them. However, since at least half of the teams have team members with an economics or management education or experience, who

should be familiar with existing tools or methods, one could argue that a conscious rejection was made.

ESS have problems identifying competitors. A reported problem is the identification of competitors. This includes problems of defining competition as well as finding all of the big, as well as smaller players in the market.

ESS don't know which information to collect about competitors. Another problem the participants revealed is that once they searched for information about competitors, they were confronted with an abundance of data and struggled to select relevant information. The feeling occurred that "you can't really manage the amount of information".

ESS use only limited sources of information. The most used information source is unsurprisingly the internet, not only with search engines but also industry news, open access databanks, websites of the competitors, blogs, forums or special product test websites. Even though the usage if sources with restricted access is also reported, a tendency towards information with a low acquisition effort can be observed, for example the questioning of team members, friends and family. However, even though some of the informants also realized that the value of the information of personal sources is higher (see above), which is also supported by the literature (Brush, 1992; Smeltzer et al., 1988), the desk research is the preferred collection method.

ESS have little understanding about how competitors can be analyzed. As reported above the analysis is mainly limited to the assessment of general strengths and weaknesses, and especially to the comparison of products or offerings to assess for disdavantages of the competitor's offerings. The latter was mentioned 20 times in the interviews, in statements as "too expensive for the majority", "only provides a windows desktop application" or "missing crucial features". However, the analysis is performed with "gut feeling" and "common sense", the comparative dimensions are formed rather opportunistic or even had to be "made up".

ESS have only a limited use of CA or don't know for what to collect and use the information. To "draw conclusions" out of the competitor information obtained is reported as a problem. In general, to get an overview of the market and (product) differentiation are named as main motivations and as effects, but other effects, such as the refinement of the business idea and the support of decisions are incidental by-products, and not explicit goals. Thus, they are also underrepresented in the analysis process, the analysis is performed rather broadly, instead of highlighting special outcomes that are pursued with the activity. Zahra et al. (2002) find that CA activities need to be user-orientated in order to provide value, which means that they must be tailored to the requirements of the executive.

These identified problems serve as a basis to derive the functional requirements of the artefact to be developed (chapter 4.3.1). Other mentioned problems that will not be addressed

by the artefact are the abundance of data, that market research activities usually entail, problems of data access, meaning how to access certain data or persons that are not publicly available, the form of data, which is usually unstructured at the beginning, and trustworthiness of data sources.

4.1.2.7 Implications

The in-depth analysis of eleven cases in a business plan competition revealed how startups currently perform CA, in terms of their purposes, the process and the effects. Moreover, the setting of CA with regard to the attitude, the characteristics of the procedure, the infrastructure used, the time invested, and the team involvement are presented. Seven problems, that occur when startups perform CA, are outlined.

In comparison to the findings of the SLR similarities, as well as differences can be found. With regard to the purposes, an understanding of the current situation and environment was a scheme found in both contexts. The explicit refinement of a business idea was a theme that was not found in the SLR, as well as the extrinsic motivation implied by external stakeholders, even though communication as purpose may be classified as external motivation in specific situations.

One can argue that the emphasis on the mentioned purposes is distributed differently in startups and incumbents. Recent literature suggests that finding, understanding and refining a competitive position in the market, where the customer's perception is key, is a main task of an entrepreneur (Aulet, 2013). This can be categorized as part of the identified purposes of finding a competitive advantage and understanding your market. These are purpose subcategories with a high number of mentions in the SLR. With regard to the definition of strategies, any relevant information eliminates uncertainty and reduces risk when exploiting a business opportunity and make decisions (Kuckertz, 2016), but the entrepreneur must find the correct balance between ill-informed and ill-judged (Wickham, 2006). Defining concrete strategies is, thus, supposedly also a relevant goal for startups. However, despite the refinement of a business model, which might be interpreted as concrete strategy, no evidence was found for the conscious pursuit of the goal of developing a concrete strategy. On the other hand, purpose subcategories that were not mentioned as often in the SLR might be more emphasized for startups. Legitimation, motivation and communication could be regarded as a major goal of startups to perform a CA, as the results may serve to justify the startup's right to exist towards the founders themselves, investors and employees. This idea is supported by the purposes of CA with regard to external motivation, as well as the effect of strengthened self-consciousness. Also, the current entrepreneurship literature indicates that learning and problem-solving could be of high priority for conducting a CA in startups, as proposed in the Lean Startup

approach's validated learning cycles (Blank & Dorf, 2012; Ries, 2011), or effectuation (Sarasvathy, 2001b, 2001a). Even though, CA is typical causational activity, Sarasvathy (2001a, p. 245) already states that "causation and effectuation are integral parts of human reasoning that can occur simultaneously, overlapping and intertwining over different contexts of decisions and actions". Chandler et al. (2011, p. 388) argue that both processes are "legitimate ways to initiate and grow businesses". Therefore, CA, although being an instrument of traditional planning, can support to prove and validate primary hypothesis through actual information, avoiding effort based on false assumptions in the mindset of the Lean Startup approach and effectual thinking. Evidence for this argumentation can be found in the data. Effects such as generation of options, learning from others and inspiration supports the argument, that learning is indeed more pronounced in the startup context.

With regard to the process, the planning theme was not pronounced in the startup context. To the contrary, the process was performed in an unstructured way and opportunisticly for example with regard to the information to be collected. The implementation process, that was observed in the case studies, followed the identification-collection-analysis- process derived from the literature, however, highlighting the ongoing and iterative character. The identified effects supported the purposes for conducting the CA, but have also gone beyond these, indicating that indeed the consciousness of potential purposes is not complete.

This part of the research confirms that, ESS do have their specific needs for conducting CA and that they experience several problems when confronted with the task of conducting a CA. The specified problems will be used for the derivation of requirements, the insights from literature review and the case studies to design of the first version of the artefact.

4.2 ITERATION CYCLE I: ALPHA AND CASE STUDIES

In the first iteration cycle, the requirements of the artefact will be derived from the problem specifications, a first version developed, and evaluated. The evaluation will then be used as basis for the following iteration cycle.

4.2.1 Definition of solution space

After having reviewed the relevant literature and analysed the current problems (chapter 4.1) a solution space is presented. A solution space contains requirements and objectives of a possible solution, and identifies and outlines the artefact (Johannesson & Perjons, 2014, p. 103 ff.; Peffers et al., 2007).The case studies' and the reviews' insights from the preceding problem specification and knowledge generating research activities are also used as basis for the

development and evaluation of the first version of the artefact. As such the artefact will be created and evaluated in a theory-ingrained way (Sein et al., 2011).

4.2.1.1 Outline of the artefact

In discussions with other researchers and startup coaches a decision upon the type of tool and its basic characteristics was made. The conclusion was drawn that a possible solution to the problem could be the introduction of a novel canvas or framework that provides structure, as well as interactive and collaborative opportunities to conduct a viable CA. Thus, the artefact was classified as a design instrumentality (Vincenti, 1993, p. 219 f.) or method (March & Smith, 1995).

In this regard, the framework to be developed in the context of the current research project has the function to augment startups to perform their CA in a viable manner and is thus classified as a tool (Iivari, 2007).

Rigby (2001, p. 139) defines management tools as involving "a set of concepts, processes, exercises, and analytic frameworks". A tool may serve to optimize workflows, support decision-making and consequently ensure or foster a project's success (Doskočil, 2016). Brinckmann et al.(2010) find that even though business planning, as well as the process of business planning itself enhances the performance of new ventures, an absence of business planning structures and procedures can limit the return on business planning. A tool may provide the structure needed. It also may facilitate group interaction and idea generation (Eppler et al., 2011). However, even though tools are no guarantee for success, they provide the necessary elements for performing specific tasks, while creating enough space to concentrate on the essentials. On the other hand, a tool cannot prevent that some startups consider CA as unimportant task (Mohan-Neill, 1995), or that they do not execute this activity due to time and resources constraints (Zahra et al., 2002). However, tools make getting started easier and implementation more efficient, thus, may increase the probability of success.

The proposed framework will be pen and paper-based, inspired by the Business Model Canvas (Osterwalder & Pigneur, 2010) or Jobs-to-Be-Done-Framework™ (Ulwick & Boysen, 2018) format. The graphical tool is supposed to give a cohesive overview, facilitate communication among the team members, and to increase creativity and innovation by enabling discussion and brainstorming sessions (see Trimi & Berbegal-Mirabent, 2012). Besides team discussion, it should also enable time management (Lukas, 2018).

4.2.1.2 Requirements

A requirement is a "property of an artefact that is deemed as desirable by stakeholders in a practice and that is to be used for guiding the design and development of the artefact. A

requirement can concern the functions, structure, or environment of an artefact as well as the effects of using the artefact." (Johannesson & Perjons, 2014, p. 103). The functional requirements, as the name implies, refer to the functions of the artefact and are specific to the situation. They are derived from the explicated problems and based on stakeholders' needs and wants. Structural requirements, on the other hand, are typically more generic and refer to structure of the artefact itself. Examples are coherence, consistence, modularity, or conciseness. Environmental requirements, also more generic requirements, refer to the relationship with the environment. Environmental qualities may be subdivided into usage qualities, management qualities and generic environmental qualities. Usage qualities concern usability, comprehensibility, learnability, customizability, suitability, accessibility, elegance, and fun. Management qualities consider maintainability, flexibility, and accountability of an artefact. Generic environmental qualities relate to the expressiveness, correctness, generality, interoperability, autonomy, proximity, completeness, effectiveness, efficiency, robustness, and/ or its resilience. In addition, requirements can be formulated, that refer to the effects of using the artefact (Johannesson & Perjons, 2014, p. 103 ff.).

Other authors propose shorter lists of requirements, such as the 5Es (efficacy, efficiency, effectiveness, elegance, and ethicality) framework by Checkland & Scholes (1999).

However, the requirements need to be carefully selected based on the stakeholders' problems and needs and the desired outcome. As such the functional requirements are derived from the explicated problems.

The derived problems (1) – (6) can be translated directly into requirements of the framework. Problem (7) needs to be discussed in more detail. The derived requirement is to explicate a purpose that the framework needs to fulfill. However, from the majority of purposes from the SLR as well as the case studies, a focus must be chosen, since it is unrealistic to meet all objectives equally. Because the design and validation of a business model is at the core of the startup process (Faltin & Ripsas, 2011; Osiyevskyy et al., 2018), business model validation, i.e. the confirmation or adaption of a current business model component, and the generation of options for the business model are determined as main goals of the framework. Moreover, to gain a market understanding is a main goal of CA, which is confirmed in the SLR as well as in the interviews with the startups. The same holds true for the general goal of supported decision-making. As such, a newly developed framework should also enable these goals. Table 27 shows an overview of the problems and the explicated functional requirements.

Problems	Functional Requirements
(1) ESS conduct CA unstructured	(1) The framework must support conducting a structured CA.
(2) ESS lack a guideline about how to conduct CA	(2) The framework must provide clear guidance on the process of CA.
(3) ESS have problems identifying competitors	(3) The framework must help to identify competitors.
(4) ESS don't know which information to collect about competitors	(4) The framework must help to collect relevant knowledge about competitors.
(5) ESS use only limited sources of information	(5) The framework must encourage to use diverse information sources.
(6) ESS have little understanding about how competitors can be analyzed	(6) The framework must provide clear guidance on how to analyze competitors
(7) ESS have only a limited use of CA or don't know for what to collect and use the information	(7) Purpose of the framework I. The framework must fulfill a specific CA purpose. It must: (a) help to validate the current business model (confirmation or adaption of a current business model component) (b) help to generate business model options. II. General CA purposes must be fulfilled. It must: (c) help to understand the market. (d) support informed decision-making

Table 27: Functional requirements of the artefact - iteration cycle I

In addition to the functional requirements, which can be interpreted as the artefacts "usefulness", structural, environmental as well as effect requirements are postulated (see Table 28).

Structural requirements	The Framework must be • Coherent • Concise
Environmental requirements	The Framework must be • Easy to use • Easy to learn/ comprehensible • Complete • With adequate complexity • Efficient
Effect requirements	The framework must provide some advantage to status quo

Table 28: Structural, environmental and effect requirements

With regard to the research question of "How can startups conduct a viable CA?", these requirements represent the criteria, that constitute the viability concept. That means these criteria must be fulfilled by the framework to enable the users (startup teams) to conduct a viable CA.

4.2.2 Design and development of the Alpha Version

4.2.2.1 The design process

Based on the SLR, especially the methods and quality criteria identified, the supplementing literature review, the findings of the case studies to explicate the current status and problems of CA activities in startups, as well as the derived requirements a first version of the artefact, namely Alpha version, is created. In two full-day and another two-hour design session with a second and partly third researcher in June 2017 ideas for the concrete design of the Alpha version are generated, sketched, assessed and selected (Johannesson & Perjons, 2014, p. 117 ff.). The involved researchers also work at the HPI School of Entrepreneurship, and the HPI Seed Fund and, thus, also bring the perspectives of startup coaches and investors into the building process. At the end of this process, the design decisions made are justified and reflected upon. Following the proposed guidelines to design and develop artefacts by Johannesson & Perjons (2014, p. 125) each component of the artefact is described clearly and justified, and the intended use is outlined. The sources of the design, that have contributed to components of the artefact and/or inspired the design of new components are the findings of the SLR (chapter 4.1.1), the supplementing research of textbooks and practitioner media (chapter 4.1.1.3), and the case study insights (chapter 4.1.1.4). In the design sessions design options based on the sources are discussed and its usefulness for startups discussed. The selected design options are sketched and reevaluated in the next session until an agreement for the Alpha version to be evaluated was reached.

4.2.2.2 The design

The Competitor Analysis Framework (CAF) in its Alpha Version is a tool that supports the assessment of a (preliminary) business model through a structured process of CA. It is organized into three phases: (1) planning and focus, (2) execution, (3) decision (see Figure 35). The process and structure are mainly inspired by (Dishman & Calof (2008) and Prescott & Smith (1987). It consists of clear design principals and provides a step-by-step procedure.

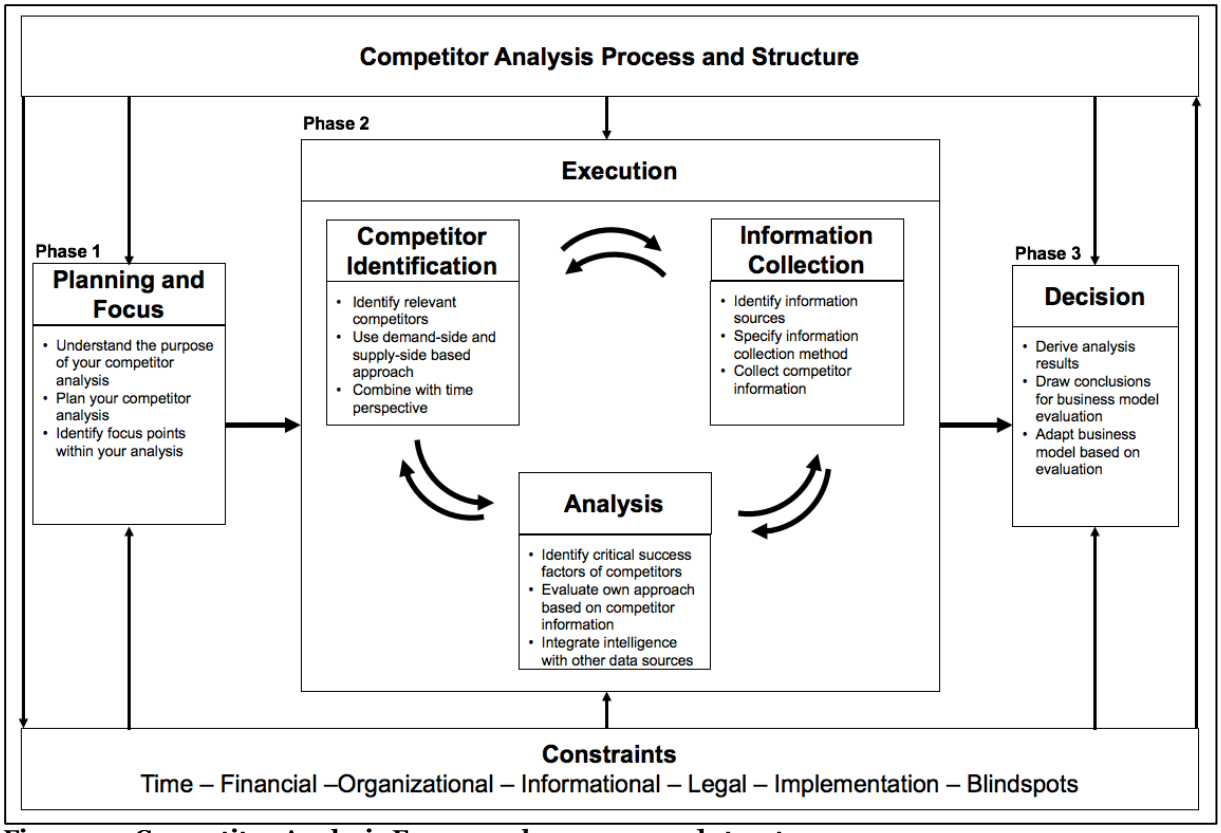


Figure 35: Competitor Analysis Framework - process and structure

In the following, each of the three phases and related steps is presented in an actionable way.

Phase 1: Planning and focus. As suggested in the literature this part of the CAF supports managing the process (Gruber, 2007). During this stage, the nature, scope, and the overall goals of the project must be clearly established (Prescott & Smith, 1987).

Step one includes understanding the purpose of the CAF as reassessment of a (preliminary) business model. The process serves the legitimation (Bennett, 2003; Goshal & Westney, 1991) of adapting or confirming the status quo. The unit of analysis are competitors within the same and across markets. The analysis covers business units ranging from corporates, subsidiaries to business departments (Aaker, 2013).

Step two covers the fulfilment of analysis prerequisites. In order to be able to examine competitive relationships an operational definition of competition which reflects the customer perspective is needed (Shocker et al., 1990). Thus, the prerequisite for applying the CAF is a preliminary Business Model Canvas in which at least the value related components are filled. These include the value proposition, customer segments, customer relationships and channels. This is used to develop a first understanding of the own business model and delimit it from other businesses by the value components of the business model (Moyer, 1982; Patterson & McCullough, 1980). This sets the stage for the next CAF phases.

In a third step the focus of the analysis is set by the performing team in order to account for time and resource constraints. Thus, it needs to be possible to place a focus on individual business model components or defining other or additional focus points. At this point the performing team has the possibility to choose the effort along an effort scale that is to be used on a specific component. By default, every business model component will be of interest (effort scale on "0"). If a component is of special interest to the analysis team, a focus can be defined, leading to an enhanced effort in the next phases compared to other components (effort scale on "+" and "++").

In a fourth step the performing team should think about the constraints of the analysis. It is important to understand, that the business model assessment based on the CAF is always limited in terms of resources. It can only be applied, when a sufficient amount of resources is available. The constraints covering the analysis need to be specified during the planning phase, and further adapted throughout the process (Prescott & Smith, 1987). Additionally, an awareness of and/or a reaction to possible blindspots can be achieved (Zajac & Bazerman 1991; Zahra & Chaples 1993). As such, the following constraints need to be defined:

- Time: How much time can be invested to perform the analysis?
- Organizational: Who will participate in performing the analysis?
- Financial: What budget is available to perform the analysis?
- Informational: Which information will be available for the analysis? Which information sources and methods can we use?
- Legal: What legal aspects need to be considered?
- Implementation: Which constraints occur during the execution? How is a knowledge bank created?
- Blindspots: What blindspots exist? How can we overcome them?

Phase 2: Execution. The aim of phase 2 is the iterative performance of the following three steps: competitor identification (1), information collection (2) and analysis (3). They are not ordered sequentially and therefore switches between steps are expected.

For the identification of competitors, a demand-side based, i.e. consumer perceptions (Shocker et al., 1990), and supply-side based approach, including competences (Gorman & Howard, 1997) and resource similarity concepts (Bergen & Peteraf, 2002), are combined with a time perspective. Thereby, direct, indirect, potential and historical competitors can be identified (Bergen & Peteraf, 2002; Chen, 1996; Clark & Montgomery, 1999; Peteraf & Bergen, 2003; Zahra & Chaples, 1993). Approaches to identify the first set of current competitors can be substitution-in-use (Aaker, 2013, p. 44), job theory (Christensen et al., 2016; Ulwick, 2016), next-best alternative (Wouters, 2010) and share of wallet (Lehmann & Winer, 2002). To

support the teams with identifying competitors a matrix with guiding questions is designed based on Christensen et al. (2016), Aaker (2013), Czepiel & Roger (2012), Wouters (2010), Peteraf & Bergen (2003), Bergen & Peteraf (2002), Lehmann & Winer (2002), Clark & Montgomery (1999),Gorman & Howard (1997), and Day & Wensley (1988) . This matrix (Table 29) can be filled in an iterative process with steps two and three of this phase.

	Direct Competitors	**Indirect Competitors**
Historical Competitors Which business served or tried to serve the same need in the same market but does not exist anymore?	served the same customer need, business doesn't exist anymore	
Current Competitors What do customers buy, when your product doesn't exist? Which other products do the job? What is the next best alternative for the customer? How does the customer solve the problem now?	serve the same customer needs, using the same resources	serve the same customer needs, using different resources
Potential Competitors Which firms have the potential to sell to your customers?	do currently not serve the same customer need, but have the same resource base	have different resources, that are potentially usable to serve the same customer need

Table 29: The CAF competitor identification matrix

In the information collection step information for each business model component for the identified competitors based on data collection questions adapted from Osterwalder et al. (2010) needs to be gathered. Special effort needs to be put on the collection of information for the previously defined focus points. This step is also inspired by the Business Model Analysis Method described by Fleisher & Bensoussan (2015, p. 159 ff.)

The analysis step is performed for each business model component, by using the information collected in the previous step. First, the criticalness of the respective business model component for each competitor is rated. This step is inspired by the Critical Success Factors Analysis outlined by Fleisher & Bensoussan (2015, p. 221 ff.). If possible, the competitor's approach is compared to the own status quo. One approach of generating options can be the copying or imitation of the competitor (Dattakumar & Jagadesh, 2003; Gelb et al., 1991; Wright et al., 2002), thus already existing options of the market may be a source of inspiration. Another approach is the generation of new options. This can be achieved through the application of the four actions framework that challenges a given industry's logic by answering the four key questions: 1. Which of the factors that the industry takes for granted should be eliminated? 2. Which factors should be reduced well below the industry's standard? 3. Which factors should be raised well above the industry's standard? Which factors should be created that the industry has never offered? The four actions framework is developed by Kim & Mauborgne (2005)and based on the analysis of an industry. Finally, key findings, derived learnings and insights

according to the guiding questions can be summarized and options listed. It is intended to use (at least this part of) the framework in a team, because the team members need to share a common understanding of the competitive arena (Blank & Dorf, 2012, p. 226).

Phase 3: Decision. The decision phase covers decision-making activities based on the insights gained in phase 2. Ideally, by utilizing the intelligence the initial business model will be (extended and) adapted or confirmed. Decisions can be made for each business model component based on the identified and evaluated options. It is important to keep the interdependencies of the individual components in mind while making these decisions. The decisions then lead to a new business model or confirm the existing one.

The artefact Alpha Version. Based on the knowledge of the archival knowledge base, the design decisions were made to create an Alpha Version of the artefact. It was designed for a Din A0 printout using Microsoft Office Powerpoint. Figure 36 displays a scaled-down version of the CAF.

Competitor Analysis Framework

The Competitor Analysis Framework is a tool that supports the assessment of a (preliminary) business model (BM) through a structured process of competitor analysis. It is designed with focus on Early Stage Software Startups . The outcome of the framework is a validated or newly created BM that can then be applied in the market.

Assessment for:

Assessment by:

On:

Provide Input

Preliminary Business Model Canvas with at least the value components.

Set Focus

Place a focus on individual components.

BM Component \ Effort & Focus		Analysis Effort (+, +, o)	Focus
Value Components	Value Proposition		e.g. Product features/ MVP development product quality, pricing
	Customer Segments		e.g. Niche/ mass market and enterprise/ consumer choice
	Customer Relationships		e.g. Plan for recurring revenue
	Channels		e.g. Channel selection
	Revenue Streams		e.g. Revenue model
Efficiency Components	Key Activities		
	Cost Structure		e.g. Cost strategy
	Key Resources		e.g. Intellectual property strategy
	Key Partnerships		*e.g. Alliance strategy*

Optional: Add additional focus points

Specify Constraints

Specify limitations of your analysis.

Constraint	Specification
Time	How much time can be invested to perform the analysis?
Organizational	Who will participate in performing the analysis?
Financial	What budget is available to perform the analysis?
Informational	Which information will be available for the analysis? Which information sources and methods can we use? Sources: open sources, as well as personal sources (e.g. competitor, customer)
Legal	What legal aspects need to be considered
Implementation	Which constraints occur during the execution?
Blindspots	What blindspots exist? How can we overcome them? - Information sources - Team

Competitor Identification

	Direct Competitors	Indirect Competitors
Historical Competitors Which business served or tried to serve the same need in the same market but does not exist anymore?	*served the same customer need, business doesn't exist anymore*	
Current Competitors What do customers buy, when your product doesn't exist? Which other products do the job? What is the next best alternative for the customer? How does the customer solves the problem now?	*serve the same customer needs, using the same resources*	*serve the same customer needs, using different resources*
Potential Competitors Which firms have the potential to sell to your customers?	*do currently not serve the same customer need, but have the same resource base*	*have different resources, that are potentially usable to serve the same customer need*

BM Component \ Competitor	Competitor 1 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure:*	Competitor 2 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure:*	Competitor 3 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure:*	Competitor 4 *Location:* *Short Description* *History:* *Key events:* *Major transactions:* *Ownership structure:*	Competitor 5 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure*	Competitor 6 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure:*	Competitor 7 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure:*	Competitor 8 *Location:* *Short Description:* *History:* *Key events:* *Major transactions:* *Ownership structure*	Your Startup	Findings *What did you learn about this BM component?* *What did you learn by comparing your own with your competitors' approaches?* *Which options exist?* *Which options are feasible for your startup?* *Which risks / uncertainties does each option include / reduce?*	Select Option & Adapt or confirm BM
Value Proposition *Characteristics* *Newness* *Performance* *Customization* *"Getting the Job Done"* *Design* *Brand/ Status* *Price* *Cost Reduction* *Risk Reduction* *Accessibility* *Convenience/Usability*	*What value does your competitor delivers to the customer? ◇ Which problems is your competitor helping to solve for the customer? ◇ What bundles of products and services is your competitor offering to each customer segment? ◇ Which customer needs is your competitor satisfying?*								*Describe how you plan to perform it.*	*Summarize key findings, derive learnings, and insights.* *List options.* *1. Options derived from competitor's approaches and analysis thereof.* *2. Options outside the industry's logic.*	
Customer Segments	*For whom is your competitor creating value? ◇ Who are the most important customers of your competitor?*										
Customer Relationships *Examples* *(Dedicated) Personal assistance* *Self-Services* *Automated Services* *Communities* *Co-creation*	*What type of relationship establishes and maintains your competitor with each of its customer segments? ◇How are they integrated with the rest of your competitor's BM?*										
Channels *Channel phases* *1. Awareness about products/services* *2. Evaluation of value proposition* *3. Purchase* *4. Delivery of value proposition* *5. After sales*	*Through which channels does your competitor reach its customer segments? ◇ Which ones work best? ◇ Which ones are most cost-efficient? ◇ How is your competitor integrating them with customer routines?*										
Revenue Streams	*For what value do customers currently pay your competitor? ◇ How are they currently paying? ◇ How would they prefer to pay? ◇ How much does each revenue stream of your competitor contribute to its overall revenue?*										
Key Activities	*What key activities do the value propositions/ distribution channel/ customer relationship/ revenue streams of your competitor require?*										
Cost structure	*What are the most important costs inherent in your competitor's BM? ◇ Which of your competitor's key resources are most expensive? ◇ Which of your competitor's key activities are most expensive?*										
Key Resources *Types of resources* *Physical* *Intellectual (brand patents, copyrights, data)* *Human* *Financial*	*What key resources does your competitor own?*										
Key Partnerships	*Who are the key partners of your competitor? ◇ Who are the key suppliers of your competitor? ◇ Which key resources is your competitors acquiring from partners? ◇ Which key activities do partners perform for your competitor?*										

Rate how critical the BM component is for the competitor's success - from 1 (not critical) to 5 (very critical)

The Competitor Analysis Framework is based on the Business Model Canvas (Osterwalder et al. (2010) and other literature. For a complete list of the literature, contact nicolas.bohnert@hpi.de or nadja.hatzijordanou@hpi.de. The Competitor Analysis Framework is work in progress. Distribution only after consultation with the aforementioned contacts.

Figure 36: Competitor Analysis Framework Alpha Version

4.2.3 **Demonstration and evaluation**

The activity of evaluation in a DSR project is crucial (Hevner et al., 2004; March & Smith, 1995; Vaishnavi & Kuechler, 2004), as it provides evidence that the artefact solves the problem or improves the situation, it provides feedback for the next artefact iteration as well as assures the rigor of the research (Venable et al., 2014). The artefact is evaluated to answer the research questions: "Is the developed artefact supporting startups in conducting a viable CA?" and "How can the developed artefact be further improved, if necessary?"

4.2.3.1 The FEDS Framework

To perform the evaluation in a structured way, Venable et al. (2014) introduces the FEDS framework (Framework for Evaluation in Design Science Research) to guide the evaluation of DSR projects. The FEDS framework is applied in this thesis to conceptualize and implement the evaluation rigorously.

In the first step, the goals need to be explicated. Goals may be rigor, uncertainty and risk reduction, ethics and efficiency (Venable et al., 2014). A main goal is to ensure rigor in the sense of efficacy, i.e. that the outcome is caused by the artefact, and effectiveness, i.e. that the artefact works. Uncertainty and risk reduction is mainly important with regard to social and use risk, meaning that the artefact needs to fit the situation in which it is applied. Areas for improvement and potential difficulties, thus, need to be identified as soon as possible in the DSR project's process. Ethical goals play only a minor role, since the application of a framework presumably does not put any users at risk. However, with regard to the evaluation in the business plan competition context, it must be ensured, that the participants of the competition are not disadvantaged through the use of the artefact. With regard to efficiency goals this thesis is subject to common time constraints of a dissertation. Moreover, at the beginning of the research, only limited knowledge about CA activities in startups are prevalent and about how users would respond and react to the new artefact. This makes the development of the artefact to some extent exploratory in nature. Thus, the initial design could contain flaws. Thus, the evaluation needs to be rigorous, compensate for false starts, and formative in order to learn and improve the artefact as it developed. (Venable et al., 2014).

In a second step, the evaluation strategy is chosen as the human risk & effectiveness strategy. The reasons for that are diverse. First, the major design risk is social or user oriented, meaning that the artefact is highly dependent on its usage by real people. Second, it is feasible to evaluate with real users in a real context. This is mainly, because it is possible to evaluate the artefact within the course of the HPI business plan competition teams from 2017 and 2018. Third, a critical goal of the evaluation is to rigorously establish that the utility and benefit of

the artefact are given in real situations. The evaluation process focusses on naturalistic evaluation, i.e. the assessment of the artefact's performance in its real setting with real people (Sun & Kantor, 2006). Hereby, purposes along the continuum of formative and summative evaluation are pursued. Thus, summative evaluation is used to assess the performance, and formative evaluation additionally informs the actions for a next iteration in the light of evidence (Black & Wiliam, 1996). Early formative, naturalistic evaluation is needed to conduct the research efficiently, in order to address the possible initial flaws and allow for iterations.

The third step of the FEDS framework deals with the choice of properties to evaluate. As proposed by Venable et al. (2014) potential evaluands are listed and aligned with the goals of the project. The selection of evaluands is "necessarily unique to the artefact, its purpose(s), and its situation during evaluation" (Venable et al., 2014, p. 7). Evaluands are proposed by several authors (Mathiassen et al., 2000; Stuffelbeam, 2003; Sun & Kantor, 2006). Based on the evaluands proposed and used in prior literature and the specified requirements (chapter 4.2.1.2) the evaluands are chosen.

In a fourth and last step, the individual evaluation episodes are designed. The evaluation was performed iteratively. Thus, it was decided step by step which evaluation would be most meaningful next and would provide the most added value. Similar to the concept of theoretical sampling (Glaser & Strauss, 1967) the process ends with an evaluation where no new information is expected to be obtained from further data. Three evaluation loops were completed until a final version of the framework was defined. With regard to specific research strategies or methods none are excluded in advance, since any can be valuable depending on the goals and characteristics of the specific evaluation episode (Johannesson & Perjons, 2014, p. 77).

4.2.3.2 Research design

As case studies are an optimal design evaluation method for studying the artefact in depth in its business environment (Hevner et al., 2004), they are chosen as research approach for the first evaluation. Thus, the evaluation design is performed as an embedded multiple-case study according to (Yin, 2014, p. 31 ff.).

According to the process described in chapter 4.1.1.4, semi-structured interviews are conducted, which are then transcribed and coded, and a content analysis using the "Gioia-Method" (Gioia et al., 2012; Gioia & Pitre, 1990) is performed.

The setting and the participants in the case study are similar to those from the chapter 4.1.2.2. The participants remain the same (see Table 23), as well as the overall setting of the described business plan competition (see chapter 4.1.2.2). However, the participants are further ahead in the entrepreneurial process. They also received an input session, where amongst

input to other relevant topics concering the business model environment, such as trends and macroeconomic forces, the developed artefact is introduced and its usage explained. The teams received a handout from the input session slides, which includes the following content with regard to the CAF:

- An overview of the DIN A1 Alpha Version of the CAF
- A description of the three phases (planning/focus, competitor identification/ information collection/ analysis and decision) and the respective action steps to be fulfilled within these phases.

The teams also received a DIN A1 handout from the framework in its Alpha Version and a digital version as pdf upon request, which occurred once.

4.2.3.3 Data points

As data sources the following data are collected and analysed:

- A submitted CA after the input session on CA per team. That equals a CA influenced by the E-School coaches' input session and the exposure to the artefact to be developed. The participants' CAs were handed in on 16. and 17.07.2017 as a powerpoint or pdf file with note section.
- The used, i.e. filled out, artefacts per team. The frameworks were used between their handout at the respective input session on 29.06.2017 and the submission deadline of 23.07.2017. They were handed in as manually filled out DIN A1 hardcopies (5), as digitally edited versions as pdf (5) or as excel files (1).
- Emails from the participants of the business plan competition with regard to the CAF.
- One interview per team after the submission of the influenced CA and usage of the artefact. Again, up to three team members per team participated in the interviews. Table 30 summarizes the conducted eleven interviews. In sum, 13 team members have been interviewed in 04:43 hours. On average one team member per team has been interviewed in 25 minutes. Even though more than one team member was interviewed, the teams chose to fill out one questionnaire per team.

  The interviews were conducted between the 20th and 25th of July 2017.

Team code name	Team members interviewed	Interview length (hh:mm:ss)	Filled out questionnaires
Startup 1	1	00:35:11	1
Startup 2	1	00:19:29	1
Startup 3	1	00:13:12	1
Startup 4	1	00:40:48	1
Startup 5	3	00:31:02	1
Startup 6	1	00:25:51	1
Startup 7	1	00:12:13	1
Startup 8	1	00:20:36	1
Startup 9	1	00:37:16	1
Startup 10	1	00:22:35	1
Startup 11	1	00:25:33	1
Sum	13	04:43:46	11
Average	1,18	00:25:48	

Table 30: Interviews case study part 2 overview

4.2.3.4 Data collection and analysis method

A mixed methods approach is used with regard to the data collection and analysis. Qualitative interviews, that are suitable for asking open-ended questions, pursuing a flexible interview structure, allowing for upcoming questions spontaneously during the interview, and individual in-depth investigation of addressed issues (Döring & Bortz, 2016, p. 365; Flick, 2014, p. 217 ff.; Schnell et al., 2013, p. 379 f.) are combined with quantitative assessment questions. As such, similar to the protocol method (Hunt et al., 1982) the participants were asked to think aloud while rating statements on a five-point likert scale in the questionnaire to explain their choices, allowing for a flow of speech while the interviewer still has the opportunity to ask for more details and to go deeper into specific aspects. Open-ended questions complement the interview. The parallel combination of quantitative and qualitative data collection and analysis as concurrent triangulation serves to expand the potential knowledge gain and to mutually validate findings (Flick, 2011). The quantitative research results gain from a detailed look at the individual case, a better understanding through the contextualisation of the quantitative data is enabled and the knowledge and insights are more comprehensive, and more multi-perspective (see Kuckartz, 2014, p. 54). The selected mixed methods approach also allows for a combination of summative and formative evaluation.

With regard to the mixed method approach, the data analysis is conducted in a twofold way taking into account the quantitive and the qualitative data obtained.

For the qualitative analysis of the mentioned data points, a content structuring content analysis (Kuckartz, 2018, p. 97 ff.) with the goal of summarizing the material (Philipp Mayring, 2015, p. 69 ff.) is used. For this purpose the inductively emerging categories are developed using the Gioia Method (Clark et al., 2010; Corley & Gioia, 2004; Gioia & Chittipeddi, 1991;

Gioia et al., 2012) as described in chapter 4.1.2.5. However, the main goal of this evaluation is not to derive a structure out of the data, thus, finding relationships between the categories is of subordinate importance. The main goal is to detect improvement potential. Thus, a hybrid form of category building (Kuckartz, 2018, p. 95 f.) is applied. In particular that means, that a substructure is applied, categorizing data into their affiliation to a particular statement to a questionnaire and categorizing into positive codes, negative codes and suggested improvements. Again, Atlas.ti 8, a computer-based qualitative software application, is used to support in coding and analyzing the transcripts and documents throughout the entire research process.

4.2.3.4.1 Interview process of CAF Alpha Version evaluation interviews

The interview process follows the process described in chapter 4.1.2.4.1. The teams are now in a position where they have received an input session for how to use the CAF Alpha version and had the task to perform a CA using the developed artefact. The questionnaire and interview guideline were developed according to the derived requirements and is described in the next chapter.

4.2.3.4.2 Interview guideline

The preparation of the guideline considers the information given in chapter 4.1.2.4.2. The warm-up phase (Gläser & Laudel, 2010, p. 148 f.) was reduced since the interview partners already knew each other, but was used to gain background information about who conducted the competitor analysis and how much time was spent on this. The questionnaire, which is also used as an interview guideline, consists of four parts which are directly related to the derived functional, structural, environmental, and effect requirements. For each requirement one or more statements are phrased for which the participants needed to rate the extent to which they agree with each statement on a five-point likert scale (Friedrichs, 1990, p. 175 f.; Likert, 1932) and to explain their choice while thinking aloud. The rating of statements is a common procedure in the evaluation of artefacts (Bosch et al., 2013; Davis, 1989; Moore & Benbasat, 1991; Venkatesh et al., 2003) and the Likert scale is especially useful for formative evaluations (Sun & Kantor, 2006). An open question is included to ask the interviewee, if there are important aspects about the CAF that haven't been mentioned before. This increases the openness of the interview (Gläser & Laudel, 2010, p. 149). Table 31 displays the questionnaire, that was handed out to the interviewee in the left column, the related requirements in the middle column and literature on which the questions are based on in the right column. The functional requirements test the usefulness for the main purpose of the artefact (Bosch et al., 2013) and are thus individually created for this framework. Environmental, structural and effect requirements are based on evaluands used in the literature. The FAROUT (Future-Orientation/ Accuracy /Resource-efficiency/ Usefulness/ Timeliness) evaluation of competitor analysis techniques was created by (Fleisher & Bensoussan, 2003, 2015). This evaluation part was used primarily as

summative evaluation. However, the usefulness part was omitted since the usefulness is already represented in the derived requirements, especially in the functional requirements. The questions are pretested with entrepreneurs and fellow researchers to ensure comprehensibility, and test the duration (Berger-Grabner, 2016, p. 142; Döring & Bortz, 2016, p. 372; Friedrichs, 1990, p. 221 f.), which led to minor changes in wording.

Questionnaire	**Requirement Coverage**	**Related literature**
Rate the extent to which you agree with each statement 1 -5 (strongly disagree, neutral, strongly agree). Please explain your choice. 1. The framework supports conducting a structured CA. _____ 2. The framework provides clear guidance on the process of CA. _____ 3. The framework helps to identify competitors. _____ 4. The framework helps to collect relevant knowledge about competitors. _____ 5. The framework encourages to use diverse information sources. _____ 6. The framework provides clear guidance on how to analyze competitors. _____ 7. The framework helps to validate my current business model. _____ 8. The framework helps to generate business model options for my own business. _____ 9. The framework either leads to confirmation or adaption of a current business model component. _____ 10. The framework helps to understand the market. _____ 11. The framework supports informed decision- making. _____	Functional Requirements: The usefulness for the artefact's main purposes (design goals) is evaluated.	(Bosch et al., 2013)
12. Overall, I believe that the framework is easy to use. _____ 13. Learning to use the framework is easy for me. _____	Environmental Requirements: The Framework must be • Easy to use • Easy to learn/ comprehensible • With adequate complexity	(Davis, 1989; Moore & Benbasat, 1991; Venkatesh et al., 2003)
14. Using the framework improves the quality of the CA work I do. _____ 15. Using the framework makes it easier to do my CA job (i.e. conduct a viable CA). _____ 16. Using the framework enhances my effectiveness on the CA job (i.e. conduct a viable CA). _____ 17. Using the framework increases my productivity. ____	Effect requirement: The framework must provide some advantage to status quo.	(Moore & Benbasat, 1991)
Is there something you want to tell us with regard to the usage/ quality or design of the CAF?	Structural Requirements: The Framework must be • Coherent • Conciseness Environmental Requirements:	

	The Framework must be • Easy to use • Easy to learn/ comprehensible • Complete • With adequate complexity • Efficient	
Rate the items. 18. Future-Orientation _____ (1 = output is not future-oriented. It may be too anchored in the past or present. 5 = the method is highly future-focused.) 19. Accuracy _____ (1 = the level of accuracy for outputs using this method is low, taking into account the probable sources of data underlying its application. 5 = the requirements of the model lead to the generation of highly accurate outputs.) 20. Resource-efficiency _____ (1 = this method requires a large volume of data, financial, and human resources, and is low in efficacy. 5 = this method is highly efficient in its use of resources and in deriving desired outputs from utilizing lesser inputs) 21. Objectivity _____ (1 = provides low levels of objectivity due to its inability to reduce the presence of biases and mindsets in its application. 5 = the potential for biases and distortions can be minimized through effective use of this method.) 22. Timeliness _____ (1 = method that requires a great deal of time to properly complete. 5 = method takes little time to successfully complete.)	Environmental Requirements: The Framework must be • Complete • With adequate complexity • Efficient Summative evaluation	(Fleisher & Bensoussan, 2003, 2015).

Table 31: Development of the questionnaire for the evaluation of the CAF Alpha Version

4.2.3.5 Findings

The findings relate to the main goal of a formative evaluation, thus, to explore improvement potential of the artefact. For this purpose, descriptive statistics and a qualitative analysis using the Gioia Method are performed.

4.2.3.5.1 Descriptive statistics

The quantitive data are analysed first. The first data points analysed are the submitted CA slides before and after the usage of the CAF. Several aspects give a first indication about the quality of the created artefact. The number of words used in the CA slide and the related notes section of the submitted pitch decks of each team are counted and compared to the word count of the CA slide and notes section before the usage of the CAF. Overall it can be stated, that the number of words used clearly increased after the usage of the CAF. While the sum of words used in the notes section appears stable, the overall word count and average number of words used increased by 83%, the median number of words used by 37% (see Figure 37).

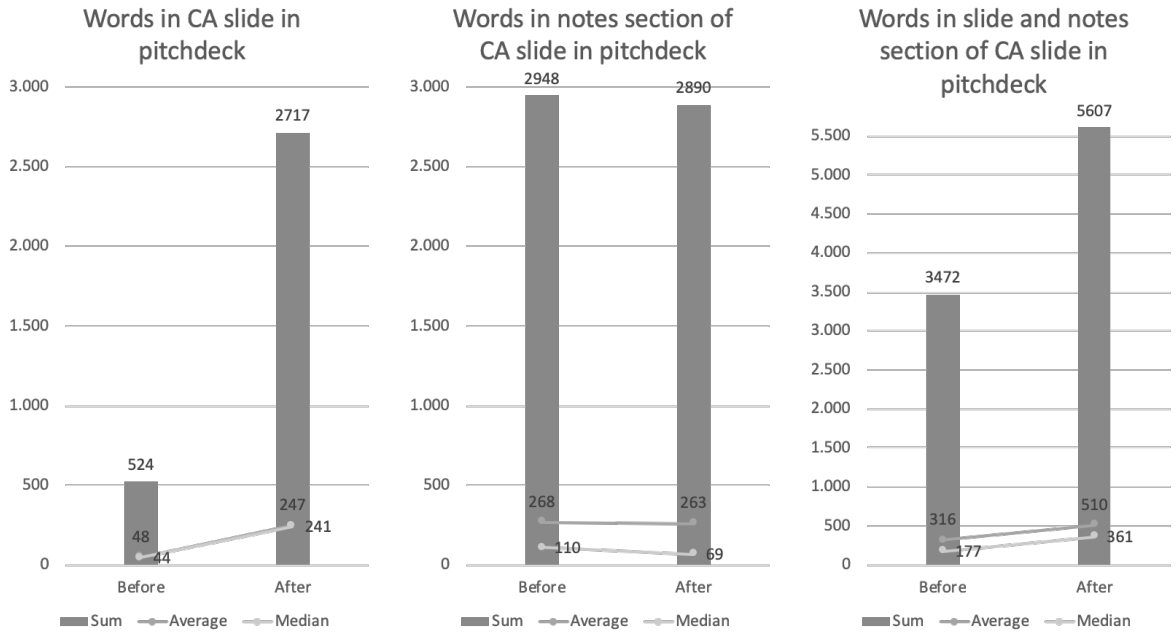


Figure 37: Descriptive statistics: word count of CA slides

When looking in detail, three of the eleven participating teams haven't changed the word count. All other teams increased the word count on their slides. One can interpret this fact in such a way that the teams found more insights that they considered relevant and important to share with the business plan competition team.

A similar impression, although not quite so clear, is gained by comparing the number of identified competitors, which are named in the slides and the number of categories used for comparison with the rivals (see Figure 38). Even though the absolute number of mentioned competitors increased by 11% to 80 identified competitors after the CAF usage, the median and average nearly remained the same. The same applies to the number of categories the teams used to compare their company and offering to others. The overall number of categories increased by 68% to 67 categories, however the median and average increased only by 1 category to 6 (median) and 7 (average) categories used.

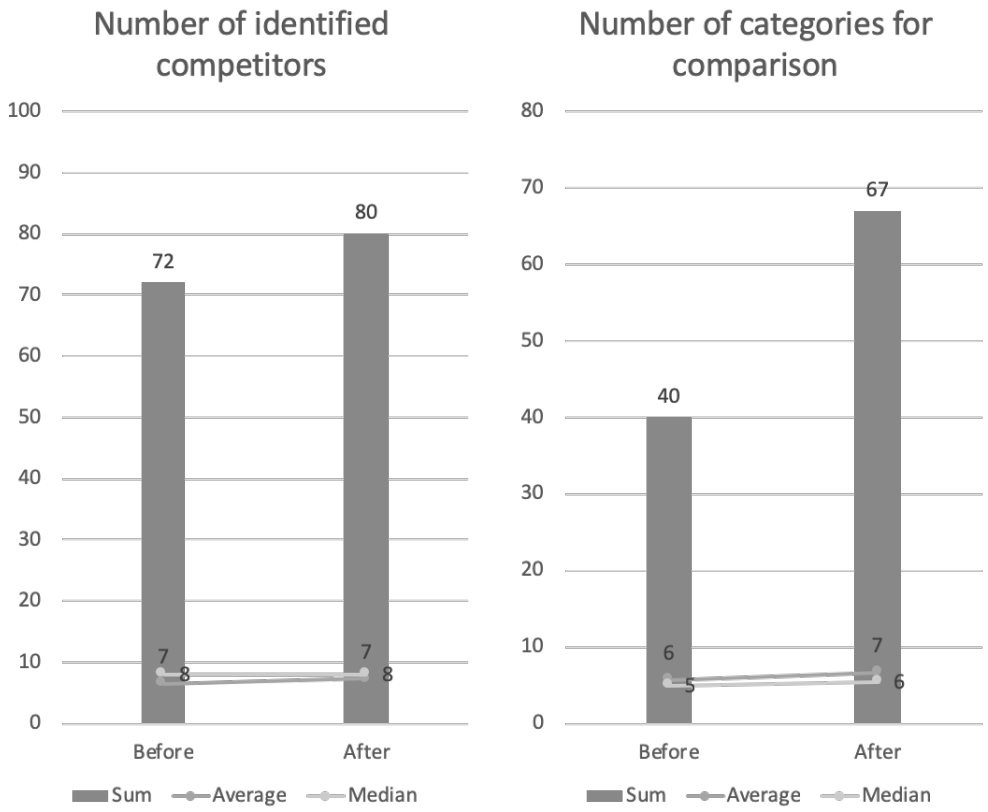


Figure 38: Descriptive statistics: number of competitors and comparison categories in the CA slides

However, even though these descriptive statistics hint that the CAF indeed supported the teams to conduct a viable CA, details are relevant to conclude upon further necessary improvements. In a next step, the questionnaire will be analysed to draw further conclusions. First, on a quantitive basis, then in a qualitative way by also considering the explanations of the choices made in the questionnaire and analysing further material such as the artefact itself and emails written to the coaching team of the business plan competition.

Figure 39 displays the average rating each statement in the questionnaire received by the entrepreneurs ordered by the ratings. The best ratings (on average >=4,0) in the formative evaluation part (question 1 to 17) were given to the support of a structured process for CA, the support for the generation of business model options, the improvement of the quality of the CA work, and the improvement of the effectiveness on the CA work. Mediocre ratings, defined as valuations that are the higher as the median valuation of 3,6 but below 4,0, were given to the statements, that the framework provides clear guidance on the analysis of competitors, leads to confirmation or adaption of business model components, supports informed decision-making, and makes it easier to do the CA job. Median ratings and below were given to the statements of clear guidance on the process of CA, help to identify competitors, help to collect relevant knowledge about competitors, encouragement to use diverse

information sources, help to validate the current business model, help to understand the market, ease of use and ease of learning to use the framework, as well as the improvement of productivity. With regard to the summative evaluation part in question 18 to 22, the entrepreneurs agreed that the CAF is resource-efficient with an average rating of 4,1. However, future-orientation, accuracy, objectivity and timeliness were only rated on a medium level.

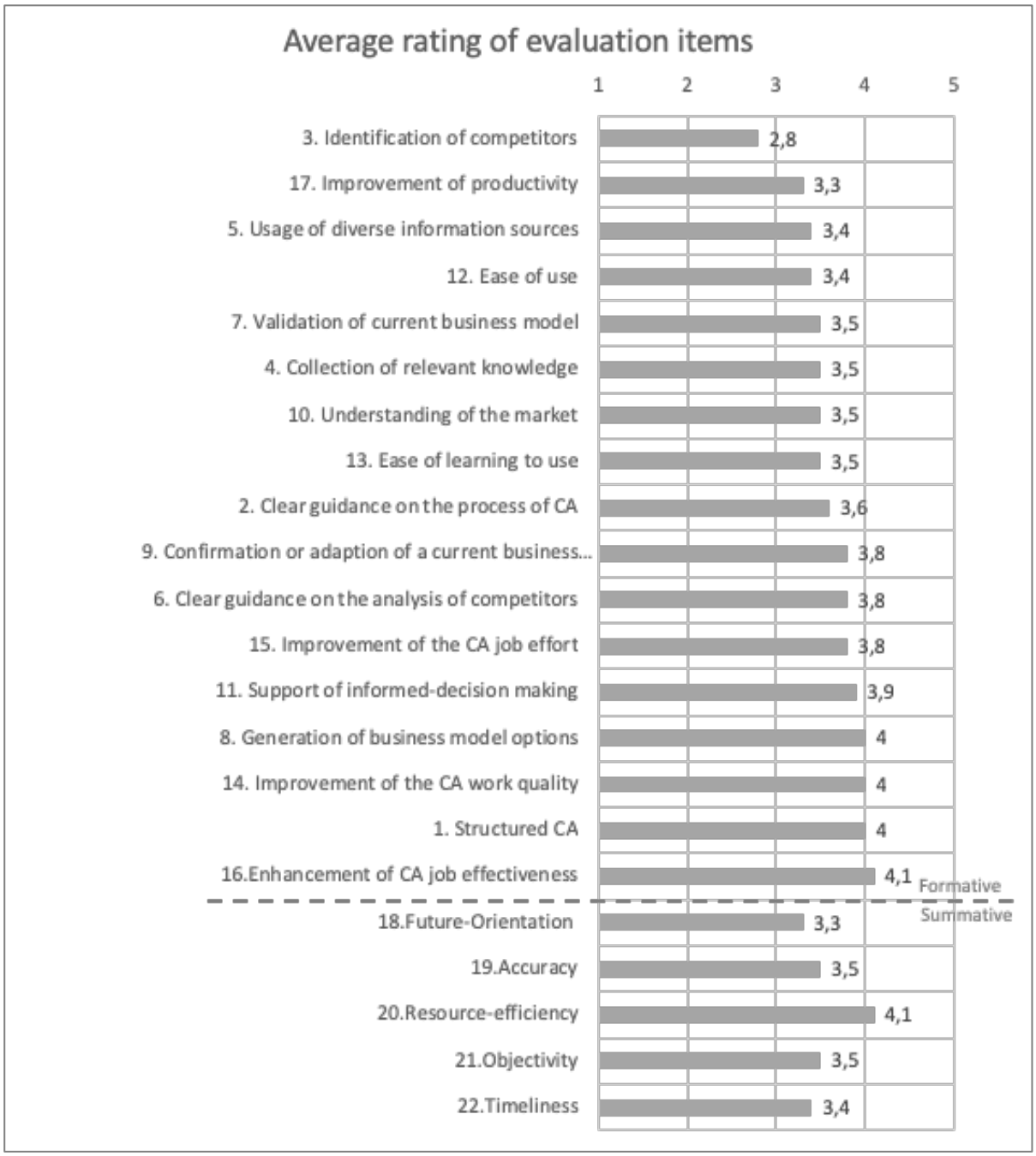


Figure 39: Average rating of evaluation items - CAF Alpha Version

When reflecting upon these data, one can argue that some of these findings contradict each other. First, the participants agreed that framework supports to generate business model options (average rating of 4,0), but they rate rather neutrally the statements, that the

framework leads to validation, confirmation or adaption of the current business model, which should be somehow related to each other. Also, the structured process was rated high with an average of 4,0, and a clear guidance on how to analyze the competitors was also rated with 3,8 on average, however, the clear guidance on the overall process was only rated with 3,6 and the ease of use and the ease of learning to use the framework even lower.

As an interim result, one can state that indeed the structure of the CAF and parts of its content were perceived as useful for the users with regard to efficiently using their resources and improving their effectiveness. However, there are also parts of the CAF which were not well rated. In particular, the identification was not supported, also the ease of use is clearly in need of improvement. With regard to the goal of the analysis itself, the data are ambiguous. On the one hand, the CAF supported the generation of business model options, but on the other it performed only mediocre with regard to validation of current business model or confirmation or adaption of a current business model component. Also, the understanding of the market was not perceived as having improved in a major way.

In order to understand in-depth, how the framework was used, how it was helpful, what worked and what didn't a further analysis of the transcribed oral explanations of the rating choices of the individual statements made in the questionnaire, the submitted frameworks, email conversations, and CA slides of the submitted pitch decks were analysed using content analysis.

4.2.3.5.2 Qualitative analysis

The data is categorized into their affiliation to a particular statement in the questionnaire and into positive codes, negative codes and suggested improvement codes. The analysis starts with the positive and negative statements. Since the details are of particular importance, the display of the representative data is made according to first-order categories, not as usual on a second-order theme basis. Table 32 provides these representative supporting data for the first-order categories. The codes are sorted by affiliation to a statement. The statements are ordered by their average evaluation starting with the worst average evaluation. The first-order categories are also divided by positive and negative statements. Code parts in parentheses refer to wordings from the CAF. Only the formative questions 1 to 17 are displayed, however the whole interview was transcribed and coded. Thus, if an interviewee gave relevant information to an evaluand in another part of the interview and not directly as explanation of the rating choice, it was nevertheless coded as such, assigned to the matching evaluand and also taken into consideration.

Question (sorted by average evaluation in questionnaire)			
Negative first-order category	Representative first- order data	Positive first-order category	Representative first- order data
3. Identification of competitors (2,8)			
"Resources" unclear	"Das einzige, was ich hatte, war da die Nachfrage irgendwie, was heißt denn jetzt Resources, ist das jetzt auf User-Seite oder ist das jetzt auf der Business-Seite" (SU1)	Hint for indirect competition is helpful	"vor allem dieser Teile, welche direkt und indirekt sind [...] das hat uns eigentlich die Augen geöffnet" (SU5)
Identification is not considered a goal	"das ist nicht das Ziel von dem Framework nämlich" (SU1)	Expansion of competitive field	"mir wurde auch zum ersten Mal klar, wie viele Apps es eigentlich da gibt" (SU5)
Identification is not supported by the framework	"Das hat uns nicht so geholfen, die Competitors zu finden. Die haben wir eigentlich gegoogelt. Also wir haben sie dann eingetragen dort, aber nicht gefunden" (SU11)		
17. Improvement of productivity (3,3)			
Missing focus	"dafür war das Framework fast schon zu umfangreich" (SU11)	Increase of productivity for someone unfamiliar with CA	"für jemanden, der das mal strukturiert auch neu lernt, ist es, glaube ich, schon ein großer Produktivitätsschritt" (SU11)
Dependent on other factors	"wie produktiv oder nicht produktiv ich auch mit diesem Framework arbeite, hängt relativ wenig vom Framework ab, sondern einfach [...] von meiner Arbeitsweise allgemein" (SU4)		
5. Usage of diverse information sources (3,4)			
Naming of potential sources is missing and how to reach them	"Die geben mir keine Tipps, wo ich jetzt gucken soll." (SU5)	Different queried types of information make different sources necessary	"weil das auch sehr, sehr unterschiedliche Kategorien waren und man jetzt nicht alles bei der gleichen Quelle findet" (SU9)
No encouragement to use diverse information sources	"Das Framework encouraged mich nicht dazu." (SU5)		
Customer's point of view is missing	"sondern wir sind zu den Kunden gegangen, [...] haben gefragt: Ey, was funktioniert bei euch, was funktioniert bei euch nicht, wo seht Ihr Verbesserungsbedarf" (SU2)		
Sources of information cannot be captured	"Was mir ein bisschen gefehlt hat[...] ist, dass man irgendwie sortiert auch die Quellen erfassen kann, die		

	man selber benutzt hat" (SU9)		
12. Ease of use (3,4)			
Negative emotions	"Ich habe es auch aufgemacht und es hat mich erstmal total erschlagen."(SU5)	Paper form advantages	"Man verliert bloß den Überblick, wenn man es am Rechner ausfüllt"(SU7)
Intended use is partly unclear or impractical	"Das sind irgendwie so viele Fragen auf einmal, dass ich dann irgendwie auch so ein bisschen den Fokus verloren habe"(SU1)		
Paper form disadvantages	"entweder auf Papier habe oder auf PDF, was sich halt schwerer editieren lässt" (SU1)		
Space and proportions insufficient and misleading	"wie das alles visuell größenmäßig angeordnet war, gibt dem Ganzen ja auch eine gewisse Gewichtung, die nicht mit meiner eigenen Wahrnehmung zusammenpasste" (SU5)		
7. Validation of current business model (3,5)			
Goal of the framework unclear	"im Sinne von wir wissen nicht, was wir erwarten, was das Resultat ist." (SU5)	Comparison of offerings is possible	"ich fand vor allem sehr gut diese Übersicht, wo man sagt, [...], was ich anbiete, wie kann ich dieses Angebot irgendwie anpassen." (SU10)
		Determination of positioning and differentiation is possible	"Wir haben eigentlich nur gesehen, dass wir uns schön positionieren und absetzen können" (Su11)
		Reflecting on own business model is stimulated	"Zumindest haben wir nochmal drüber nachgedacht im Pricing zumindest" (SU11)
4. Collection of relevant knowledge (3,5)			
Information overload	"ich finde es ein bisschen zu viele Komponenten." (SU8)	Required information is helpful	"Wir dachten ja, wir hätten die alle schon recherchiert und haben dann festgestellt, wie viele Sachen uns noch gefehlt haben" (SU3)
Restrictions through specifications	"du bist einmal auf diese Faktoren dann fokussiert und dann guckst du nicht mehr nach anderen Faktoren. Das heißt, einerseits gibt dir das Framework ziemlich viel, aber andererseits wirst du auch einigermaßen eingeschränkt" (SU10)	Reusage in the future is possible	"Ich glaube auch, wir werden da in der Zukunft, wenn wir weiter voranschreiten, immer mal wieder hierhin zurückkommen."(SU5)
Assignment of information to Business	"Wir hatten auch Probleme, cost structure und key	Business Model alignment is good	"ich fand das eben total sinnvoll und hilfreich, anhand der Business-Model-Components die

Model components unclear	resources zu unterscheiden"(SU5)		Wettbewerber durchzugehen" (SU3)
10. Understanding of the market (3,5)			
Market understanding is incomplete	"Also wie das jetzt mit irgendwelchen Marktbewegungen zu tun hat, also mit Wachstumseigenschaften, mit Korrelationen zu anderen Sektoren, mit der Politik, mit den Finanzmärkten, [...] hilft einem das halt gar nicht weiter meiner Meinung nach" (SU9)	Understanding of industry logic is possible	"als ich das Framework ausgefüllt habe, kam dann dieser Aha-Moment, ah ja, irgendwie eigentlich sollten wir nicht das Spiel spielen, was die anderen spielen" (Su8)
No value added with regard to market understanding	"weil das, was wir an Marktverständnis hatten, hatten wir auch schon davor und der Mehrwert war jetzt nicht so groß" (SU2)	Understanding through awarenes of direct and indirect competitors	"die Matrix, indirect, direct competitor und [...] Das hat uns tatsächlich auch ein bisschen, na ja, also mehr weitergeholfen in dem Sinne, dass wir uns das mal einfach klargemacht haben das einzuordnen" (SU6)
Market understanding not seen as goal	"Das [Marktverstaändnis herstellen] ist nicht für das CAF das zu tun" (SU10)	Understanding through finding market niches	"man halt die Möglichkeit hat aus dem zu sehen, was die anderen machen, irgendwie zu sehen, wo ist vielleicht eine Nische" (SU4)
		Understanding through recognition of differences	"es zwingt einen ja wie gesagt dazu, das strukturiert zu machen und da fallen die Unterschiede auf und das macht ja den Markt transparenter" (Su7)
		Understanding through understanding of competitors	"um den Charakter der Wettbewerber zu erkennen und zu verstehen, ist es, glaube ich, dann doch ganz wichtig und wenn man dann so ein Modell vor sich hat, [...] das hat unser Verständnis vom Markt und den Wettbewerbern [...] verbessert." (SU9)
13. Ease of learning to use (3,5)			
Starting difficulties	"Allerdings haben wir erstmal 10 Minuten davor gesessen und uns gefragt, wo man jetzt anfangen soll" (Su9)	Short familiarization time	"Aber gut, ich meine, in 10 Minuten, Viertelstunde hat man sich da schon eingedacht." (SU11)
Previous knowledge necessary	"Nach dem Motto man sollte schon vorab etwas Grundkenntnisse haben, damit man das Ganze versteht. " (SU10)		
2. Clear guidance on the process of CA (3,6)			
"Adaptions" unclear	"Ich glaube, der einzige Teil, der ein bisschen - für mich zumindest - unklar war, war eben, wie man genau das umsetzt, den letzten Teil, also wie man sein eigenes Business Modell darauf anpasst." (SU6)	Appreciation of the beginning steps	"und noch davor fand ich es auch sinnvoll, sich überhaupt erstmal klarzumachen, das ist jetzt ein kleines Projekt, wir müssen uns überlegen, wie viel Zeit wir haben, auf welche Aspekte wir uns konzentrieren wollen" (SU3)

"Findings" and "Adaptions" are not distinguished incisively	"packe ich die jetzt in das letzte oder vorletzte. Das konnte ich nicht so ganz voneinander trennen." (SU9)		
"Findings" unclear	"Und ein paar Kategorien habe ich nicht so ganz verstanden, also die ganz unten rechts [findings]"(SU9)		
"Optionen" unclear	"bei den Options, die habe ich nicht sofort verstanden." (SU11)		
"Provide Input" unclear	"Also gerade am Anfang war ja so eine Art kleines Business Canvas auch aufgemalt, diese Hälfte/Hälfte und dann standen ja eigentlich auch die Punkte untereinander und ich habe jetzt erst gedacht, muss ich jetzt unseren Canvas aufmalen " (SU11)		
"Set Focus" & "Constraints" unclear	"diese Constrains, da konnten wir jetzt nicht so viel Sinnvolles irgendwie zu reinschreiben." (SU4)		
Phase separation/ steps unclear	"also diese Phasenaufteilung wird ja auf dem Blatt an sich auch nicht klar" (SU11)		
9. Confirmation or adaption of a current business model component (3,8)			
No new insights gained through CAF	"Also nachdem ich das Framework ausgefüllt habe, haben wir halt eben jetzt keine große Änderung oder sowas festgestellt, die wir davon hatten. "(SU6)	Confirmation of business model	"also wir haben uns bei sowas wie einer Value Proposition bestätigt gefühlt, " (SU6)
Real confirmation can only be obtained by the market	"letztendlich ich kann eine Drei geben, aber die letztendliche Bestätigung geschieht durch den Kunden und durch den Markt, wie der Markt reagiert" (SU9)	New insights about the own business model are gained	"Also ich hatte während des Erstellens ein, zwei Sachen, die mir aufgefallen sind, die fand ich bemerkenswert und die habe ich mir auch für die Erweiterung des Business Modells gemerkt. " (SU7)
6. Clear guidance on the analysis of competitors (3,8)			
"Rate criticalness" not useful	"Dann was ich noch nicht gut zu nutzen fand, war das Raten der Criticalness für die einzelnen BM-Components, weil einfach auf der Skala von Eins bis Fünf habe ich ganz oft dann einfach nur eine Drei eingetragen." (SU3)	"Rate criticalness" useful for reflection	"Also das fand ich zum Beispiel auch richtig gut mit diesen Bewertungspunkten… […] weil mir das im Nachhinein zur Reflexion viel gebracht hat" (SU5)
"Rate criticalness" unclear	"Die Sterne zum Beispiel, die habe ich einfach komplett ignoriert und habe irgendwie in die Felder Sachen eingetragen und einfach über die	Analysis more in-depth	"also in einer Tiefe, wie wir sie selber eigentlich jetzt auch nicht im Vorlauf gemacht hatten." (SU11)

	Sterne drübergeschrieben. Die habe ich irgendwie gar nicht richtig wahrgenommen." (SU4)		
No focus in analysis	"weil es war dann, würde ich halt sagen, wieder dann doch sehr, sehr breit und ich wusste dann auch nicht genau, wo ich jetzt den Fokus irgendwie legen sollte oder ich wusste dann teilweise nicht genau, wie ich es machen soll." (SU1)		
15. Improvement of the CA job effort (3,8)			
Not easier: Data acquisition remains difficult	"Was für uns auch eine große Schwierigkeit [...] ist dann auch einfach wirklich die Informationsbeschaffung, also wie kriege ich jetzt die Informationen, die dieses Framework gerne von mir möchte." (SU1)	Easier through the given structure	"Es gibt halt einen Rahmen vor irgendwie, wie man das macht." (SU1)
11. Support of informed decision-making (3,9)			
Draw right conclusions is difficult	" Informationen kann ich mir beschaffen, aber dennoch fehlte der eine Schritt, um daraus selber was zu generieren und richtig konkludieren zu können." (SU5)	Gives better feeling for making decisions	"CAF gibt einem so ein bisschen mehr Selbstbewusstsein bei den Entscheidungen, die man trifft" (SU9)
		Helps to spread information in the team	"dann, wenn es darum geht, dass man Informationen in einem Team austauscht und einander zugänglich macht und sicherstellen will, dass alle auf dem gleichen Stand sind, bevor man irgendwelche Entscheidungen macht" (SU4)
8. Generation of business model options (4,0)			
		Options detected	"von dem, was andere machen, inspirieren hat lassen. Dafür ist es auf jeden Fall gut geeignet" (SU4)
		Options reflected	"weil das war nochmal gut das auch so aufzulisten und dann auch so ein bisschen die Bandbreite zu sehen und nochmal zu reflektieren, okay, die benutzen das und das, ist das jetzt für uns gut?" (SU1)
14. Improvement of the CA work quality (4,0)			
No quality improvement	"und auch bei ein paar Sachen war ich mir halt nicht so sicher, was mir das jetzt genau dann noch zusätzlich bringt" (SU6)	Blind spots are reduced	"Also da hat es sehr geholfen, so blind spots auszuräumen, weil diese Matrix ist halt gnadenlos, es gibt halt überall so ein Feld" (SU3)

		Deriving strategies is supported	"Für uns hat das mehr zu einer Confirmation, aber mit einem Arbeitsauftrag geführt, an welcher Schwäche wir arbeiten wollen oder welches Risiko wir integrieren wollen." (SU3)
		Gaining an overview	"Ich fand vor allem sehr gut diese Übersicht, wo man sagt, das sind meine Competitors, das sind Key-Eigenschaften von denen" (SU10)
		Prevents superficial analysis	"Sonst analysiert man die Teilbereiche, die halt gerade einfach zu finden sind, weil man die auf der Webseite der Leute sieht oder bei Wikipedia lesen kann oder so und jetzt musste man halt doch nochmal tiefer graben." (SU3)
		Knowledge gaps are revealed	"dass das Framework gut darin ist, einem Lücken aufzuzeigen, wo einem halt noch was fehlt, wo man nochmal vielleicht ein bisschen eher dazu neigt, das einfach zu ignorieren," (SU4)
		Results are reliable	"aber es liefert, denke ich, zuverlässige Ergebnisse" (SU7)
		Serves as basis for discussion	"es gibt einen guten Überblick und hat mich auch dazu und uns dazu bewegt, nochmal ganz andere Fragen aufzuwerfen und nachzuschauen" (SU1)
		Serves as motivation for better quality	"prinzipiell ist es auf jeden Fall ein Motivator, qualitativ besser zu arbeiten" (SU4)
1. Structured CA (4,0)			
		Predefined process/ steps give a clear structure	"Also dadurch, dass das Framework ein bisschen eine Struktur vorgibt, hat das auf jeden Fall etwas geholfen, ein bisschen Ordnung in das Chaos zu bringen " (SU4)
		Structure forces detailed discussion and accuracy	"weil dich das Framework ja nötigt, genau hinzugucken und detailliert zu recherchieren" (SU5)
16.Enhancement of CA job effectiveness (4,1)			
		Resources used efficiently	"weil es ist eine sehr gute Möglichkeit, sehr viel Informationen irgendwie auszuwerten und zu verstehen." (SU10)

Table 32: Representative supporting data for each negative/ positive first-order category

With regard to the content of these categories, one can notice that some of the negative and positive categories are contradictory. For example, for some of the startups a CA quality

improvement was not perceived, others appreciated the value add the CAF holds for them, for example in terms of more reliable results, or minimizing blind spots. Another contradiction is the usefulness of the critical success factor rating part. It was explicitly assessed as unuseful by one startup and as especially useful by another. Concerning the design, the paper form of the CAF was considered useful and cumbersome and unfavorable by others. These contradictions need to be considered when designing the next version of the CAF. In the subsequent analysis of the interviews the negative categories will be examined further. However, the implementation of their underlying improvements should not be made in an unreflected way.

Question (sorted by average evaluation in questionnaire)	**Negative**	**Positive**	**Difference**
Group of questions above the median rating of 3,6 (group 1)			
3. Identification of competitors	3	2	-1
17. Improvement of productivity	2	1	-1
5. Usage of diverse information sources	4	1	-3
12. Ease of use	4	1	-3
7. Validation of current business model	1	3	2
4. Collection of relevant knowledge	3	3	0
10. Understanding of the market	3	5	2
13. Ease of learning to use	2	1	-1
2. Clear guidance on the process of CA	7	1	-6
Sum	29	18	-11
Average	3,22	2,00	-1,22
Group of questions below the median rating of 3,6 (group 2)			
9. Confirmation or adaption of a current business model component	2	2	0
6. Clear guidance on the analysis of competitors	3	2	-1
15. Improvement of the CA job effort	1	1	0
11. Support of informed decision-making	1	2	1
8. Generation of business model options	0	2	2
14. Improvement of the CA work quality	1	8	7
1. Structured CA	0	2	2
16.Enhancement of CA job effectiveness	0	1	1
Sum	8	20	12
Average	1,00	2,50	1,50

Table 33: Positive and negative category count comparison

Table 33 displays the number of positive and negative first-order categories and their difference per question. It also shows the sum and average of the number of categories for the group of questions above (group 1) and below (group 2) the median rating of 3,6. Initially, this can be interpreted as a confirmation of the quantitive results, as the number of negative (positive) categories is higher (lower) and the number of positive (negative) categories is lower (higher) in group 2. Also, the average difference between positive and negative category number per question differs in the two groups. Whereas in group 1 1,2 more negative category

numbers emerged per question in group 2 1,5 more positive categories are present. With regard to the highest difference of positive and negative categories, the question regarding the clear guidance has the worst ratio with six more negative than positive categories. On the other hand, the improvement of the CA work quality has the best ratio with seven more positive than negative categories, indicating that indeed the framework supported the teams in a positive way.

To explore the particular improvement potential of the CAF, a further thorough analysis of the perceived problems and difficulties the users experienced is performed. The negative first-order categories are used for this purpose.

Figure 40 shows the data structure of the findings with regard to the negative categories, i.e. the perceived problems and difficulties the users experienced with the artefact. The three main dimensions of the analysis are depicted (aggregate dimension), as well as the representative seven second-order themes and 35 first-order categories that constituted these themes.

The findings are additionally reported in a descriptive findings narrative. For the findings narrative supplementary quotes may be provided, which are, if necessary, translated to English to ensure a smooth reading flow.

The negative categories can be aggregated into the three dimensions bad user experience, missing guidance, and unsatisfactory analysis content and outcome.

Bad user experience. The users described several bad experiences when they were confronted with the application. Under this aggregated dimension negative emotions and unfavorable design arguments are summarized. This includes that eight of the eleven teams describe the first impression as overwhelming, dissuasive, and demotivating, and the use as exhausting. As such, SU1 states that “It overwhelmed me in the beginning, [...] so it was a bit of a blow at first.” With regard to the design, several teams mentioned disadvantages of the paper form instead of a digital version. They also felt restricted with regard to the specifications made, found that the space was insufficient to capture all important information, and sometimes also misleading in terms of that more space indicates a higher importance.

Missing guidance. The aggregated dimensions missing guidance refers to problems the teams had with regard to what they were supposed to do. As such nine teams struggled with the beginning of the CAF, as stated by SU9 “But first we sat 10 minutes before and asked ourselves where to start now”, or had problems understanding specific wordings or activities to be performed, such as SU6 describes “the only part that was a bit unclear - for me at least - was how to do exactly that, the last part, how to adapt your own business model to it”. The teams also partly had problems in understanding the goals of the CAF even though it was (at least partly) stated in the CAF itself as “The Competitor Analysis Framework is a tool that

supports the assessment of a (preliminary) business model (BM) ". As such they were partly unsatisfied with what can be achieved through using the CAF. For example, SU8 refers several times to the Strategy Canvas by (C. Kim & Mauborgne, 2005). Only after pointing out that for using the Strategy Canvas an understanding of the current industry logic is possible, the interviewee agrees that this might be a useful goal of the CAF. Also enhancing market understanding and identifying competitors are not perceived as a main goal.

Unsatisfactory analysis content and outcome. In addition to the aforementioned unclear goals, the interviewees referred to goals of the CAF that are indeed not achieved, for example no generation of new insights or no usage of diverse information sources. The entrepreneurs also missed a focus of the CAF in general and in the analysis in specific. SU1 for example states that "it [the analysis] was very, very broad again and I didn't know exactly where to put the focus or I didn't know exactly how to do it". Combined with the reported problems through missing functions such as the naming of specific information sources, that can be used, or no help with regard to how the required data can obtained, these themes can be aggregated into the dimension of unsatisfactory content of the CAF and analysis outcomes.

On the basis of the problem analysis, so far it can be stated that three areas for improvement are determined:

1. The visual design of the CAF
2. The guidance for using the CAF
3. Content-related design, especially in the identification and analysis part of the CAF

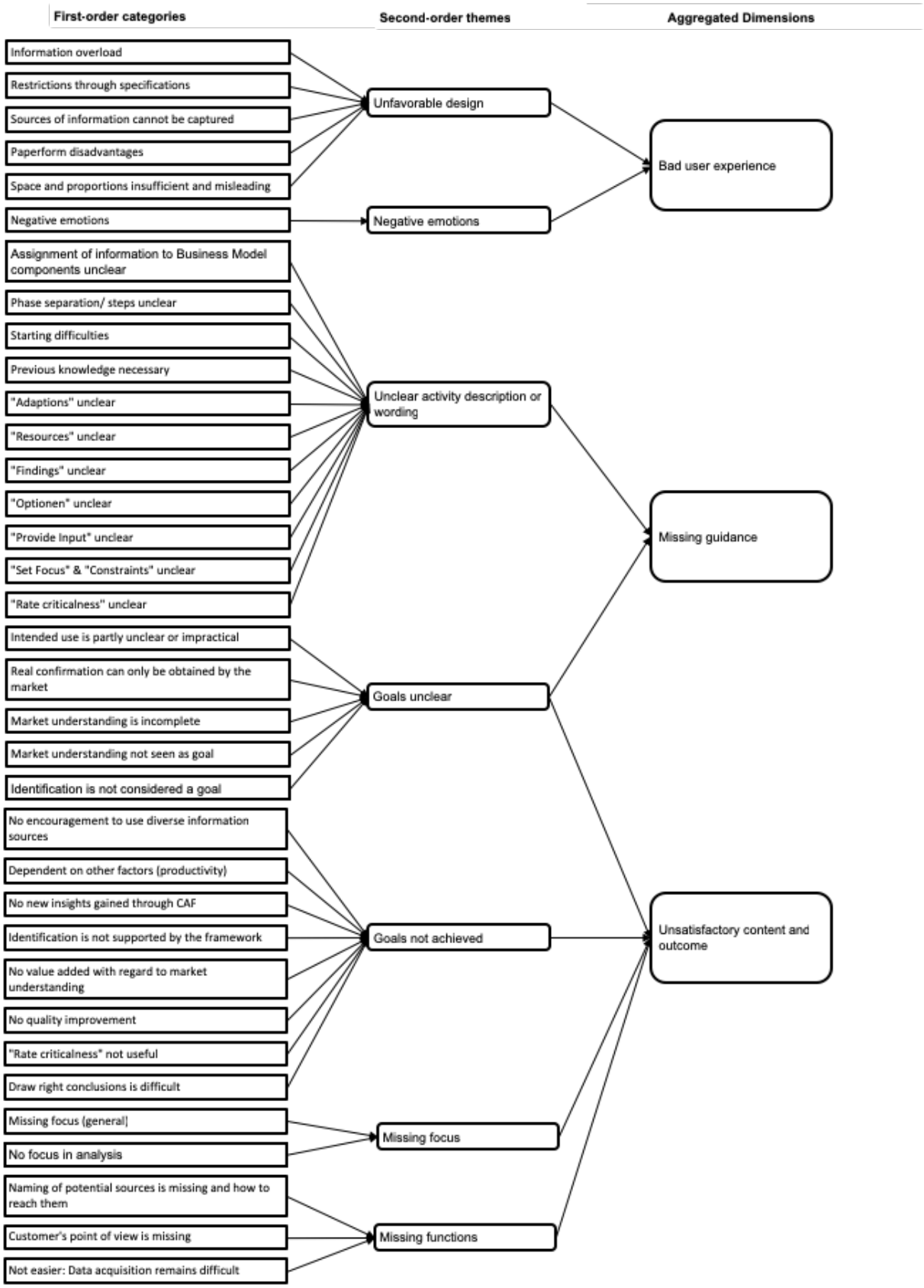


Figure 40: Data structure of problems in Alpha Version evaluation interviews

In addition to the analysis of negative category codes representing problems, that the teams experienced, a supplementing analysis of proposed improvements is performed. These proposed improvements were either directly expressed by an interviewee or derived from observations of the circumstances, in which the framework was considered to be of particular value. Table 34 provides representative supporting data for the first-order categories with regard to improvement suggestions.

First-order categories	Representative first- order data
Digital version preferred	"es verlangt für ich mehr nach irgendeiner Computerlösung, wo man unterschiedlich lange Texte für die einzelnen Wettbewerber haben kann." (SU3)
Dynamic adaptions should be possible	"das ist [...] eher so ein begleitendes Tool, was man auch dynamisch anpassen könnte oder so, je nachdem wie sich das entwickelt, weil es ist nur eine Momentaufnahme." (SU9)
Multi-step structure preferred	"Die Frage ist halt, wie man das auch irgendwie generell von der Benutzung her mehrstufig organisieren kann," (SU8)
Extended version with more details	"man kann nicht so präzise sein bei so einer Übersicht, weil das ist nicht möglich [...] so eine extended version sozusagen von dem Competitor Analysis, wo man viel mehr Variablen dann sich angucken könnte" (SU10)
Lean Canvas preferred	"why didn't you use the Lean Canvas?" (SU8)
Grouping of competitors should be enabled	"fände ich es gut, wenn es die Möglichkeit gibt, Anbieter zu klassifizieren. " (SU7)
Clarifying of goals of at the beginning	"ich fand diesen ersten Schritt war ein bisschen schwierig, also genau zu wissen, was sind meine Ziele. Das sollte irgendwie schon klar sein vom Anfang," (SU10)
More specifications for use of information sources	"Die geben mir keine Tipps, wo ich jetzt gucken soll." (SU5)
Example analysis	"Es ist die Frage, ob man ein Beispielexemplar von so einer Pseudoanalyse einfach [...] an die Hand geben könnte" (SU5)
Guideline necessary	"Vielleicht wäre sinnvoll hier, wenn man dazu vielleicht so ein Blatt hätte, wo das alles ausführlich beschrieben ist" (SU10)
Personal briefing preferred	"aber wenn es mir nochmal jemand persönlich erklärt hätte, dann wäre das auf jeden Fall besser gewesen" (SU4)
Team should be involved	"Du brauchst einen [...] Pingpong-Partner, wenn du sowas ausfüllst" (SU5)
Creating a database is necessary	"Aber wir haben es jetzt so als unser Excel-Sheet und wir gucken da bestimmt auch nochmal rein und editieren nochmal was und fügen vielleicht noch was hinzu." (SU1)
Timing of CAF performance: before first CA	"Da hätte ich mir gewünscht, dass wir das früher gekriegt hätten, dass man so analytisch da rangeht und sich mal anschaut, also wenn man zum ersten Mal sich die Wettbewerber raussucht und aufstellt," (SU9)
Attitude influences perceived usefulness	"Nicht so wirklich, weil im Prinzip war das schon davor fertig und wir haben das Framework da draufgebastelt" (SU2)
Critical thinking/ open mind is necessary	"Also ich sehe so ein bisschen die Gefahr, dass man dann doch nochmal das, was man irgendwie schon dachte zu wissen oder denkt zu wissen, da dann einträgt, also schon mit der Überzeugung, dass das Business Modell halt gut ist, dass man dann auch eben genau das einträgt, was man sich sowieso schon denkt. Das ist so ein bisschen die Gefahr" (SU1)

Table 34: Representative supporting data for other improvement insight first-order category

Figure 41 shows the data structure of the findings with regard to the improvement suggestions made directly or indirectly by the users. The four main dimensions of the analysis are depicted (aggregate dimension), as well as the representative six second-order themes and 15 first-order categories that constituted these themes.

The findings are additionally reported in a descriptive findings narrative. For the findings narrative supplementary quotes may be provided, which are, if necessary, translated to English to ensure a smooth reading flow.

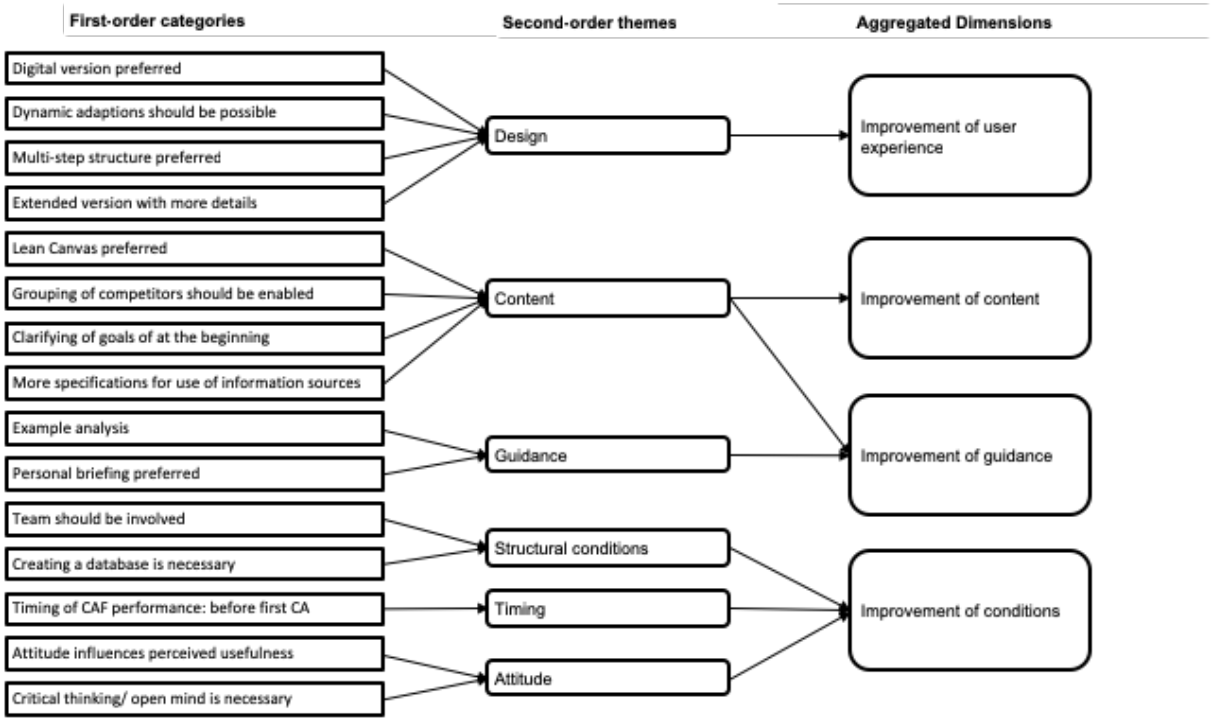


Figure 41: Data structure of improvement suggestions in Alpha Version evaluation interviews

The improvement categories can be aggregated into the four dimensions improvement of user experience, of content, of guidance and of conditions.

Improvement of user experience. The suggestions aggregated under this dimension refer to the design of the CAF. Especially the wish for a digital version was expressed by five of the users. Also, the adaptability is perceived as high enough. As such, adaptions should be possible, instead of the snapshot moment it provides. Moreover, it was perceived as not providing enough space to capture all of the information, calling for an extended version with all of the information and a condensed version for gaining an overview. The multi-step structure needs to be made clearer, as pointed out by SU "because there is no index number with arrows indicating where you first enter what, and how you finally go through it."

Improvement of content. Content-wise the users also gave improvement suggestions. These referred to the usage of the usage of the Business Model Canvas by Osterwalder, the possibility of grouping of competitors, and the wish for more specifications with regard to

how and where the information can be obtained. The clarification of goals at the beginning of the analysis was also asked for, as put by SU8 it needs to be “more clearly formulated, what it is for”. This stands in close connection to the setting of a focus. Clarification of goals and setting of a focus was mentioned by five startups.

Improvement of guidance. Mirroring the missing guidance dimension of the negative category analysis, the request for an (improved) guideline was expressed by seven users. Also, a completed template of the CAF as an example was suggested, as well as a personal accompanying briefing for the usage.

Improvement of conditions. Among this dimension structural conditions, the attitude towards using the CAF and the timing of using the CAF are aggregated. With regard to structural conditions the teams four users highlight that a database is necessary, to reuse the information in the future. Also, teams reported that a discussion in the team about the content of the CAF improved the analysis outcome “through reflecting one another when filling it out” (SU5). SU8 states that “I think if I'd used it alone, I'd have had a hard time understanding the market”. Also, the attitude towards the CAF influences how it is perceived. SU2 for example, that had the lowest average rating of all participants, states that “the competitor analysis is rather directed towards the fact that it was said that we have to make one for the competition, so we make one.” Mere filling out without discussion or reflection diminishes the perceived usefulness, quality and efficiency. In close connection stands the observation that timing matters. Due to the fact that all of the participants had to submit a CA slide in the business plan competition before receiving the CAF, in seven cases observations were made that hint to the fact that the framework might have been more useful before the performance of the first CA. As SU8 states „ From an organisational perspective it would have have been better for us to use the CAF before doing the competitor analysis. We did the analysis somehow in an unstructured way and the CAF is a good tool for bringing in more structure.”

Summarizing the improvement potential derived from the in-depth analysis of the problems and directly or indirectly suggested improvements (see Table 35), one can see that the problem and improvement suggestions areas overlap each other in three dimensions. Design and user experience are consolidated. Guidance- and content-related improvements are also summarized in one dimension each. Additionally, the conditions of use complement the improvement potential dimensions. Consequently, the next version of the CAF should implement adaptions in the following dimensions:

1. User experience
2. User guidance
3. Content
4. Conditions of use

Improvement potential derived from problems	Improvement potential derived from suggestions	Improvement potential dimensions
The visual design of the CAF	Improvement of user experience	User experience
The guidance for using the CAF	Improvement of guidance	User guidance
Content-related design, especially in the identification and analysis part of the CAF	Improvement of content	Content
	Improvement of conditions	Conditions of use

Table 35: Improvement potential alpha version

4.2.3.6 Implications

The findings carry important implications for the further course of this project. On the one hand, they show that the framework supported the startups to conduct a viable CA in different ways. The structure was well appreciated. Also, the improvement of CA quality and effectiveness was recognised by the case study participants. It also helped to generate options for their business model development. On the other hand, the findings also indicate that there is major improvement potential of the CAF in the dimensions of user experience, user guidance, content, and conditions of use.

In the next iteration cycle an updated version of the CAF will be developed with improvements based on the identified dimensions. However, a one-to-one implementation of the derived and proposed improvements seems not reasonable. First, because contradictory positive and negative statements about the CAF have been detected. Second, because the suggested improvements seem partially little specified, not well-founded, and arbitrary. Furthermore, it seems not confirmed that a validation of the business model as the main goal is sufficient. As such, a re-examination of the target structure in combination with the analysis part of the CAF will be performed by consulting again the literature.

The derivation of concrete improvements in the identified dimensions and their rationale will be discussed in detail in the design of the beta version.

4.3 ITERATION CYCLE II: BETA AND EXPERT INTERVIEWS

In the second iteration cycle, the requirements of the artefact and its specifications will be adapted based on the insights of the first version of the artefact supported by reflecting further on the knowledge base. A second version (Beta) will be developed and evaluated. The evaluation will then be used as basis for the third iteration cycle.

4.3.1 Definition of solution space

In the area of the solution space especially the improvement dimension of necessary content-related adaptions is of superior importance, since the purpose of the framework is a main derived functional requirement.

However, it is not sufficient to implement the suggestions of the participants one-to-one without reflecting them. Reasons are, that the suggestions in the area of content improvements are little and focused on individual specific parts. Also, as pointed out in the preceding analysis several contradicting statements have been given. However, it appears, that the assumption that business model validation is the most important and only target is not confirmed. Thus, the target structure, which is mainly incorporated in the analysis part of the CAF, is carefully reflected and adapted with renewed consideration of the literature.

In two three-hour workshops in the beginning of May 2018 the content of the analysis part of the CAF was redesigned. In these workshops a second researcher was involved. By reviewing the literature once more the concepts of Table 36 were compiled and then discussed extensively in the workshops with regard to their suitability for integration into the analysis part of the framework. Table 36 also displays the respective literature and the extent of the integration and the main reasons for the decision.

Concept	Brief description	Literature	Beta integration, reason
Market-type hypothesis	Determination of the kind of market: existing, new, resegmented or clone market	(Blank, 2013, p. 71 ff.; Blank & Dorf, 2012, p. 112 ff.)	Partly, as decision for one market type
Competitive hypothesis	Questions to assemble a competitive brief	(Blank, 2013, p. 76 ff.; Blank & Dorf, 2012, p. 112 ff.)	Partly, as analysis of basis of competition, industry standard
Defining the Core	Determination what a startup has, that competitors don't (internal view with regard to capabilities/ not the reason customers buy); Determination of what it is that a startup does, that will make it better than anyone else (at producing a solution for the customer)	(Bill Aulet, 2013)	Partly, by integrating the company differentiation
Competitive position	Draw a chart to see how much better a startup is vis-à-vis its competition? Axes: Personas top 2 priorities	(Bill Aulet, 2013)	Adapted, as differentiation matrix based on the Strategy Canvas (C. Kim & Mauborgne, 2005)
Assessment of competitive	Assess a strategic competitive advantage: it must be perceived by the	(Homburg & Simon, 1995; Simon, 1988)	yes

advantage as being strategic	customer as important, robust, inimitable		
Assessment of resources as competitive advantage	Assessment of VRIO-Framework	(Barney, 1991)	No, this activity was assessed as out of scope for the CAF, and is integrated in reduced version through the assessment of competitive advantage as being strategic and company differentiation
SWOT	Assess strengths weaknesses, opportunities and threats	(Weihrich, 1982)	No, this activity was assessed as out of scope for the CAF and might be done by the startups additionally regardless of the CAF usage
SWOT in the digital economy	Success criteria in a chart assessed against competitors	(Kollmann, 2016, p. 265 ff.)	No, this activity was assessed as out of scope for the CAF and might be done by the startups additionally regardless of the CAF usage
Competitive strategies	Cost, differentiation, focus	(Porter, 1980)	Indirect, through the decision for one market type and product and company differentiation
Drivers of differentiation	Differentiation based on products, relationships, linkages	(Homburg, 2017, p. 513; Porter, 1985)	Indirect through differentiation based on product or business model attributes
Positioning	Positioning of product and company	(Blank, 2013, p. 144 ff.; Blank & Dorf, 2012, p. 413 ff.)	Adapted, as reflection of differentiation possibilities
Positioning	Marketing mix positioning: product, price, place, promotion	(Kollmann, 2016, p. 264 ff.)	Indirect, through product and company differentiation
Positioning	Positioning statement	(Blank & Dorf, 2012, p. 294 ff.)	yes
Characteristics of a Unique Selling Proposition	Characteristics: important, preventive, superior, affordable, profitable, distinguishable, communicable	(Kollmann, 2016, p. 244; Kotler & Armstrong, 2008, p. 207)	Partly, as assessment of competitive advantage as being strategic
Feasibility Analysis of Business Model	Assessment of competitive intensity	(Wirtz, 2018, p. 270 ff.)	Partly, through general assessment of competitive intensity, player, market power, and industry standard
Feasibility Analysis of Business Model	Positioning of market offering (product/ service/ value proposition)	(Wirtz, 2018, p. 270 ff.)	Indirect, through positioning statement
Feasibility Analysis of Business Model	Assessment of coopetition potential	(Wirtz, 2018, p. 270 ff.)	yes
Sustainability strategies	Block, run, team-up strategy	(Afuah & Tucci, 2003)	No, the derivation of concrete strategies was assessed as out of scope for the CAF and might be done subsequently

Competitor response profile	Assess future goals, strategy, assumptions, capabilities to derive a response profile.	(Porter, 1980, p. 49 ff.)	No, this activity was assessed as not useful for startups
Five forces analysis	Assess rivalry among existing firms.	(Porter, 1980, p. 3 ff.)	Partly, through general assessment of competitive intensity, player, market power, and industry standard

Table 36: Concepts for extending the target structure and analysis part

With regard to functional requirement number (7), that was derived out of the problems in chapter 4.2.1.2. adaptions need to be made. The main adaptions in the analysis part can be summarized into: first, an expansion of the market understanding through specific questions, that needs to be answered and, second, an assessment of the positioning of the startup in the competitive environment, which includes to infer the differentiation with regard to the product and the company. As such, the target structure needs to include the positioning of the product and company in the market. Table 37 shows the respective adaptions in the functional requirements in comparison to the requirements in iteration cycle I.

Requirement iteration cycle I	**Adapted requirement iteration cycle II**
(7) Purpose of the framework. I. The framework must fulfill a specific CA purpose. It must: (a) help to validate the current business model (confirmation or adaption of a current business model component) (b) help to generate business model options. II. General CA purposes must be fulfilled. It must: (c) help to understand the market. (d) support informed decision-making	(7) Purpose of the framework. I. The framework must fulfill a specific purpose. It must: (a) help to validate the current business model (confirmation or adaption of a current business model component) (b) help to generate business model options. (c) help to position the product/ company in the competitive environment. II. General CA purposes must be fulfilled. It must: (d) help to understand the market. (e) support informed decision-making

Table 37: Adapted functional requirement for iteration cycle II

All other functional, as well as the structural, environmental and effect requirements remain the same.

4.3.2 Design and development of the Beta Version

4.3.2.1 The design process

Based on the identified improvement areas in the evaluation of the CAF Alpha Version, and the detailed insights gained about the usage design adaptions have been decided.

As a first step, a professional designer was involved in the process in order to implement the required changes in a functional and proficient way and compensate the author's lacking skills with regard to the use of professional design software, such as Adobe Indesign. This designer made three general design layouts based on the communicated use case:

1. Approach: sketchy style - casual design, sketched elements, "handmade" look, colorful, attention-grabbing, fun to use
2. Approach 2: clear and graphical - clear design, very tidy, factual, timeless
3. Approach 3: playful - modern interpretation of a board playing field, colorful, attention-grabbing, fun, yet factual

In a two-hour workshop on 07.05.2018 with a second researcher the general layouts were discussed. The clear and graphical layout approach 2 in a black/white/grey version was identified as suiting the purpose best. Even though approach 3 seemed appealing, the usefulness was doubted since it provides even less space to fill out than the Alpha Version. The sketchy style seemed untidy and disoriented, making it hard to understand the process and activities. Approach 2 seemed to be suitable, as it reflects the seriousness of the topic, providing clear orientation and enough space to use. A colorless version was picked, because a reproduction via printing should be possible cost-effective and without loss of quality or legibility to ensure the usage by teams in their working environment. Also, it should evoke the impression of a serious working tool, instead of a game. Moreover, in the management tool landscape shades of grey with only limited use of color are common. As such, existing standards are accepted and applied with regard to the basic layout. Form follows function is applied as design principle (see Hagen & Golombisky, 2013, p. 2 f.).

In five more design iterations between May 10th and June 06th 2018 with the hired designer the Beta Version of the CAF was created. Design iterations consist of change requests formulated by the author and end with a new design version implemented by the external designer. In addition to the intense discussions held to review the target structure of the CAF (see chapter 4.3.1) intermediate versions were partly discussed with a second researcher. The design workshops were documented via pictures of the contents on whiteboards filled during these sessions (see Figure 42), memos, as well as emails and attachments to the designer after these sessions.

Figure 42: Picture of a whiteboard used in a design session for the CAF on 07.05.2018

4.3.2.2 The design adaptions

In particular, the following improvements were implemented. Timeboxing was introduced to reduce the overwhelming impression and set expectations openly. For the same reasoning the divisions into phases and steps was marked more distinctly through clear separation, numbering, headings, and icons. Overall, design elements, such as icons, for guiding questions and work instructions were created to facilitate the learning to use the CAF. The change of completion forms, e.g. use gap text, checkboxes, and empty bullet points, should clarify the use and make it more intuitive. An additional harmonization of the character formatting was intended to assist user orientation and support guiding through the process. An adaption of proportions allows for more space to fill out, while the size of the fields reflect the time spent and the effort needed to process the corresponding step. A new display of identified competitors in an "onion ring" inspired by Wickham (2006, p. 468) was introduced, and the guiding questions to support the identification were highlighted, as it seems that this information has not been prominent enough before, since a use was not reported.

The guidance was improved by creation of an accompanying document that describes the use with concise sentences in an action-based manner, restricted to a few but understandable descriptions including a legend for the icons. A lack of guidance was perceptible and a guideline considered as useful. The accompanying document was designed in powerpoint in DIN A4 format. Some information does not seem to have been perceived and are, thus, clarified and pointed out more prominently, such as the goals of the CAF, the usage of multiple

information sources, and the fact that a database of some kind is needed in addition. Also adapted were unclear wordings and instructions to reduce ambiguities. For example, the word "market" was replaced by "competitive environment", because the former led to misunderstandings and was interpreted unintentionally (see chapter 4.2.3.5.2).

With regard to the content, the goals and analysis part was redesigned as described in chapter 4.3.1. Moreover, instead of using the Business Model Canvas by Osterwalder and Pigneur (2010) as display option a selection of criteria is proposed, that include the nine business model components. As alternative display option the more aggregated four-dimensions categorization (value proposition, value network, value architecture and value finance) of (Al-Debei & Avison, 2010) as well as a separate field for general information about the competitors is chosen to allow for more adaptability, giving the teams the freedom to set their own analysis focus, as well as adjusting the analysis to their own case more individually.

As discussions and reflecting findings within the team was found to support the quality of the CA work, the involvement of the team and outsiders was explicitly included, introduced by icons representing tasks that can be performed alone, such as information collection, and tasks that are better performed on a team or even by including a third party to reduce blind spots and enhancing objectivity (Zahra & Chaples, 1993), such as an industry expert (Blank & Dorf, 2012, p. 426 f.). As such, the category blindspots for specifying the constraints in the Alpha Version was dissolved and addressed indirectly through highlighting the involvement of an outsider, identification questions, and the emphasis on different information sources. The timing for using the CAF is specified. It provides the most value for performing the first CA. A second complementary document is created in Excel to be used as a template for a database. The type of document allows for quick adaptions, capturing of information sources, improve collaboration and (re-)using the information again in the future.

Table 38 summarizes the adaptions, their justifications, and the assigned areas for improvement, that were derived from the evaluation of the Alpha Version. Each specific adaption effects one or more of the areas, that needed to be improvement.

Chosen improvement	Justification	Associated with improvement area				
		User experience	Guidance	Content	Conditions of use: Structural	Conditions of use: Timing
Integrate timeboxing	• Reduction of overwhelming impression • Setting of expectations	x				
Adapt proportions	• More space to fill out • Size of the fields reflect the time spent and the effort needed to process the corresponding steps	x				
Divide phases and steps more distinctly through clear separation, numbering, headings, and icons	• Reduction of overwhelming impression • Setting of expectations	x				
Integrate new display of identified competitors and highlight the guiding questions	• "Onion ring" • Questions do not seem to have been prominent enough	x				
Involve of a professional designer	• Implement the changes in a functional way • Compense the author's lacking software skills	x				
Integrate new design elements, such as icons, for guiding questions and work instructions	• Reduction of overwhelming impression • Facilitate orientation and learning	x				
Change completion forms, e.g. use gap text, checkboxes, empty bullet points	• Clarify the use • Make the use more intuitive	x				
Harmonize character formatting	• Facilitate orientation • Support guiding through the process	x				
Create an accompanying document that describes the use with concise sentences in an action-based manner	• A guideline was considered useful • Reduction of overwhelming impression • Support the usage	x	x			
Improve unclear wordings and instructions	• Reduction of ambiguities	x	x	x		
Clarify goals	• Information does not seem to have been prominent enough		x	x		
More clearly encourage to use multiple sources	• Information does not seem to have been prominent enough		x	x		
Clarify, that creating a database is still necessary	• Information does not seem to have been prominent enough		x	x	x	
Adapt CAF goals	• See chapter 4.3.1			x		
Adapt CAF analysis	• See chapter 4.3.1			x		
Use an aggregated business model categorization instead of the Business Model Canvas as display option	• More adaptability • More individuality • Letting the teams set their own focus			x		
Encourage to involve team and outsiders	• Higher CA quality through reflection with the team and a third-party (specialist) perspective				x	

Determine the timing for using the CAF as before performing the first CA	• Greater added value for identification and analysis of competitors, and a structure for CA if no CA has been performed before					x
Create an additional document (Excel file), that can be used as a database	• More adaptability • Capture sources • Improve collaboration • Make (re-)using the information in the future possible		x		x	

Table 38: Adaptions for the creation of the artefact's Beta Version

4.3.2.3 The neglected design adaptions

However, several major design options have not been implemented. First, the format of the artefact as a paper form in DIN A0 remained, and was only complemented by an excel file as database template. The reasoning behind that decision is, that the framework is not only a tool to capture information, but also to visualize and discuss them. Also, the gained overview at a glance has been perceived as useful as well. Second, the attitude of the user has not been addressed, neither in the framework nor in the guidance. It is being questioned, that the pure instruction to be open-minded and strive for critical thinking is sufficient to achieve the desired behavior or whether the behaviour should not be implicitly induced. Third, personal briefing and an example analysis were neglected as teaching forms. These teaching forms might become relevant in the future. However, the goal is to design the artefact in a way, that it can also be used by teams without a dedicated instructor. And a good example analysis, might be added prospectively, but is not yet available.

4.3.2.4 The design

CAF in its Beta Version is a tool that supports a structured process of competitor identification and analysis in order to develop an understanding of the competitive environment, position a product and company in the competitive environment, and to iterate a business model. It consists of a framework as hardcopy in DIN A0, a one-pager user guideline in DIN A4 and an Excel template for a competitor database. The CAF provides a step-by-step procedure. After the adaptions it consists now of six distinct steps.[9]

The first step instructs the user to set a mental starting point of the analysis using a gapped sentence. The sentence reads as follows: "For (customer segment) _____ who has (customer problem) _____ and wants to (customer need/ reason to buy) _____ our offering (product name/brand) _____ is a (product category/ market category/ technology) _____ that provides (key benefits) _____." In a second step, the settings of the analysis should be

[9] Since a step constitutes a distinct section or part in the framework, these terms are used interchangeably.

specified, including how much time and money the analysis should consume, who will perform the analysis, how the information will be stored that are gathered throughout the process and which sources and methods will used and applied. In the next step, current and potential competitors are to be identified with the use of the provided guiding questions. The placement in the in the graphic can indicate which ones are more perceived as more close or distant. Figure 43 shows the identification part of the CAF.

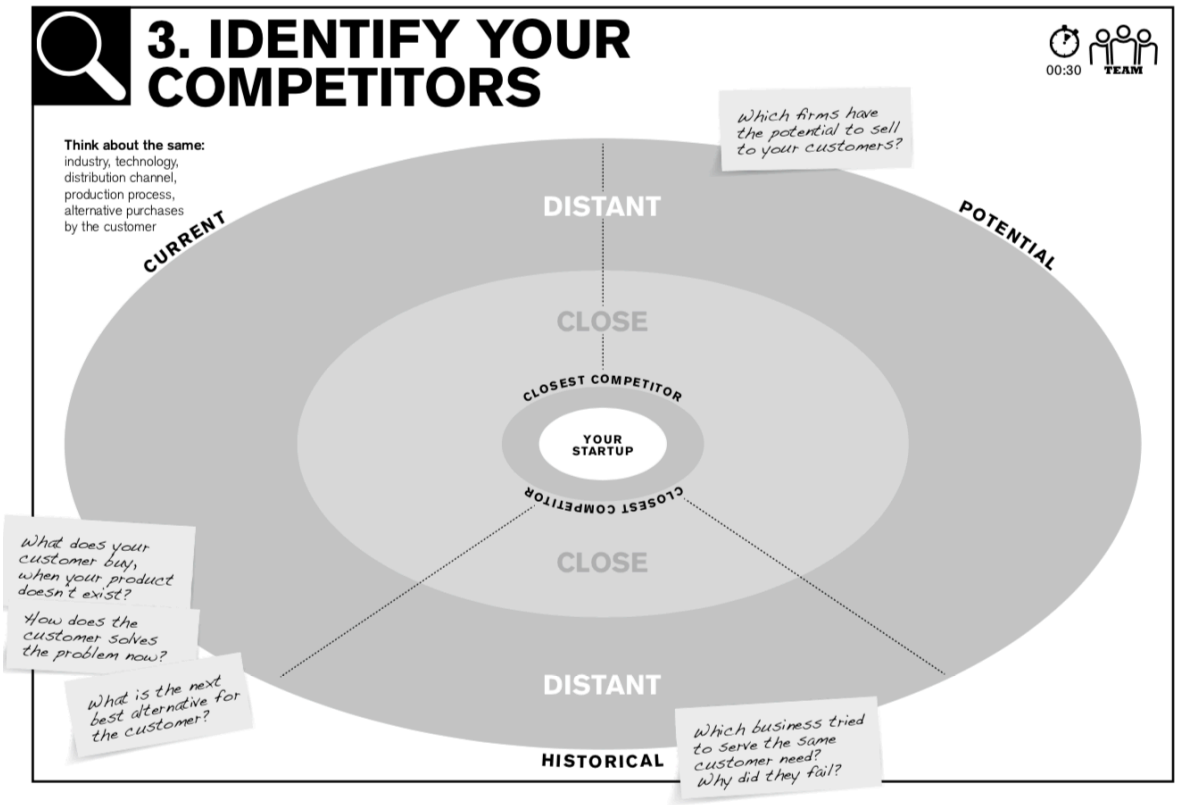


Figure 43: Competitor Analysis Beta Version Excerpt of Identification Part

The information collection step (step four) requires collecting background information and business model information about each competitor. The user is prompted to have a look at the proposed properties but adapt them to their own needs. The collected information should then be shared with the team. For that task, a presentation area is provided in step five. A short brainstorming task is included to reflect upon the shared information. In the sixth and final step, the actual analysis of the information is divided in three sections: understand the competitive environment, differentiation and positioning. Step six provides guiding questions to gain an understanding of the competitive environment, differentiate (if necessary) and position the product and/ or company and (re)phrase and extend the gapped company statement from the starting point. The understanding section in step six consists of five parts and is also guided by questions to be answered. The competitive environment in general is to be analysed by thinking about how the distribution of competitors is, if they are small or big, if there are dominating players, if there are trends, and how the competitive intensity is. A further

understanding of the competitive environment is established by examining how existing competitors have defined the basis of competition and if there are defined industry standards. Moreover, potential complementary products ought to be discussed and the market-type hypothesis (Blank, 2013, p. 71 ff.; Blank & Dorf, 2012, p. 112 ff.) is to be stated via checkboxes. The differentiation section deals with product and company differentiation and supports to reflect what differentiates the product/ service (company) from existing offers (companies). Examples are given. The overall differentiation then needs to be assessed by checking three boxes, that testify that the differentiation leads to a value that is perceived by the customer, important to the customer and not easy to imitate. In the last section (see Figure 44) the positioning can then be visualized in a positioning matrix and the gapped sentence from step one is repeated and extended by the part "unlike (main competitor/ industry standard) _____ (product/ company name) _____ key differentiation _____."

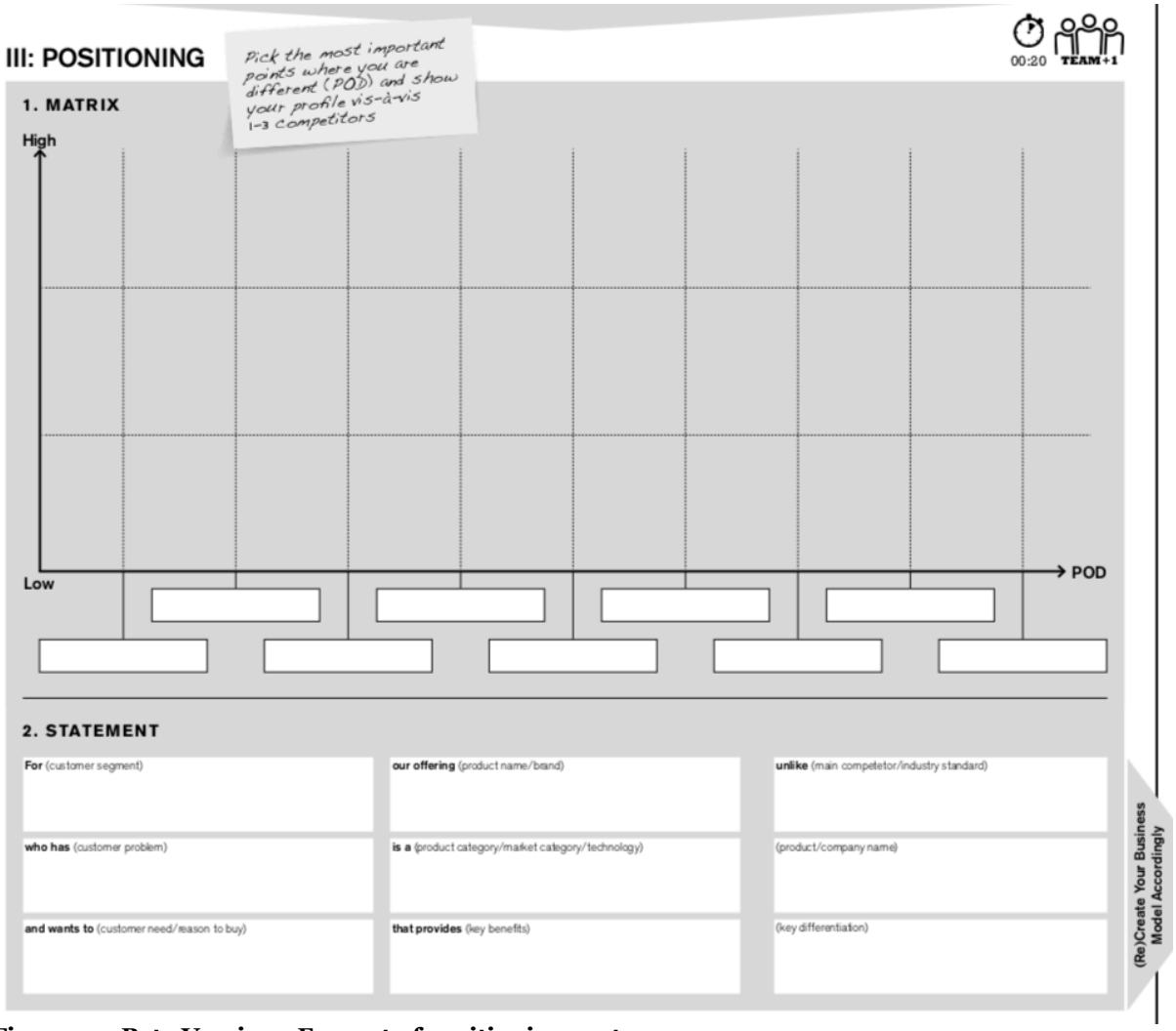


Figure 44: Beta Version - Excerpt of positioning part

Figure 45, Figure 46, Figure 47, and Figure 48 show the CAF Beta Version, the corresponding guideline and two excerpts from the template database.

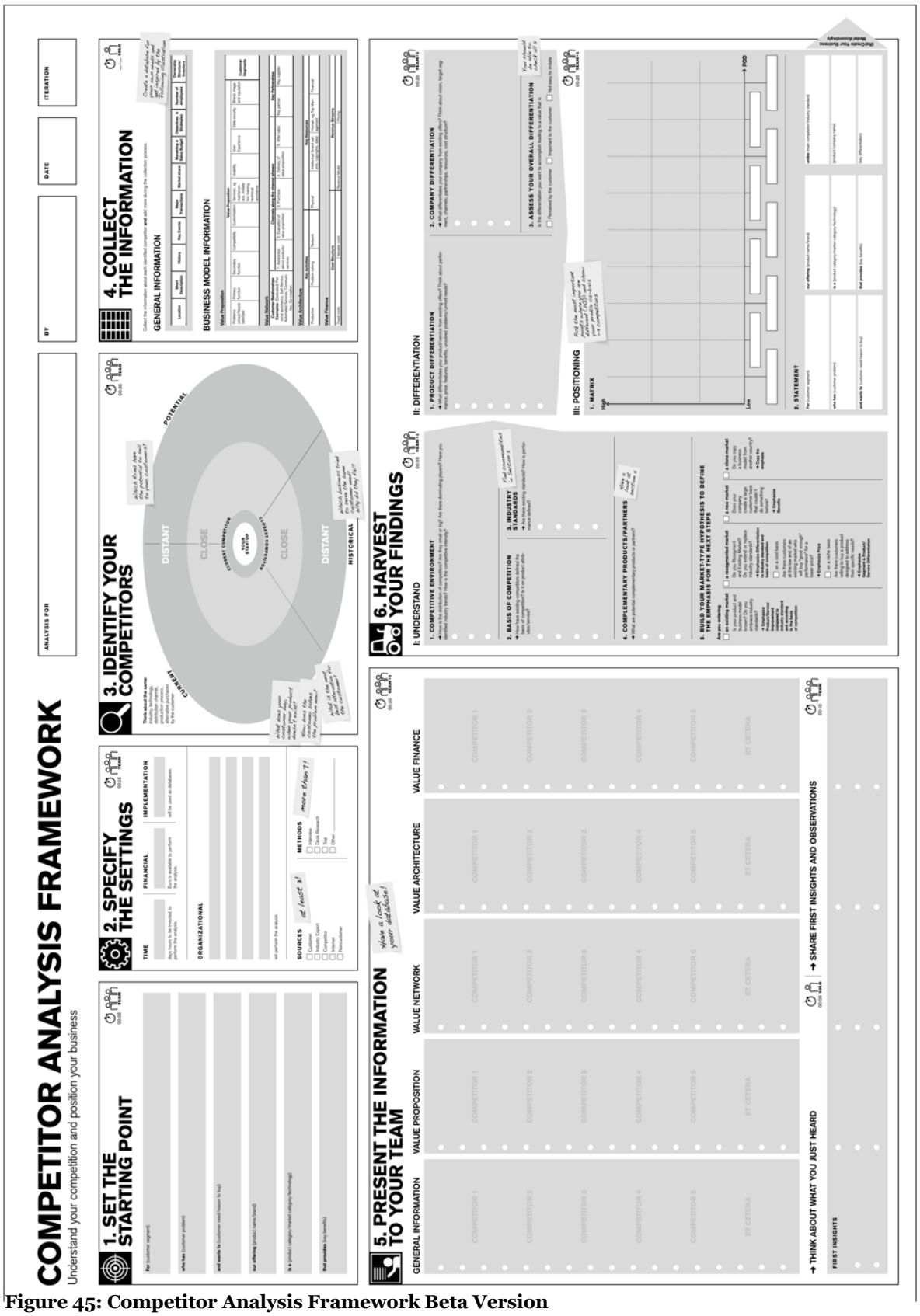


Figure 45: Competitor Analysis Framework Beta Version

THE COMPETITOR ANALYSIS FRAMEWORK

A GUIDELINE

The Purpose. The Competitor Analysis Framework is a tool that supports a structured process of competitor identification and analysis. The outcomes are:

- an understanding of your competitive environment,
- a positioning of your product and company in the competitive environment,
- thus, enabling you to iterate your business model.

1. STARTING POINT OF YOUR ANALYSIS. Use the gapped sentence to set a mental starting point for your competitor analysis.

2. SETTINGS OF YOUR ANALYSIS. Set how much time and money the analysis should consume. Also specify who will perform the analysis, how you will store the information you gather throughout the process and which sources and methods you will apply. Think about limitations and constraints.

3. IDENTIFICATION OF YOUR COMPETITORS. Have a look at the guiding questions to identify current and potential competitors and place them in the graphic. Which ones are more close/distant to you? Which ones failed (historical) and why?

The list doesn't need to be complete at this point, you can add more during the process!

4. INFORMATION COLLECTION. Collect background information and business model information about each competitor. Have a look at the proposed properties and get inspired but adapt them to your own needs.

5. PRESENTATION OF COLLECTED INFORMATION TO YOUR TEAM. The team member, who collected the piece of information to be displayed, presents his/ her findings to the team. Take post-its or write directly in section 5.

Afterwards, each team member thinks about what they just heard and shares his/her first observations with the team.

6. HARVEST YOUR FINDINGS. Go through section 6 and use the guiding questions to gain an understanding of your competitive environment, differentiate (if necessary) and position your product and/ or company and (re)phrase and extend the gapped company statement from the starting point.

LEGEND

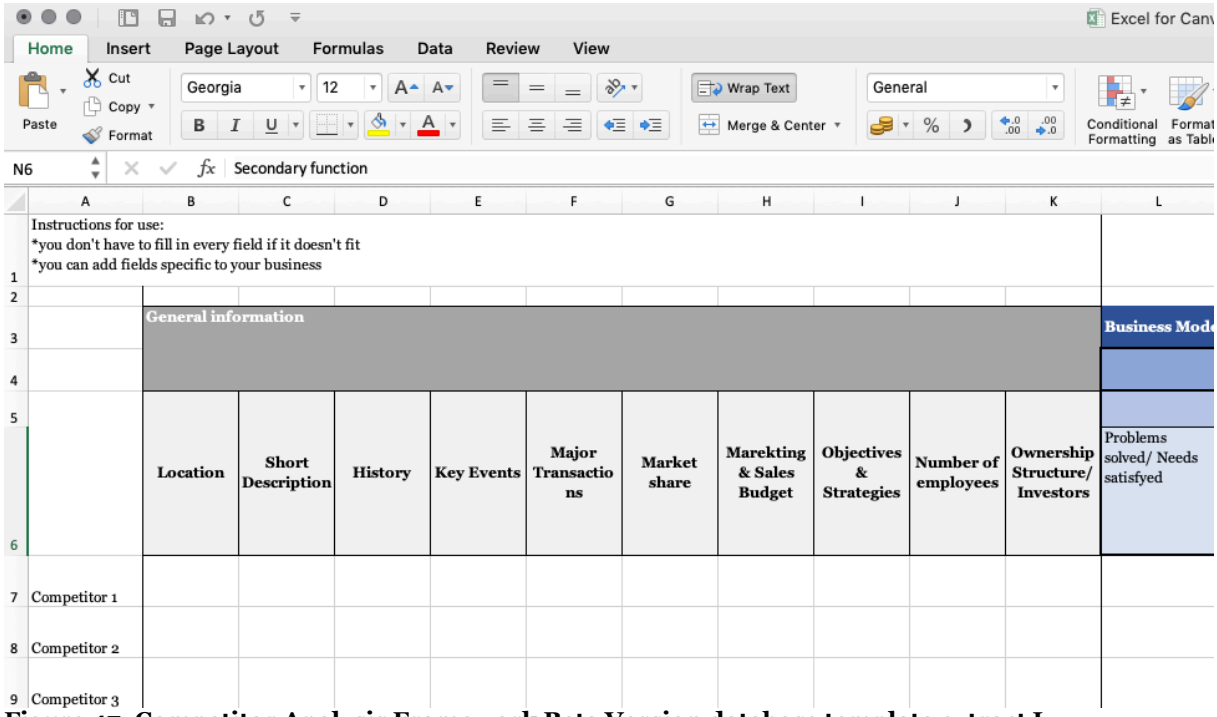
Suggested time for task

Task can be performed by one person

Task needs to be performed as a team

If you can: add an outsider to perform the task

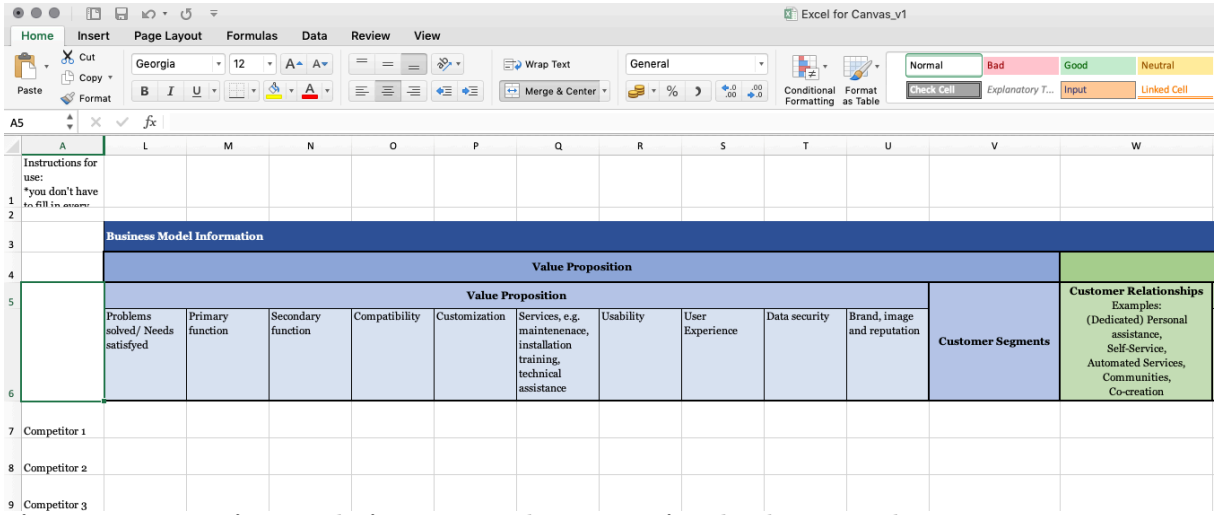
Figure 46: Competitor Analysis Framework Beta Version guideline



Instructions for use:
*you don't have to fill in every field if it doesn't fit
*you can add fields specific to your business

	General information										Business Mode
	Location	Short Description	History	Key Events	Major Transactions	Market share	Marekting & Sales Budget	Objectives & Strategies	Number of employees	Ownership Structure/ Investors	Problems solved/ Needs satisfyed
Competitor 1											
Competitor 2											
Competitor 3											

Figure 47: Competitor Analysis Framework Beta Version database template extract I



Instructions for use:
*you don't have to fill in every

	Business Model Information											
	Value Proposition											
	Value Proposition											Customer Relationships Examples: (Dedicated) Personal assistance, Self-Service, Automated Services, Communities, Co-creation
	Problems solved/ Needs satisfyed	Primary function	Secondary function	Compatibility	Customization	Services, e.g. maintenenace, installation training, technical assistance	Usability	User Experience	Data security	Brand, image and reputation	Customer Segments	
Competitor 1												
Competitor 2												
Competitor 3												

Figure 48: Competitor Analysis Framework Beta Version database template extract II

4.3.3 Demonstration and evaluation

In the second evaluation episode the artefact's Beta Version is evaluated. Given the fact, that the artefact has been revised in a major way, especially in the content-related dimension, the goals of this evaluation are formulated as follows. With regard to the functional requirements it is necessary to explore if the artefact in the latest version contains all necessary goals for a viable CA. Closely related therewith, the environmental requirement of completeness of the artefact is to be explored. As such, this evaluation episode also aims at evaluating the functional requirements themselves.

As secondary objectives, the structural requirements of coherence and conciseness are to be evaluated, as well as the environmental requirement of comprehensibility (ease of learning to use), ease of use and efficiency. The underlying research questions are again "Is the developed artefact supporting startups in conducting a viable CA?" and "How can the developed artefact be further improved, if necessary?".

4.3.3.1 Research design

Given the major revisions of the artefact and the formulated goals of this evaluation episode, a qualitative research approach is chosen to explore in-depth the impact and perception of the artefact's adaptions. Thus, this evaluation episode is purely formative. As research design explorative expert interviews are chosen (Bogner & Menz, 2005, p. 37). This design evaluation can be classified as a mix of descriptive and analytical method, as it uses informed arguments from the newly created knowledge base, and a static examination of the artefact to explore the fulfilment of requirements (Hevner et al., 2004). The chosen experts are not the object of investigation itself, but take up a specific role as a source of specialist knowledge on the subject to be researched (Gläser & Laudel, 2010, p. 12). This specific knowledge stems from the expert's professional or business field of activity and refers not only to technical or special, but also to practical or operational knowledge (Bogner & Menz, 2005, p. 44). In this case, especially their practical, operational and professional knowledge with regard to the use, quality, and implementation of CA is requested.

Again, semi-structured interviews are conducted, which are then transcribed and coded, and a content analysis using the "Gioia-Method" (Gioia et al., 2012; Gioia & Pitre, 1990) is performed according to the process described in chapter 4.1.1.4.

Selection of experts. In order to select suitable interviewees, it is obligatory to assess who has the desired knowledge at their disposal. To retrieve all relevant information, it is necessary to question different persons, who represent different perspectives, thus, providing other complementary evidence. This perspective triangulation is applied by interviewing experts with different backgrounds, that are classified as potentially relevant. The experts are also able to and willing to giving precise information (Gläser & Laudel, 2010, p. 117).

Overall, six experts have agreed to evaluate the CAF Beta Version. Table 39 presents the background of each expert. Some experts represent more than one background, whereas the most relevant function with regard to this project is marked. Startup coaches, investors, and founders, as well as researchers were identified as stakeholders with potentially relevant backgrounds. Three of the experts work as startup coaches. A part of their usual work is to support ESS within the entrepreneurial process. That also includes the development of pitch decks, including competitor slides, as well as the performance of CA itself. Two of the experts

work as startup investors, where among other things it is their task to review and judge the outcomes of performed CAs, generally in the form of pitch slides or parts of business plans. One of the interviewed experts, represents the user perspective as a startup founder. To summarize, the perspective triangulation includes the performer of CAs, the assessors of the outcome of CA, and the potential user of the artefact (as coach or as founder). That also represents the perspectives of opportunity creation and evaluation.

Additionally, the experts have backgrounds as researchers in a relevant field such as strategic marketing, innovation and entrepreneurship or venture capital, and work as corporate consultants, which adds another perspective.

Expert code name	**Background** (*main background)				
	Startup coach	Startup investor	Startup founder	Researcher	Corporate consultant
E1	x*			x	
E2	x*				x
E3	x*			x	x
E4	x	x*			
E5	x	x*		x	
E6			x*		

Table 39: Background of experts, evaluation Beta Version

4.3.3.2 Data points

With each expert a semi-structured interview is conducted either personally or on the phone. Table 40 summarizes the conducted six interviews. The average interview lasted 38 minutes. In sum 03:50 interview hours were recorded. The interviews were conducted between the 6th and 17th of June 2018.

Expert code name	**Interview length (hh:mm:ss)**	**Interview type**
E1	00:57:26	Personal
E2	00:34:30	Telephone
E3	00:36:04	Telephone
E4	00:38:21	Telephone
E5	00:37:53	Personal
E6	00:26:33	Personal
Sum	**03:50:47**	
Average	**00:38:28**	

Table 40: Expert interviews overview

Additionally, emails with the experts before or after the interview are used as data points, if they provide supplementary information with regard to the evaluation of the CAF.

4.3.3.3 Data collection and analysis method

Semi-structured interviews are conducted following the process described in chapter 4.1.2.4.1. As in the previous evaluation cycle, a content structuring content analysis (Kuckartz, 2018, p. 97 ff.) with the goal of summarizing the material (Mayring, 2015, p. 69 ff.) is used for the analysis of the data points. For that purpose, a hybrid form of category building (Kuckartz, 2018, p. 95 f.) is applied. To this end, the inductively emerging categories are developed using the Gioia Method (Clark et al., 2010; Corley & Gioia, 2004; Gioia & Chittipeddi, 1991; Gioia et al., 2012) as described in chapter 4.1.2.5. Again, the main goal of this evaluation is not to derive a structure out of the data, but to detect improvement potential. Thus, finding relationships between the categories is of subordinate importance. The a priori deductive category formation is carried out on the basis of the research questions and the defined requirements that are of special interest for this evaluation episode (see 4.3.3). They build a substructure to categorize the data into their affiliation to one of the six steps in the framework, purpose, efficiency, ease of use and ease of learning (Table 41). As a formative evaluation, the analysis will focus on improvement potential only. The a priori codes will be used to define the area of improvement.

A priori code (areas)	**Related to formative evaluation part**
Section 1, Section 2, Section 3, Section 4, Section 5, Section 6 (refers to the six steps that are outlined in the CAF)	• Completeness • Coherence • Conciseness
Purpose (refers to the goals the CAF has to fulfill)	• Functional requirement fulfillment
Efficiency	• Adequate complexity • Efficiency
Ease of learning	• Ease of learning/ comprehensibility
Ease of use	• Ease of use

Table 41: Deductive categories Beta Version evaluation

Due to time restrictions, this evaluation was performed manually using Excel instead of using a qualitative analysis software.

4.3.3.3.1 Interview setting

The experts were sent the current version of the CAF and the guideline before the interview appointment. If the interview was conducted personally a printout of the artefact was shown during the interview. If the experts asked for it, a short introduction of the CAF process was given. The interview was performed by going through the steps of the framework.

4.3.3.3.2 Interview guideline

The preparation of the guideline considers the information given in chapter 4.1.2.4.2. In the warm-up phase (Gläser & Laudel, 2010, p. 148 f.) the experts were thanked for taking their time to answer the questions and the research project was shortly described. They also had the opportunity to give a first uninfluenced impression about the artefact since they

received the digital version in advance and may have comments to make. The main parts are directly related to the requirements under evaluation. To increase the openness of the interview (Gläser & Laudel, 2010, p. 149), an open question is included to ask the interviewee, if there are important aspects about the CAF that haven't been mentioned before.

The interview guideline on the basis of which the interviews are conducted consists of six parts and includes key questions that will be asked in any case and possible questions that will only be asked if the conversation process allows it or makes it necessary. Table 42 displays the interview guideline.

Part	Interview Questions	Requirement Coverage
Part1: Introduction	What was your first impression of the CAF?	Comprehensibility
Part 2: The process and content of individual steps	Let's go through the individual steps of the CAF! Questions for each step: Do you think the step is complete? Is something missing? Do you understand what needs to be done? Does the step build upon the previous step? Are there parts that you consider irrelevant?	Coherence Conciseness Completeness Ease of learning/ comprehensibility
Part 3: Goals	Does the CAF cover all CA related goals that are relevant for startups in the early stage? Are there goals that are not covered? Do you think it is possible with the CAF to • Understand the competitive environment • Validate a business model • Position a product/ company	Functional requirements Purpose of the CAF
Part 4: Ease of learning/ Ease of use	How easy was it for you to understand the usage? Was the guideline helpful? Is something missing in the guideline?	Ease of learning/ comprehensibility Ease of use
Part 5: Efficiency	Do you believe that the CAF enhances the efficiency of startup teams in conducting a CA?	Efficiency
Part 6: Closing remarks	Do you have any additional remarks concerning the CAF, its usage/ design/ content/ usefulness?	All of the above

Table 42: Interview guideline expert interviews

4.3.3.4 Findings

The data is coded, and the evolving first-order categories classified according to their affiliation to one of the deductively derived categories as of Table 41.

It can be said that the experts regard the CAF in general as a useful tool to conduct a viable CA for startups. None of the experts questioned in general the usefulness of the tool. All of them focused in the interviews and with their comments on the improvement potential they identified. The general positive attitude towards the CAF is grounded by statements such as "Basically I think it's [the CAF] really good, because it's well visualized, so you have the possibility to use it in the team as a work instruction, but also to record the essential findings" made

by expert E1 or “So, the most important thing, I think is, that what you're doing there covers real needs. […] and I also think it's great that there's a structured tool for that […] I could well imagine using it with some of our startups as well, and I'm sure there would be an immediate benefit” by expert E3.

In the following analysis the focus is set on the improvement impulses generated by the experts. The improvement impulses, also called hereinafter improvement suggestions or proposals, were either directly expressed by an expert or derived by expressed doubts and criticisms, remarks on malfunctions or shortcomings, and/ or revealed ambiguities.

Table 43 provides representative supporting data for the first-order categories related to improvement potential classified by a priori code, i.e. the area for improvement. A supplementary area that evolved through the process was “mindset”, which came up in the former evaluation cycle as well and relates to the attitude the users should adopt for executing the CAF.

Improvement first-order category	**Representative first- order data**
Section 1 • The requirements of performing a CA need to be stated	• “Weil die Grundlage von Competitor Analysis ist eigentlich Market Analysis. Du musst erst wissen, auf welchem Markt du dich bewegst, bevor du dich mit deinen Mitbewerbern auseinandersetzen kannst.“ E3
Section 2 • Ambiguities in wording • Request to set the time frame also	• „und was Trial bedeutet, das könnte ich gar nicht zuordnen.“ E3 • „Zeit benötigt weicht ab von in welchen Zeitraum will ich das abgeschlossen haben.“ E1
Section 3 • Ambiguities regarding the process of and relationship between section 3 and 4 • Ambiguities regarding the "distant/close" scale • Ambiguities regarding the "distant/close" definition • Criticism regarding the question about potential competitors as being too narrow • Design remark with regard to the noticeability of text box "think about the same" • Remarks with regard to the identification guiding questions (problem solved, budget, alternatives) • With more than one customer group, this step needs to be done several times	• “Da ist für mich ganz viel Feedbackschleife hier zwischen [Zwischen 3 und 4].“ E6 • „manchmal ist es schwierig zu sagen, was ist close und distant“ E1 • „Dann war hier habe ich mich gefragt, wie definierst du close und distant, also was grenzt du ab voneinander?“ E5 • „Ich würde eine Sphäre mehr hinzufügen. […]: Alternative.“ E2 • „dass man das [text box „think about the same…“] von hier oben nach hier unten tut“ E1 • „wobei ich mich jetzt bei dem eine Prompt hier, Potential, auch gefragt habe, ob dieses „sell“ das einzige ist, was wichtig ist.“ E1 • „dadurch, dass wir so three-sided sind und sozusagen man für alle drei Kundengruppen Competitors hat, […] und man muss dann ja auch in unserem Fall drei, aber bei vielen Unternehmen, denke ich, mindestens zwei Zielgruppen haben, für die man […] zwei competitive Environments hat“ E6
Section 4 • Remarks on the importance of creating a database • The design is not clear, overengineered, too complicated, no longer self-serviceable	• “Gleichzeitig brauchst du - und das habe ich mehrfach getan - ein richtig gutes Datenbuch, um eine sinnvolle Wettbewerbsanalyse zu machen“ E3 • „da würd ich an deiner Stelle versuchen es einfacher hinzukriegen, so dass es selbst bedienbar bleibt, keine großen Rückfragen gestellt werden müssen“ E4

• Remarks on the importance of thoroughness when creating a database • Request for a hardcopy template or excel for distribution to information collectors • Request for information about the duration • Request for references to more detailed information sources • Remarks regarding the possible irrelevance of individual proposed data points • Remarks relating to the limited possibility of obtaining data	• „und das hatte ich auf jeden Fall, dass es sehr wertvoll war, sich dafür auch länger Zeit zu nehmen“ E6 • „Aber ich hätte mir vielleicht auch gewünscht, dass dieses Kästchen 4, dass ich das soz ja auf DIN A4 als Kopiervorlage rausholen kann, und dann setzen wir uns im Team hin, jeder nimmt einen anderen Mitbewerber, füllt es aus“ E4 • Aber da würde ich [...] auch nochmal [...] versuchen einen Hinweis zu geben [für die Ausführungsdauer von Schritt 4]“ E1 • „Manchmal kannst du die Infos bekommen durch einen Ex-Mitarbeiter, der irgendwo dazu was erzählt.“ E2 • „Hier habe ich mich gefragt, [...], ob man bestimmte Themen wirklich braucht [...] Also gerade, wenn ich jetzt hier oben bei Marketing & Sales Budget, Market Share“, E5 • „ich weiß nicht, ob man das rauskriegt. Also wenn man das rauskriegt, ist es gut, aber Market Share...“E5
Section 5 • Ambiguity regarding the content of the columns / transition from 4 to 5 is unclear • Ambiguities regarding the completeness of the information to be presented and recorded • Remarks regarding the importance of understanding the individual components of the competitor's business model • Ambiguities with regard to the use for the presentation • Doubting the usefulness of presentation of the information • Criticizing the time limit as too short • Doubting the importance of individual aspects	• „So, und jetzt muss ich noch hinkriegen, den Schritt von 4 zu 5“ E3 • „eigentlich geht es jetzt nicht darum, alles sozusagen im Detail [...] hier hin zu übertragen. [...] Also hier wäre für mich [...] nicht die Frage nach dem present the information, sondern present the most relevant information“ E1 • „Ist das hier so gemeint, dass dann jede Zeile ein Competitor ist in 5?“ E6 • „Also würde ich wahrscheinlich auch schon nicht, um es mit dem Team zu diskutieren, so machen, sondern dann irgendwie digital“ E6 • „ich meine, das ist pushy [20 min für section 5]“ E5 • „Zum Beispiel Value Architecture interessiert dich da selbst noch nicht“ E5
Section 6 • Ambiguities regarding the procedure in 6 • Criticism that CAF is only a snapshot, but should actually be a permanent process that includes how competitors develop • Remarks on future orientation: Competitors' developments, future standards and changes in the basis of competition must be taken into account • Remarks regarding the importance of understanding and analyzing in depth the individual components of the competitor's business model • Remarks on the outcome: the case that no differentiation is found is not provided for	• „Also worauf die Kriterien nicht zutreffen, die braucht man eigentlich nicht mehr für die weitere Positionierung, weil die dann durchs Raster gefallen sind.“ E6 • Also mein größerer Kritikpunkt [...] ist [...] der, dass das halt eine Zeitpunktaufnahme ist. Das ist zu statisch. Eigentlich sollte man und das wäre tatsächlich ein Mehrwert für alle, wenn man so eine Art permanenten Prozess entwerfen könnte.“ E5 • „aber einfach nur mal sich ganz bewusst zu werden [...], dass sich auch alles verändern kann, nicht nur das competitive environment, [...] ,gibt’s neue Pricing Modelle, wird es neue Industriestandards geben, kann ich sogar vielleicht selber einen setzen“ E1 • „Also finde ich, gerade wenn man bei seinem eigenen Business Modell halt noch unsicher ist, [...] dann finde ich das schon spannend, sich das im Detail

• Remarks regarding the characterization of competitors (large/small; new/ established; definition of similarity) • Remarks on the prioritization of competitors: the most important must be identified • Remarks on missing action derivation • Ambiguities regarding the process and relationship between section 5 and 6 • Design and wording remarks • Remarks on the assessment: positioning is currently not assessed • Notes on the positioning matrix: other suggestions for the display of positioning • Comments on the future: Startups should formulate their bets on the basis of changes in the competitive environment • Notes on the content of the analysis: changes in customer segments (future purchasing criteria) should be taken into account. • Remarks on the outcome: falsified/ proven hypotheses should be displayed • Uncertainty regarding the added value through the building of the market-type hypotheses • Remarks on the need to define market maturity • Remarks that step 6 as a central point brings the actual added value and the process is less important	anzugucken, wie balancieren die das eigentlich, worin sind die wirklich gut, worin machen sie so das Nötigste.“ E6 • „sechstens macht Sinn, wenn du genügend Differenzierungsmerkmale findest. Es kann aber auch passieren, dass du zu wenig findest.“ E4 • „das würde mich noch… wenn du Competitors analysierst, hast du davon etablierte Player, hast du neue, die reinkommen?“E5 • „Das sind zum Beispiel very important Startups, die man sich angucken will, und es gibt andere, die machen ihr Ding und die haben da keine großen Ambitionen, mache keine großen Veränderungen. Die muss man nicht so genau angucken.“ E2 • „sondern für mich geht es ja auch wirklich darum, irgendwie drei bis fünf Action Items abzuleiten“ E5 • „den Schritt von fünftens nach sechstens, den habe ich jetzt noch nicht verstanden.“ E4 • „ernten […], das ist eine sehr wenig tiefgründige Tätigkeit […] Für mich ist harvest nicht die Intuition, die ich mir wünschen würde.“ E4 • „Jetzt hast du einmal den assess drin für einen Unterpunkt bei Differentiation, und bei positioning ist…hast du das halt nicht drin“ E1 • „du brauchst hierfür [positioning matrix] keine stetige Skala, keine Null bis Hundert Skala, es genügt völlig, wenn du eine Skala hast, von Strich, Plus, Plus Plus und Plus Plus Plus.“ E4 • „Genau, durch die Topologie des Playing Fields kannst du ja auch in gewisser Weise vorhersagen oder zumindest wetten, dass du vorhersagen kannst, wo sich gewisse Spieler hinbewegen werden.“ E2 • Also Trends, Treiber, damit decke ich Kundenverhalten auch ab und Kundenbedürfnisse und Kundensegmentveränderung […] muss ich angucken“ E2 • „stringent nach einem hypothesenbasierten Ansatz, was auch so Sinn macht. Also […] welche der Hypothesen konnte wie belegt oder falsifiziert werden. Das ist für mich relativ immanent und auch ganz wichtig, dass man das entlang von Hypothesen macht.“ E3 • „Build your Market Type to define the next step. Das ist für mich gerade schwierig.“ E5 • “Der Marktreife. …Ist es ein Pull oder ein Push. Bist du in einem Markt, wo es einen Market Pull schon gibt oder bist du im Markt drin, wo du halt gerade so einen Technology Product Push betreibst.” E5 „mich interessiert eigentlich mehr das Ergebnis als der Weg dorthin. […] Deswegen, die 6 steht doch eigentlich mehr im Zentrum der ganzen Sache als dass das Schritt 6 ist“ E3
Ease of use • Ambiguities with regard to the overall structure and procedure • Questioning of the chosen format (DIN A0) in comparison to single sheets for each section	• „Also ich würde sogar denken, dass hieraus [aus Schritt 5] nochmal wieder Recherchebedarf auch entsteht.“ E6 • „Was ich ehrlich gesagt noch nicht ganz verstanden habe, ist, was letztendlich das Format ist, also ob es dieser Canvas-One-Pager ist oder ob das fünf oder

• Remarks with regard to legibility and uniformity of work instructions and user prompts	sechs verschiedene sind, weil das sind ja letztendlich sechs Zwischenschritte.“ E3 • „Das, was mir ebenfalls aufgefallen ist, die Schriftarten variieren bzw. die Schriftgrößen. Das erweckt halt nicht unbedingt das Gefühl, dass das ruhig wäre. […] Diese Zwischeneinwürfe mit at least three, more than one, teilweise etwas komplexere Side-notes, das finde ich irritierend. Also entweder ich kriege zu jedem ein gleichförmiges Lesebeispiel oder ich will es gar nicht.“E3
Purpose • Creating the database is a key purpose • Remarks with regard to presentation: the problem of converting the analysis into a presentation slide is not solved • In addition to positioning, a strategy for optimizing access to market shares in knowledge of competition must also be defined • Informed decision-making is a key purpose • It is a communication and discovery process tool • Production costs of competitors must be determined	• „Ich finde das halt auch diesen Wert, dass du da eben die Datenbank aufbaust, die du pflegst.“ E5 • „Aber man braucht, nachdem das hier fertig ist, auch noch eine Transformation in Richtung Präsentierung gegenüber Dritten“ E2 • „Das einzige, was ich letztendlich damit beeinflussen kann, ist, dass ich mir meinen Zugang zu den gewünschten Marktanteilen optimiere in Kenntnis des Wettbewerbes.“ E3 • „ vor dem Hintergrund was machen Menschen, die gründen wollen, und sich mit dem Tool vielleicht noch gar nicht auskennen, dass das klar wird das das nicht eine Spielerei ist, im Sinne von Analyse ist, sondern dieses Thema informed decision-making, […] key [ist].“E1 • „Es ist mehr so ein Findungsprozess, was man hat, wo eine Mannschaft versucht, systematisch an die Sache herangetragen zu werden.“ E2 • „Die eigentliche Kunst von Competitor Analysis ist ja zu hinterfragen, was deren Produktionskosten sind. Also das Theorem dahinter nennt sich Industriekostenkurve.“ E3
Mindset • Remarks on the attitude when analyzing competitors/ explicit mentioning: open, honest, use not only to confirm existing opinions, critically scrutinize • Remarks on the attitude when analyzing competitors: optimism and overconfidence necessary • Remarks on the attitude when analyzing competitors: explicit mentioning of the attitude not necessary, objectification is ensured by the framework itself	• „Ja, diese Ehrlichkeit, die man braucht, also nicht sich irgendwie selbst belügt oder so und dadurch ein verkehrtes Bild bekommt.“ E2 • „man muss ja auch ein bisschen optimistisch sein. […]… man muss ja ein bisschen das selber auch überschätzen, was man hinkriegt, sonst wird man ja deprimiert und gibt auf“ E6 • „Ich glaub nicht, dass es das [Einstellung in den starting point aufnehmen] unbedingt braucht, ganz ehrlich. Also was ich an den ganzen Dingern ganz charmant finde, ist das es alles sehr objektiviert“ E1
Ease of learning • Didactic structure: At the beginning, the user must know what the procedure is aimed at • Guideline: is not suitable for persons who are not familiar with the subject • Understanding the usage: a fully completed example would help • Ambiguities regarding the symbols	• „So eine Art retrograder Erkenntnisgewinn frei nach dem Motto, lies erstmal die fünf Seiten und im letzten Satz steht dann, um was es eigentlich ging oder warum wir das jetzt gemacht haben - das ist suboptimal“ E3 • „diese Guideline […] halte ich […] für wenig geeignet, jemanden Fachfremdes dort damit fit zu machen.“ E3 • „Wenn ich jetzt zum Beispiel den Case XYZ durchdeklinieren würde, sähe dieser Zwischenschritt, an dem ich jetzt gerade bin, fertig ausgefüllt so und so aus. Also das so als Orientierungshilfe.“ E3

	• „Aber dieses plus, was heißt dieses plus eins, das habe ich nicht verstanden“ E4
Effectiveness • Request for a digital version • Request for interview questionnaire and further support for the collection phase • Request for splitting teams more often during the process for increased effectiveness • Complexity is too high	• „sowas Komplexes würde ich gar nicht auf ein A0-Blatt schreiben, weil mir klar ist, dass ich hinterher das nicht als A0-Blatt speichern will, sondern ich will es irgendwie digital haben, wo ich dann wieder drauf zugreifen kann.“ E6 • „Ja, aber dann muss ich dir ganz ehrlich sagen, dann wäre der wirklich frappierende Mehrwert der ganzen Sache, wenn du einen guten Interviewbogen zur Verfügung stellst.“ E3 • „Ich würde die Teams aufsplitten und dann die mergen lassen. […] an mehreren Stellen zwischendurch.“ E2 • „ich überlege halt, ob man so ein bisschen das noch leaner machen kann, dass du ein paar Sachen rausnimmst, weil es halt schon sehr, sehr umfangreich ist.“ E5

Table 43: Representative supporting data for each improvement first-order category

Table 44 displays the number of unique first-order codes and the thereof classified first-order concepts, indicating the major improvement areas for the next iteration cycle. The most improvement impulses (18 first-order categories) were found in section six, which represents the analysis part of the CAF, section four, i.e. the information collection part (8 first-order categories), section three representing the identification part (7 first-order categories), and for section 5 dealing with the presentation of the collected information to the team (7 first-order categories). All other themes comprise one to six improvement impulses. The relative deviation between the first-order codes, that were assigned while analysing the interviews for the first time, and the first-order categories, that consolidate topics, that are “thematically similar to each other, that is, they communicate same or very similar semantics and ideas” (Al-Debei & Avison, 2010, p. 364), hints at the parts were the experts were the most in agreement. Regarding the ease of use 73% of the first-order codes could be consolidated. The same applies to section six, section three and section two, where the deviation ranges from -40% to -33%.

Area (a priori code)	First-order codes	First-order categories	Relative (absolute) deviation
Section 1 (Starting point)	1	1	(0)
Section 2 (Settings)	3	2	-33% (1)
Section 3 (Identification of competitors)	11	7	-36% (4)
Section 4 (Information collection)	10	8	-20% (2)
Section 5 (Presentation of information)	7	7	(0)
Section 6 (Analysis/Findings)	30	18	-40% (12)
Ease of use	11	3	-73% (8)
Purpose	7	6	-14% (1)
Mindset	4	3	-25% (1)
Ease of learning	4	4	(0)
Effectiveness	4	4	(0)
Sum	**92**	**63**	

Table 44: Number of first-order categories per area

Given the purely formative evaluation goal of this episode, the interviews are analysed with regard to their improvement potential for the artefact, including negative assessments, improvement suggestions and neutral remarks, that highlight specific already implemented or neutrally observe aspects.

Figure 50 and Figure 51 show the data structure of the findings. The four main dimensions of the analysis are depicted (aggregate dimension), as well as the representative five second-order themes and 54 first-order categories that constituted these themes. The additional nine neutral remarks, which were not assigned to the improvement-related second-order themes, are displayed with a gray background. For legibility and clarity reasons the data structure was separated into two figures, and the second-order themes were repeated, if necessary. The repeated second-order themes are presented in brackets.

In the following supplementary descriptive findings narrative further quotes may be provided, which are, if necessary, translated to English to ensure a smooth reading flow. The aggregated dimensions could be selected according to the categories already developed in the preceding evaluation cycle, which are: improvement of user experience, improvement of guidance, improvement of content, and improvement of conditions.

Improvement of user experience. Nine first-order categories can be assigned to the unfavorable design theme (see Table 45). Sections three, four and six are affected. This ranges from specific problems such as noticeability of textboxes, to general remarks, e.g. that section four is “overengineered” and too complicated, and thus no “longer self-serviceable”, as stated by expert E4. Also, general usage requests are stated, such as a hardcopy to handout for users for section number four. An unfavorable design is also influencing the ease of use, the

ease of learning as well as the effectiveness of the CAF. Individual examples (expert E1), a fully completed example (expert E3), and a digital version (expert E1 and E6) were requested. The display of the positioning was addressed by two experts (E2 and E4). They suggested different displays. Expert E4 sent after the telephone interview a sketch of his suggestion (see Figure 49), stating that "you don't need a continuous scale for this". E2 proposed the Gartner Magic Quadrant, that rates companies along two criteria: completeness of vision and ability to execute, leading to a position in one of four quadrants, that are named leaders, challenger, visionaries and niche players (see Gartner Inc., 2019).

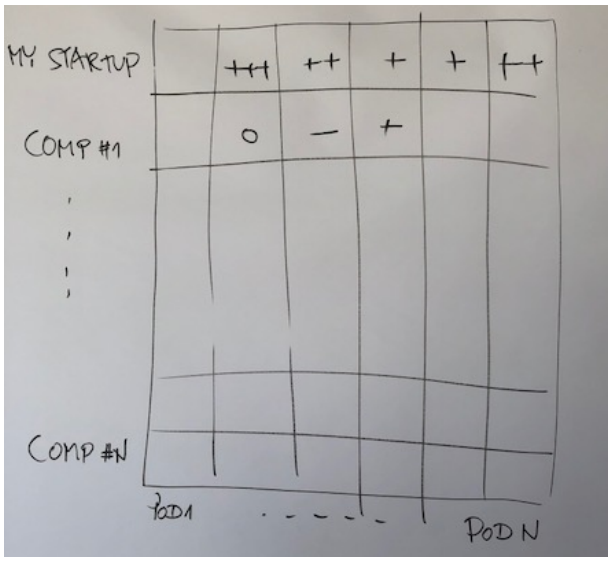


Figure 49: Suggestion made by expert E3 for positioning display

Improvement suggestions were also made with regard to wordings. E4 for example considers the word "harvest" in the heading of section 6 as not profound enough and suggests "analyse and synthesize".

Improvement of guidance. An improvement of guidance was part of 17 first-order categories that can be assigned to the second-order theme of unclear activity description or wording ambiguities. This affects the sections, two, three, five and six, as well as the ease of learning and the ease of use. The experts were not satisfied with the distant and close definition and scale as being either closer distant, rather than a continuum. In section three as well, the guiding questions were either not perceived clearly enough, since several improvements were suggested with regard to include guiding questions that are already included, such as "alternatives" (expert E2). Or the identifying guiding questions are assessed as being too narrow, such as expert E1 thinks that "sell" should be replaced by "try to solve the problem". Also, they didn't perceive the overall process as being consecutive or iterative, and wanted to that worked out more clearly. As such, the transition from section four to five, and from five to six, didn't become "intuitively" clear enough (expert E4). E1 proposed "termination criteria" for when to

restart the process form the beginning and E3 proposed to show “an infinite loop” or a “restart at the end” to make clear that the task of analyzing competitors is ongoing.

In section five, experts E5, E1, and E3 had problems to understand, that not all of the collected information should be recorded here, but only those which are crucial, and how the headings value proposition, value architecture, value finance, and value network are connected to section four and which information belong in these fields. The framework was assessed by expert E3 as having ”many terms in it, which one most probably doesn't understand without business studies or without a more complex involvement with the matter or which are in need of explanation” and the guideline as “not very suitable for making people from outside the field fit.” It was also proposed to emphasise the goal of the artefact more in the beginning.

Improvement of content. Content-wise 20 first-order categories can be assigned to missing content and functions and five to content, that the experts deemed superfluous. Redundant content was identified in section four, doubting the usefulness of the collection of the proposed data points, and in section five doubting the usefulness of the presentation of this information. Expert E3 even doubted the usefulness of all sections except six, which he regards as “the central point of the canvas” and all others “are just the way to get there”. Also, individual parts, such as the building of a market-type hypothesis, are criticized as adding not enough value.

The experts provided many suggestions for what can be improved. The second-order theme "Missing contents/functions" contains 20 first-order categories, almost a third of all first-order categories. Section 6 accounts for half of these. In particular, section six should be more dynamic and iterative, taking into account that a clear differentiation might not be found and a new iteration cycle might be necessary. In this context, it was also requested to summarize the assessment of differentiation and positioning. Also, five of the six experts suggested to derive specific actions and tasks from the analysis. These should include which companies should be monitored closely (E1, E2, E5, E3), to define open questions (E5), what should be adapted in the business model (E5), what are next steps (E5, E1, E3), and whether a repeated CA is necessary (E1, E4). Since, the value add of analysing the critical success factors has not been perceived as strong enough, this assessment was not included in the Beta Version. However, two of the experts including the expert with founding background, referred to analysing critical success factors as being crucial. As E5 states it, you need to know why a company “did [...] get there and others screwed up”, for example, because due to a “central customer they won.” Another missing content theme refers to the future orientation of the analysis. The artefact should include more future-oriented analysis parts, such as which competitor is developing in a way that might endanger the business, which trends, market forces, standards change, and can influence the business. In the rest of the artefact, ten more first-order categories stand

for improvement suggestions regarding the content. These include the request for better definition of requirements to use the framework, setting a time frame in section two, indicator for the duration of section four, more information source and in detail, an interview questionnaire for information collection, and better support for creating a presentation out of the analysis.

Improvement of conditions. With regard to the conditions of using the artefact, the attitude that users need to access the full value add, that the framework provides, came up in four of the interviews. E2 for example states that "if the discussion is open and fair, then it can help to solve this confirmation bias". An open, honest, and fair discussion is needed to prevent lying to oneself, and to use the framework to generate new insights instead of just confirming the already prevailing opinion.

Neutral categories. Next to the categories that clearly contain a message for refinement, a category for neutral remarks evolved, that are interesting to examine, as they confirm hypothesis about aspects of the CAF or give hints about the usage. For example, the founder expert explains that the identification activity might be necessary more than once if a startup faces more than one customer group. The importance of the database creation was emphasized, as was the thoroughness when creating it. Although, several proposed individual information that should be collected about competitors, the overall in-depth analysis of the competitor's business model was appreciated. The purpose of supporting informed decision-making was confirmed by the experts. E2 confirms, that the framework should not be used as a presentation tool for CA, but instead as a communication tool and for the discovery of insights.

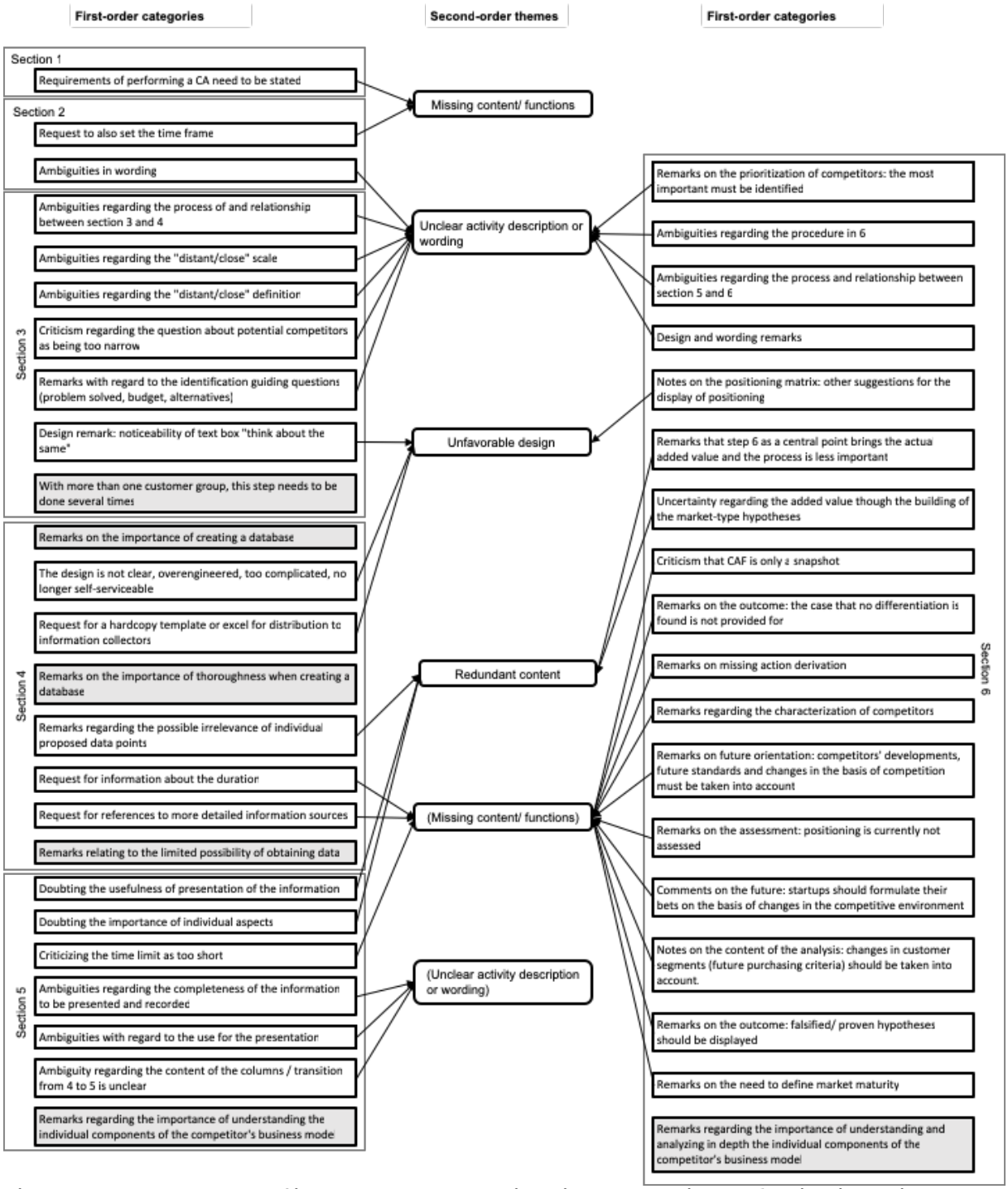


Figure 50: Data structure of improvement suggestions in Beta Version evaluation interviews – part I

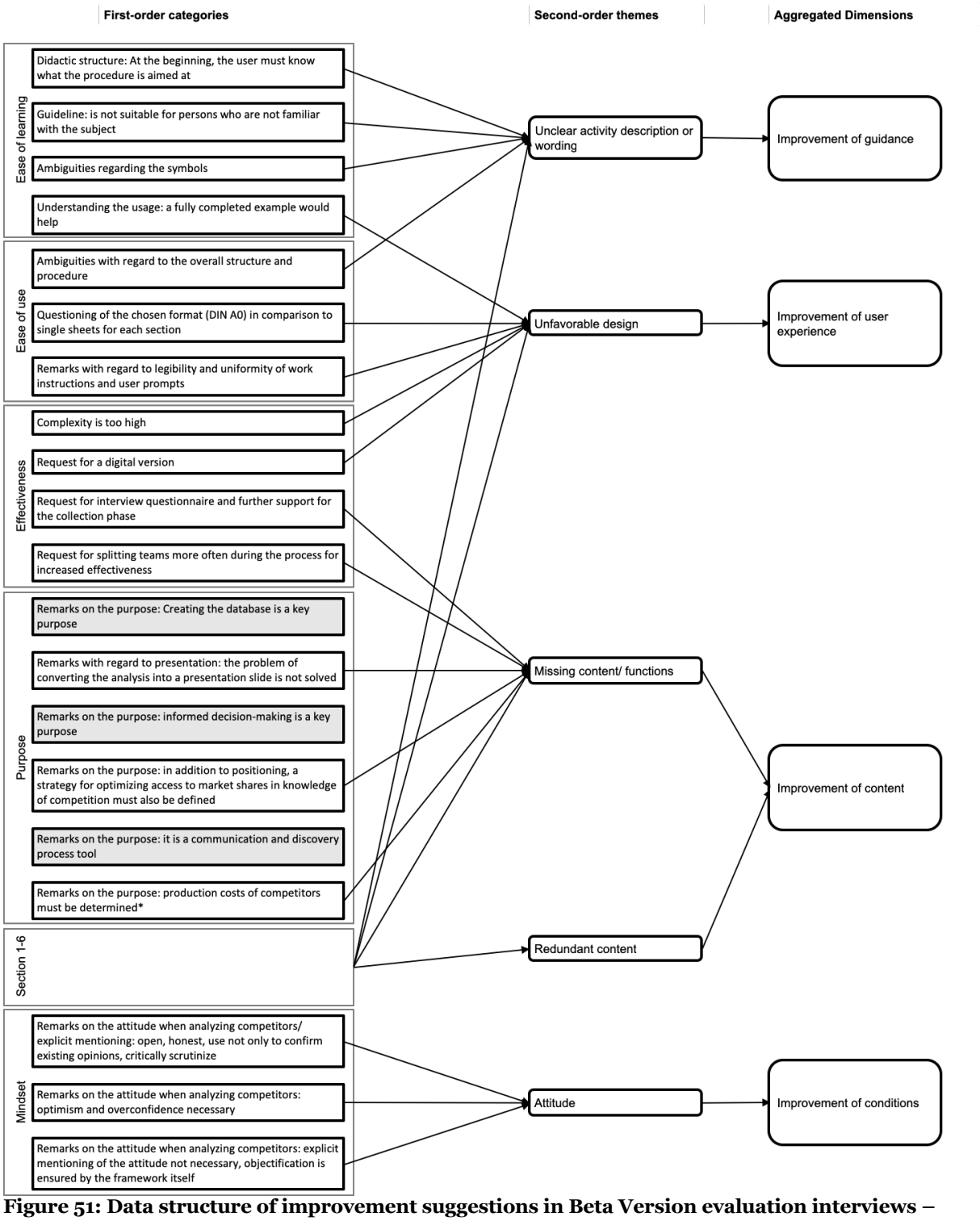


Figure 51: Data structure of improvement suggestions in Beta Version evaluation interviews – part II

Table 45 summarizes how many first-order categories per area are assigned to the identified second-order themes. The most categories are assigned to content improvement, i.e. missing content or functions (20 categories) and redundant contents (5 categories). Thereof the most are identified in the areas of section six and the purpose, supporting the hypothesis, that these two functions are strongly linked to one another and needed major improvement.

However, this seems to be still the case. Again, unclear activities and wording ambiguities are perceptible and account for 17 categories. Nine categories relate to the design.

Area	**First-order categories**	**Thereof assigned to second-order theme**					
		Missing content/ functions	Redundant content	Unclear activity description or wording	Unfavorable design	Attitude	Neutral
Section 1 (Starting point)	1	1					
Section 2 (Settings)	2	1		1			
Section 3 (Identification of competitors)	7			5	1		1
Section 4 (Information collection)	8	2	1		2		3
Section 5 (Presentation of information)	7	1	2	3			1
Section 6 (Analysis/Findings)	18	10	2	4	1		1
Ease of use	3			1	2		
Purpose	6	3					3
Mindset	3					3	
Ease of learning	4			3	1		
Effectiveness	4	2			2		
Sum	**63**	**20**	**5**	**17**	**9**	**3**	**9**

Table 45: First- and second-order matrix expert interviews

4.3.3.5 Implications

With regard to the evaluation question "Is the developed artefact supporting startups in conducting a viable CA?" it can be said that the experts regard the CAF in general as a useful tool to conduct a viable CA for startups. None of the experts questioned in general the usefulness of the tool. All of them focused in the interviews and with their comments on the improvement potential they identified. With regard to the second questions "How can the developed artefact be further improved, if necessary?", it can be stated that again major improvement potential has been identified in the dimensions of user experience, user guidance, content, and conditions of use.

In the next iteration cycle an updated version of the CAF will be developed with improvements based on the evaluation. Again, a one-to-one implementation of the proposed improvements seems not appropriate. First, a change in a specific area of the framework, might affect other areas. As such, the coherence needs to be considered. Second, excessive extension can also go beyond the intended scope of the framework. Third, even though the experts are

selected due to their expertise in the relevant fields, they are still human beings with personal experiences that might not be universally applicable. Thus, a critical assessment of improvement suggestions will be conducted. The derivation of specific improvements in the identified dimensions and their rationale will be discussed in detail in the design of the Gamma Version.

4.4 ITERATION CYCLE III: GAMMA AND CASE STUDIES

In the third iteration cycle, the solution space will be revised and a third version of the artefact (Gamma) will be developed and evaluated. After the evaluation, it will be decided whether another iteration cycle is necessary.

4.4.1 Definition of solution space

With regard to the necessary adaptions of requirements only one major adaption was identified. Creating a database was regarded as main purpose by the experts interviewed in the preceding evaluation cycle. Thus, creating a database was included as main functional requirement.

Table 46 shows how the requirements of the artefact developed over time across the iteration cycles. The only requirement that was adapted was the functional requirement with regard to the purpose the framework has to fulfill. Two purposes were added in the second and third iteration cycle, one in each cycle. These are in the second cycle a specific CA purpose, in the current cycle a general CA purpose. All other requirements were either confirmed to be relevant during the evaluations, or not significantly refused. Thus, no requirement was dropped.

Requirements iteration cycle I	Requirements iteration cycle II	Requirements iteration cycle III
Functional requirements		
(1) The framework must support conducting a structured CA.		
(2) The framework must provide clear guidance on the process of CA.		
(3) The framework must help to identify competitors.		
(4) The framework must help to collect relevant knowledge about competitors.		
(5) The framework must encourage to use diverse information sources.		
(6) The framework must provide clear guidance on how to analyze competitors		
(7) Purpose of the framework. I. The framework must fulfill a specific CA purpose. It must: (a) help to validate the current business model (confirmation or adaption of a current business model component) (b) help to generate business model options. II. General CA purposes must be fulfilled. It must: (c) help to understand the market. (d) support informed decision-making	(7) Purpose of the framework. I. The framework must fulfill a specific CA purpose. It must: (a) help to validate the current business model (confirmation or adaption of a current business model component) (b) help to generate business model options. (c) help to position the product/ company in the competitive environment. II. General CA purposes must be fulfilled. It must: (d) help to understand the market. (e) support informed decision-making	(7) Purpose of the framework. I. The framework must fulfill a specific CA purpose. It must: (a) help to validate the current business model (confirmation or adaption of a current business model component) (b) help to generate business model options. (c) help to position the product/ company in the competitive environment. II. General CA purposes must be fulfilled. It must: (d) help to understand the market. (e) support informed decision-making (f) support creating a database.
Structural requirements		
The Framework must be (8) Coherent (9) Concise		
Environmental requirements		
The Framework must be (10) Easy to use (11) Easy to learn/ comprehensible (12) Complete (13) With adequate complexity (14) Efficient		
Effect requirements		
(15) The framework must provide some advantage to status quo.		

Table 46: Development of requirements across iteration cycles

4.4.2 Design and development of Gamma Version

4.4.2.1 The design process

On 19.06.2018 a two-hour workshop with a second researcher was conducted to analyse the evaluation of the Beta Version in-depth and derive adjustments for the Gamma Version. In a first step, the suggested specific improvements represented as first-order categories are assessed with regard to their impact for conducting a viable CA for startups. As a result,

the critical ones are determined. In a second step, the categories that represent minor improvement suggestions, that can be considered for minor adjustments are determined. In the course of these steps, it was also decided which first-order categories, i.e. improvement suggestions, are considered for the design process of the Gamma Version of the artefact, and which are neglected by discussing their reasonableness, accordance with the aims of the artefact and the requirements derived for the artefact. Thereby, several of the suggestions, were assessed as being outside the core purposes of the artefact, thus, they were not considered as necessary for the next design iteration but were collected as potentially interesting extensions of the artefact in the future. These might also serve as limitations to what the artefact is able to provide and as a basis for future research. As stated in the evaluation analysis of the Beta Version, on which the following design process is built upon, the improvement suggestions were either directly expressed by an expert or derived by expressed doubts and criticisms, remarks on malfunctions or shortcomings, and/ or revealed ambiguities.

Table 47 displays the result of these categorizations. Twelve of the 63 first-order categories were assessed as critical for the viability of a CA for startups, 23 as not critical, but considered for minor improvements, nine were assessed as potential options for future extensions, and 19 were rejected to be used for adaption considerations.

Area	**First-order category (detailed)**	**Assessed as**			
		Critical	Considered for minor improvements	Potential option for future development	not to be considered for next design
Section 1	Requirements of performing a CA (i.e. market analysis and the customer definition) need to be stated				x
Section 2	Ambiguities in wording (i.e. trial or non-customers)		x		
	Request to set the time frame (not only the time duration)		x		
Section 3	Ambiguities regarding the process of and relationship between section 3 and 4	x			
	Ambiguities regarding the "distant/close" scale		x		
	Ambiguities regarding the "distant/close" definition		x		
	Criticism regarding the question about potential competitors as being too narrow		x		
	Design remark with regard to the noticeability of text box "think about the same"		x		
	Remarks with regard to the identification guiding questions (problem solved, budget, alternatives)				x
	With more than one customer group, this step needs to be done several times*				x
Section 4	Remarks on the importance of creating a database	x			
	The design is not clear, overengineered and too complicated. As a result, it is no longer self-serviceable. The contents of the business model are not immediately recognized	x			
	Remarks on the importance of thoroughness when creating a database		x		

	Request for a copy template for distribution to information collectors (Excel table is also acceptable)			x	
	Request for references to more detailed information sources (e.g. participation in conferences, homepage, news, former employees)			x	
	Request for information about the duration				x
	Remarks regarding the possible irrelevance of individual proposed data points (e.g. market/sales budget)				x
	Remarks relating to the limited possibility of obtaining data, thus leading to empty spaces				x
Section 5	Ambiguity regarding the content of the columns / transition from 4 to 5 is unclear	x			
	Ambiguities regarding the completeness of the information to be presented and recorded		x		
	Remarks regarding the importance of understanding the individual components of the competitor's business model		x		
	Ambiguities with regard to the use for the presentation		x		
	Doubting the time limit as too short		x		
	Doubting the usefulness of presentation of the information				x
	Doubting the importance of individual aspects (e.g. value architecture)				x
Section 6	Ambiguities regarding the procedure (e.g. inclusion in the matrix of only those PODs that meet the three evaluation criteria)	x			
	Criticism that CAF is only a snapshot, but should actually be a permanent process that includes how competitors develop	x			
	Remarks on future orientation: Competitors' developments, future standards and changes in the basis of competition must be taken into account	x			
	Remarks regarding the importance of understanding and analyzing in depth the individual components of the competitor's business model	x			
	Remarks on the outcome: the case that no differentiation is found is not provided for	x			
	Remarks regarding the characterization of competitors (large/small; new/ established; definition of similarity)		x		
	Remarks on the prioritization of competitors: the most important must be identified		x		
	Remarks on missing action derivation from the framework regarding next steps, necessary adjustments in the business model, learnings, options, identification of competitors to be closely monitored, necessary follow-up research, defining open questions		x		
	Ambiguities regarding the process and relationship between section 5 and 6		x		
	Design and wording remarks (e.g. "harvest" is not profound enough; symbol for "team+1" is there three times; in company differentiation resources should be specified with team and funding, the company statement at the end is central but not prominently enough depicted; "commonalities in section 5" is unclear)		x		
	Remarks on the assessment: positioning is currently not assessed		x		
	Notes on the positioning matrix: other suggestions for the display of positioning			x	
	Comments on the future: Startups should formulate their bets on the basis of changes in the competitive environment.				x
	Notes on the content of the analysis: Changes in customer segments (future purchasing criteria) should be taken into account.				x

	Remarks on the outcome: falsified/ proven hypotheses should be displayed				x
	Uncertainty regarding the added value through the building of the market-type hypotheses				x
	Remarks on the need to define market maturity				x
	Remarks that step 6 as a central point brings the actual added value and the process is less important				x
Ease of use	Ambiguities with regard to the overall structure and procedure (e.g. the settings for the collection phase will be set in section 2 whereas the actual collection is only relevant in section 4; it may be possible that new research needs arise during the process; some process steps may have to be repeated, not clear that the sections build on each other)	x			
	Questioning of the chosen format (DIN A0) in comparison to single sheets for each section: Advantages of single sheets are pointed out as supporting workshop processes, facilitate potential corrections, having even more space available to work with sticky notes			x	
	Remarks with regard to legibility and uniformity of work instructions and user prompts		x		
Purpose	Creating the database is a key purpose	x			
	In addition to positioning, a strategy for optimizing access to market shares in knowledge of competition must also be defined		x		
	Informed decision-making is a key purpose		x		
	It is a communication and discovery process tool		x		
	Remarks with regard to presentation: the problem of converting the analysis into a presentation slide is not solved, e.g. for fundraising			x	
	Production costs of competitors must be determined				x
Mindset	Remarks on the attitude when analyzing competitors/ explicit mentioning: open, honest, use not only to confirm existing opinions, critically scrutinize		x		
	Remarks on the attitude when analyzing competitors: Optimism and overconfidence necessary				x
	Remarks on the attitude when analyzing competitors: explicit mentioning of the attitude not necessary, objectification is ensured by the framework itself				x
Ease of learning	Didactic structure: At the beginning, the user must know what the procedure is aimed at	x			
	Ambiguities regarding the symbols, e.g. "Team +1"		x		
	Guideline: is not suitable for persons who are not familiar with the subject.			x	
	Understanding the usage: A fully completed example would help			x	
Effectiveness	Request for a digital version			x	
	Request for interview questionnaire and further support for the collection phase			x	
	Request for splitting teams more often during the process for increased effectiveness				x
	Complexity is too high				x
Sum		**12**	**23**	**9**	**19**

Table 47: Assessed first-order categories Beta evaluation

After the initial assessment, the individual implementation options for the design adaptions are discussed. Figure 52 shows a picture of the whiteboard used in this part of the design workshop session.

Figure 52: Picture of a whiteboard used in a design session for the CAF on 19.06.2018

After the initial workshop session, design requests are sent to the professional designer. In three more design iterations between 28.06.2018 and 05.07.2018, in which the design requests are implemented by the designer, discussed and evaluated and new design requests are made, the Gamma Version of the artefact was developed.

In the following, the design improvement suggestions from the experts, that were neglected, the design options considered for future extension, and the implemented major and minor design options are described in detail and a justification of the design adaption or non-adaption is given.

4.4.2.2 The neglected design adaptions

19 categories were evaluated as not to be considered for the next iteration. There are several reasons for not further considering these. On the one hand, it was observed that some of the information was already included in the artefact. For example, with regard to the identification questions, the framework already included a guiding question for the budget competition, which is “what does the customer buy, when your product doesn’t exist” and also questions for shared solved problems or the next best alternative. The requirements for the analysis are also included through the query of the starting point. Several remarks are just accepted, as it was judged that a remedy is not possible or not necessary. This applies for example for the remark that one needs to do step three more than once for more than one customer group.

In ten cases the discussion led to an opinion dissenting from that of the expert. The duration for the information collected will not be specified, because the step is highly depending on the information sources and methods chosen, thus, it needs individual settings. The

remarks regarding the possible irrelevance of data to be collected about competitors, or the difficulties that are correlated with obtaining this information, leading to many empty spaces, are not incorporated. Here, the empty spaces are, to the contrary, seen as support to detect blind spots by making aware of knowledge gaps. The usefulness of the presentation is not contradicted. The preceding evaluation has shown that a discussion within the team is helpful, and hence the presentation should support the discussion. To focus on step six as being the only part of the artefact is neglected, since the overall process was what was considered as very helpful in the preceding evaluation. To place a bet on the future changes in the environment as concrete work instruction or to work with hypothesis is also neglected, since it is indirectly already included, when more future-oriented questions will be incorporated and as action items to adapt business model components. Production cost assessment will not be included as a main purpose of the framework. Production cost per se can be evaluated within the value finance component of the business model but is not seen as a major purpose. That the objectivation is ensured by the framework is certainly intended, however, a decision was made to include a hint in the guideline for an open mindset. Also, it was not seen adequate to force the users to split the teams more often, since this increases the complexity which is already perceived as high, and the value add for an additional splitting didn't seem high enough.

Other improvement suggestions were neglected because they were assessed as being out of scope of a CA. These were the analysis of future purchasing criteria, and the definition of market maturity. If the part of building a market-type hypothesis is helpful or not needs to be tested with users and is thus not adapted. It is attempted to reduce the perceived high complexity by clearer instructions and wording, but a residual complexity will remain, as CA itself is a complex matter. Table 48 summarizes the neglected design improvement suggestions and the reasons for their refusal.

Area	First-order category (detailed) - neglected	Justification
Section 1	Requirements of performing a CA (i.e. market analysis and the customer definition) need to be stated	Already included
Section 3	Remarks with regard to the identification guiding questions (problem solved, budget, alternatives)	Already included
	With more than one customer group, this step needs to be done several times	No remedy possible/ acceptance of the matter
Section 4	Request for information about the duration	Dissenting opinion from expert: the duration is variable and individual depending on the selected collection sources, methods, the time frame of the overall CA project; too strong restriction not intended
	Remarks regarding the possible irrelevance of individual proposed data points (e.g. market/sales budget)	Dissenting opinion from expert: empty spaces also show knowledge gaps, which is helpful to detect blind spots
	Remarks relating to the limited possibility of obtaining data, thus leading to empty spaces	See preceding justification
Section 5	Doubting the usefulness of presentation of the information	Dissenting opinion from expert: presentation supports the discussion within the team
	Doubting the importance of individual aspects (e.g. value architecture)	Dissenting opinion from expert: empty spaces also show knowledge gaps, which is helpful to detect blind spots
Section 6	Comments on the future: Startups should formulate their bets on the basis of changes in the competitive environment.	Dissenting opinion from expert: a future orientation will be included, a bet on the future is deemed too vague
	Notes on the content of the analysis: Changes in customer segments (future purchasing criteria) should be taken into account.	Out of scope, belongs to market analysis.
	Remarks on the outcome: falsified/ proven hypotheses should be displayed	It is indirectly incorporated for the business model components.
	Uncertainty regarding the added value through the building of the market-type hypotheses	This must be validated with the user group.
	Remarks on the need to define market maturity	Out of scope, belongs to market analysis.
	Remarks that step 6 as a central point brings the actually added value and the process is less important	Dissenting opinion from expert: the process and structure were evaluated as helpful in the preceding evaluation.
Purpose	Production costs of competitors must be determined	Dissenting opinion from expert: is already included in the value finance part, but not seen as a main purpose.
Mindset	Remarks on the attitude when analyzing competitors: explicit mentioning of the attitude not necessary, objectification is ensured by the framework itself	Dissenting opinion from expert: the objectivation will be supported by mentioning the necessary mindset.
Effectiveness	Request for splitting teams more often during the process for increased effectiveness	Dissenting opinion from expert: too many constraints make the process too static, and increase complexity.
	Complexity is too high	It is tried to reduce complexity by clearer instructions and wording, but a residual complexity is inevitable.
Sum		**19**

Table 48: Neglected design adaptions from Beta evaluation and justifications

4.4.2.3 The future design extension options

Nine improvement suggestions were assessed as potentially providing valuable support for conducting a viable CA but are out of scope for this research project or at least for this iteration. These are:

(1) A copy template for distribution to information collectors (Excel table is also acceptable). This was regarded a good extension for a workshop format. However, the main focus is to provide a framework that can be used by entrepreneurial teams. Thus, the excel template was favored.

(2) References to more detailed information sources (e.g. participation in conferences, homepage, news, former employees). The option was regarded as overloading the artefact itself. This was only partly adopted.

(3) + (4): Other suggestions for the display of positioning/ The problem of converting the analysis into a presentation slide is not solved. It is accepted that the creation of a presentation slide is a major interest of a startup in the early stage. However, the display of the results of the CA for external stakeholders is outside the scope of conducting a viable CA.

(5) Format: single sheets for each section to support workshop processes, facilitate potential corrections, having more space available to work with sticky notes. The discussion whether to use single sheets for each section, or to keep all sections on one sheet, led to a decision in favor of the latter. Since the overview was regarded as more important and the format of a workshop was not the focus.

(6) Guideline must be suitable for persons who are not familiar with the subject. A glossary or similar assistance might be of help. However, a general business education was regarded as out of scope.

(7) A fully completed example of the artefact. When the artefact is fully developed, and good use cases are available, this is regarded a good support for understanding and using the artefact.

(8) A digital version of the artefact. When the artefact is fully developed, a digital version might be considered. However, the discussion and team function will be constrained. The usefulness of a digital version must then be reassessed.

(9) Interview questionnaires for the collection phase. This is potentially a helpful tool for the founding teams. However, an interview questionnaire represents an artefact on its own. Thus, it needs to be designed and evaluated on its own.

4.4.2.4 The design adaptions

On the basis of the identified twelve critical first-order categories and the 23 minor improvement suggestions, design options are displayed, discussed and evaluated.

The major adaptions. Ten of the design adaptions were classified as major revisions of the artefact. It needed to be clear that section three and four are iterative steps, and that the collection of information might bring up unknown competitors or new information needs. It was discussed in the first iteration with the designer to combine these two sections optically. However, that made the artefact more complex and unclear. Thus, the decision was to introduce a symbol that highlights the iterative process between these two sections in particular. The display of section four is being simplified and adapted to the layout of section five, to clarify the connection between section four and five. Major revisions also have been implemented in section six. Positioning and differentiation were grouped optically, and the assessment is moved to after both tasks have been performed. The iterative process is emphasized through design elements and clearer numbering. Content-wise an analysis part was included, that specifically deals with future scenarios. The user has to answer the questions, such as "Have you identified industry trends?". Another added analysis part deals with critical success factors again. As it seems, the experts missed that part that has been included in the Alpha Version but was omitted in the Beta Version. Moreover, a design element was added, that allows to derive action items out of the analysis.

The guideline was adjusted in a major way as well. The iterative and consecutive process of the overall CA process and the need to go back between process steps was included. Also, a didactic element is added in the guideline. It is recommended to look at the whole artefact before starting, to make clear where the process leads to.

To create a database was added as a main purpose. This is also mentioned in the guideline.

Overall it can be stated, that the major improvements were implemented, because the argumentation of the expert was conclusive and convincing, or the need was clear that ambiguities with regard to the process or tasks needed to be resolved.

The minor adaptions. 18 minor design adaptions were implemented. The sections were renamed, and the design was adapted, with more white fields to fill out, in order to make full use of the available space. Font styles and headings are to become even clearer and more uniform and each section is to have a uniformly designed work instruction box. Additionally, the symbols and icons are adapted and aligned, so that guiding questions, work instructions, and prompts can be easily identified. This helps to harmonize the design across all sections and makes the intended use clearer.

In section two a time frame is added, that can be set additionally to the duration, and the information source can be selected from seven options (Beta Version: five options), whereas one is formulated as "other" to be picked freely. Section three is optically redesigned. The design of the "onion ring" has been dismissed. Instead three blocks are used, to collect and

classify identified competitors. This also helps to make better use of the available space and omits the hard classification into distant and close competitors. In section three also the guiding questions are adjusted, as well as the distant/ close scale and naming.

In the framework work instructions and guiding questions are added, extended or sharpened, such as the work instructions for the first insights in section four, the hint that the information collection is to be done thoroughly, the work instruction for the presentation of information in step five, or the extension of the questions for analyzing the competitive environment in section six. In the guideline it is clarified, that the tool is to be used for supporting team communication, informed decision-making and a startup's identity-building process. Presentation of results is not declared as a goal. A favourable mindset is also specified as "Be open and honest and don't lie to yourself, when performing the analysis".

Content-wise section five is admitted 45 instead of 20 minutes as suggested time for performing the task, and the assessment of the positioning gains additional questions with regard to the overall positioning being clear and distinctive. To make the iterative process even clearer, the action items are extended by defining the next iteration cycle.

Table 49 summarizes the chosen design adaptions and the associated improvement area (user experience, guidance, content, conditions). Whereas, it must be noted that an adaption may have an impact on more than one improvement area, although the improvement suggestions they are based on from the interviews were only classified into one.

Area	**Adaption**	**Thereof major / minor**	**Associated with improvement area**			
			User experience	Guidance	Content	Conditions of use (Attitude)
Section 1 - 6	Renaming and text adjustments	Minor	x	x		
	Design adaptions	Minor	x	x		
Section 2	Time frame is added	Minor			x	
	More source options are added and clearer formulated	Minor			x	
Section 3	The iterative relationship between section 3 and 4 is highlighted	Major	x	x		
	Adjustment of distant/close scale and naming	Minor	x	x	x	
	Text adjustment for the identification of potential customers	Minor		x		
Section 4	Simplified representation of step 4, which is also adapted in the design to the subsequent step number 5	Major	x			
	Addition of a note in the framework and in the guideline that this step should be done thoroughly	Minor		x	x	
Section 5	Adaption of the simplified representation in step 4 to step number 5	Major	x	x		

	Sharpen the wording for the work instruction to highlight that first all information is presented but only key information is recorded on the framework	Minor	x	x		
	Time adjustment to 45 min	Minor	x	x		
	Addition of work instructions for generating the first insights	Minor	x	x		
Section 6	Adaptation of the process: Grouping positioning and differentiation, performing the assessment afterwards, thus allowing iteration cycles	Major	x	x		
	Addition of a section for the formulation of derived need for action/ next steps	Major			x	
	Addition of a section for considering future scenarios	Major			x	
	Addition of a section for assessing the critical success factors of each competitor	Major			x	
	Adjustment of the guiding questions for the analysis of the competitive environment	Minor		x	x	
	Adaption of assessment: assessment for overall positioning as being clear and distinctive added	Minor			x	
Ease of use	Adjustment of the guideline: description of the intended process flow, which explains that the sections build on each other and that an iterative procedure is possible	Major		x	x	
	Further harmonization of the design across all sections: font style and headings are to become even clearer and more uniform.	Minor	x			
	Further harmonization of the design across all sections: Each section is to have a uniformly designed work instruction box.	Minor	x	x		
	Definition of next iteration cycle is included in the list of derived action items	Minor			x	
Purpose	Database added as key purpose	Major			x	
	Declaration in the guideline as tool for supporting team communication, informed decision-making and a startup's identity-building process	Minor		x		
Mindset	Addition of an advice in the guideline regarding a favourable mindset for conducting the analysis	Minor			x	x
Ease of learning	Addition in the guideline: Before starting to use it, the framework has to be reviewed in detail.	Major	x	x		
	Adjustment symbols/ icons	Minor	x			
Sum	**28 adaptions, thereof 10 major**					

Table 49: Adaptions for the creation of the artefact's Gamma Version

4.4.2.5 The design

Through the implementation of the major and minor revisions, the Gamma Version of artefact was created. The CAF in its Gamma Version is a tool that supports a structured process of competitor identification and analysis for early-stage startups in order to develop an understanding of the competitive environment, position a product and company in the competitive environment, creating a database containing information about the focal startup's competitors, and provide a basis to iterate its business model. It is intended to support team communication, informed decision-making and a startup's identity-building process.

The artefact consists of a framework as hardcopy in DIN A0, a one-pager user guideline in DIN A4 and an Excel template for creating a competitor database. The CAF provides a step-by-step procedure through the six distinct steps.

All of the steps now have uniform work instructions. In general, the design has been harmonized, made clearer and more easily understandable. Also, attempts have been made to make full use of the available space. As such, step one remained content-wise the same. Step two gains additional content. A time frame, i.e. a deadline until which the analysis is to be carried out, and more information sources. Step three is again optically redesigned. The "onion ring" display is abandoned, and three blocks are now introduced to classify competitors. The distant/ close scale is renamed, and the guideline includes suggestions for the definition of the scale. Step four and five are mainly optically redesigned and adapted to each other. Step six now includes six distinct substeps (Beta Version: three substeps), whereas substep I to IV are an iterative process itself. It begins with substep I "Understand", where now seven analysis parts are to be performed: assessment of competitive environment in general, of the basis of competition, of the current industry standards, of the critical success factors, of potential partners and complementary products, of the changes of the aforementioned, and the formulation of a market-type hypothesis. Substep II supports to find potential product and company differentiation points. Substep III displays the most important points of differentiation in comparison to the most important competitors in a positioning matrix. And in substep IV the differentiation and positioning are assessed. These steps are displayed as being iterative by an arrow sketched below. Substep V contains the extended positioning statement, which was already included in the previous version. Substep VI is supposed to support the definition of points of action.

Figure 53 and Figure 54 show the CAF Gamma Version and the corresponding guideline. The excel template has not changed in comparison to the previous version as displayed in Figure 47, and Figure 48.

Figure 53: Competitor Analysis Framework Gamma Version

Figure 54: Competitor Analysis Framework Gamma Version guideline

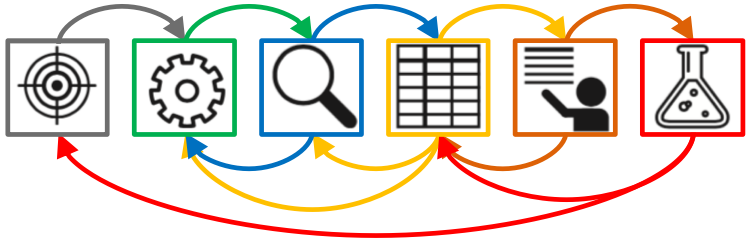
THE COMPETITOR ANALYSIS FRAMEWORK

A GUIDELINE

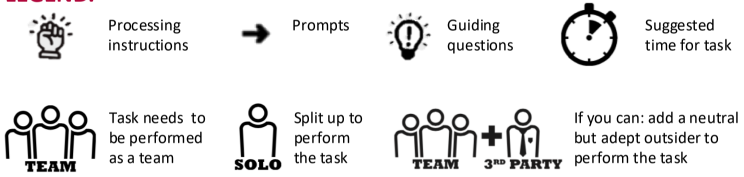
THE PURPOSE. The Competitor Analysis Framework provides a structured process of competitor identification and analysis for early-stage startups. It is a tool that supports team communication, informed decision-making and a startup's identity-building process. The major outcomes are:

1. an **understanding** of your competitive environment,
2. a **positioning** of your product and company in the competitive environment,
3. a **database** containing information about your competitors,
4. a basis on which you can **iterate** your business model.

THE PROCESS. The process consists of six steps that build upon each other. However, you might find that at some point you want to go one or more steps back and repeat the tasks before proceeding. This is open to your judgement after each step. Familiarize yourself with the framework before you start. Read the individual steps and contents carefully before you start.



LEGEND.



1. STARTING POINT OF ANALYSIS. Use the gapped sentence to set a starting point for your competitor analysis. Also set a mental starting point: Be open and honest and don't lie to yourself when performing the analysis!

2. SPECIFICATION OF ANALYSIS SETTINGS. Set how much time and money the analysis should consume. Also specify who will perform the analysis, how you will store the information you gather throughout the process and which sources and methods you will apply. Think about limitations and constraints.

3. IDENTIFICATION OF COMPETITORS. Have a look at the guiding questions to identify current and potential competitors and place them in the graphic. Which ones are more close/distant to you? Find a definition that works for you (e.g. product, performance, channel, price, stage). The list doesn't need to be complete at once, you can add more competitors during the process!

4. INFORMATION COLLECTION. Collect background and business model information about each competitor. Have a look at the proposed properties and get inspired but adapt them to your own needs. Be particularly thorough in this step – it is cumbersome but valuable!

5. PRESENTATION OF COLLECTED INFORMATION. The team member, who collected the information presents it to the team. Take post-its or write directly in this section to capture the crucial information. Afterwards, share first observations with your team.

6. ANALYSIS OF INFORMATION AND SYNTHESIS OF RESULTS. Go through the section and use the guiding questions to gain an understanding of your competitive environment, differentiate (if necessary) and position your product and/ or company and (re)phrase and extend the gapped company statement from the starting point to formulate your positioning. Define next steps!

4.4.3 **Demonstration and evaluation**

In the third evaluation episode the artefact's Gamma Version is evaluated. The underlying research questions are again "Is the developed artefact supporting startups in conducting a viable CA?" and "How can the developed artefact be further improved, if necessary?". As such, this evaluation has formative and summative evaluation goals.

4.4.3.1 Research design

After having adapted the artefact by consulting experts, it is decided to evaluate once more with case studies as an optimal design evaluation method for studying the artefact in depth in its business environment (Hevner et al., 2004). Thus, the evaluation design is performed as an embedded multiple-case study according to (Yin, 2014, p. 31 ff.) within the context of a business plan competition, where the participating teams are supposed to use the artefact to perform their CA.

A mixed methods approach with regard to the data collection and analysis as described in chapter 4.2.3.4 is again used to evaluate the Gamma Version. Thus, qualitative interviews are combined with quantitative assessment questions.

According to the process described in chapter 4.1.1.4, semi-structured interviews are conducted, which are then transcribed and coded, and a content analysis using the "Gioia-Method" (Gioia et al., 2012; Gioia & Pitre, 1990) is performed.

Moreover, a CA workshop within an accelerator program for ESS is conducted where the CAF is used to perform a CA. The workshop participants filled out the same questionnaire as the business plan competition participants, but without the respective interviews. However, they had comment fields in the questionnaire, where they had the opportunity to give additional information.

4.4.3.2 Selection of cases

The setting of the case study is similar to the one from the chapter 4.1.1.4 with the difference that it is the business plan competition in the subsequent year. The described business plan competition process remains the same (see chapter 4.1.2.2). However, unlike the first evaluation, teams were not asked to submit an uninfluenced CA before they were allowed to use the framework. This adaption is based on the evaluation of the participating teams of the first evaluation. Thereby, where several teams expressed the opinion that the framework is less valuable if a CA (of some kind) has already been performed or at least the willingness to deal with CA again in detail is significantly lower. Thus, it was decided to confront the teams with

the framework before the task of submitting a CA (at least within the business plan competition) was set.

The selected case study participants are the selected teams, that proceeded to the second phase of the business plan competition 2018. Table 50 gives an overview of the nine selected startup teams that proceeded to the second phase and are thus case study participants.

Team code name	**Short description of business**	**B2B/ B2C**	**Team member**	**Founding month/year** (working on idea since)	**Prior funding**	**Type**	**Industry**
Startup 12 (SU12)	Voice assistant integration as a service for online retailers	B2B	2	Not incorporated (< 3 months)	no	IT-bearing	Retail
Startup 13 (SU13)	Mobile-money based platform to save, send and receive funds for healthcare services.	B2C/ B2B	5	Not incorporated (4 months)	yes	IT-bearing	Health
Startup 14 (SU14)	Carpooling for commuters	B2C/ B2B	2	Not incorporated (2 months)	no	Digital	Transportation
Startup 15 (SU15)	Digital ordering and loyalty program for restaurants and bars	B2B	2	Not incorporated (7 months)	no	Digital	Food and beverage service activities
Startup 16 (SU 16)	Infrastructure software product for IoT platforms	B2B	4	Not incorporated (10 months)	EXIST scholarship	IT-bearing	Software
Startup 17 (SU 17)	Digital solution for mental training as part of human resource development	B2B	3	04/2017	yes	Digital	Health
Startup 18 (SU18)	Full body scanner for the production of made-to-measure fashion	B2C	3	12/2016	yes	IT-mediated	Manufacturing (wearing apparel)
Startup 19 (SU19)	Software for fully automatic coffee machines to individualize beverages and automize the ordering and payment process	B2B	2	Not incorporated (12 months)	no	IT-mediated	Food and beverage service activities
Startup 20 (SU20)	Software tool for geoscientists for drawing and sharing of geological successions.	B2B/ B2C	3	Not incorporated (4 months)	no	Digital	Software/ Mining

Table 50: Characteristics of case studies, business plan competition 2018

Due to anonymity reasons each startup team is given a code name. A short description of the business, the business type (B2B or B2C), the number of team members, founding time,

prior funding information, type, and industry classification is provided. The industry classification is performed according to the German Classification of Economic Activities of the Federal Statistical Office (edition 2008) and states which industry the teams are entering, even though an official classification would classify all of them as “other software development”, which belongs to the “information and communication” section.

In summary, it can be stated that the nine startup teams produce software for various purposes, one time aiming at consumers, five times aiming at other business, three times aiming at both. The types of startups according to Steininger (2018) can be classified as IT-mediated, IT-bearing and digital. On average the teams have three team members and work on their idea for 7,8 months. Seven different industries are chosen by the teams to enter: healthcare, software, manufacturing, food and beverage, transportation and retail. Four teams received prior funding of some kind, such as a governmental grant (EXIST), a foundation grant, as well as accelerator and business angel funding.

As already elaborated on in chapter 4.1.2.2 the sampling is done consciously and deliberately ("purposive/purposeful sampling") (Glaser & Strauss, 1999; Marshall, 1996). The selection of cases here is done on the basis of targeted selection of certain types of cases as the research questions focus on a very specific target group. That means that the cases from the target group are addressed via one recruitment channel, i.e. the HPI business plan competition 2018, and a relatively small sample is compiled, i.e. nine startups (see Döring & Bortz, 2016, p. 304).

Reflections on the business plan competition as a suitable research environment can also be found in chapter 4.1.2.2).

The participating teams have entered the third phase of the business plan competition. They received an input session, where amongst other topics relevant to the business model environment, such as trends and macroeconomic forces, the developed artefact is introduced, and its usage explained. The teams received a handout from the input session, which includes with regard to the CAF:

- An overview of the DIN A0 Gamma Version of the CAF
- A description of the six steps (start, set up, identify, collect, present and capture, synthesize and summarize) and the respective action steps to be fulfilled within these phases.

  The teams also received:
- the CAF guideline,
- the excel template for creating a database, and
- a DIN A0 or optionally a DIN A1 handout from the framework in its Gamma Version and a digital version as pdf was provided.

The second setting for the evaluation is an accelerator program, where the author conducted a one-day workshop for seven teams, that was supposed to support them in conducting their CA. The workshop description was as follows: "Competitor analysis is a key part of every pitch deck or business plan and essential when talking to investors and to customers. It is also a crucial starting point for developing strategies and assessing business models. However, startups tend to have several blind spots with regard to who their competition is, how they compete, and how a clear positioning can be determined in the market. During this workshop a six-step process is introduced and applied that helps startups to conduct a meaningful competitor analysis including the identification of competitors, collection of relevant information and their analysis. Subsequently, the participants will be able to differentiate and position their startups within the analysed competitive environment in a meaningful way." Table 51 displays the available information about the teams participating in the accelerator workshop.

Team code name	**Short description of business**	**B2B/ B2C**	**Team member**	**Working on idea since**
Startup 21 (SU21)	na	na	4	3 months
Startup 22 (SU22	na	na	1	Not incorporated (4 months)
Startup 23 (SU23)	Supply chain management software	B2B	2	3,5 years
Startup24 (SU24)	Payroll software	B2B	1	4 months
Startup 25 (SU 25)	Contact management tool	B2B	2	1 year
Startup 26 (SU 26)	Hand-free speechless interaction	B2B/ B2C	2	1 year
Startup 27 (SU27)	Booking software	B2B	3	< 1 months

Table 51: Characteristics of workshop participants

The agenda of the accelerator workshop is displayed in Table 52. After a short introduction of the speaker and general information about CA and CA in start-ups, the framework was introduced. Then the participants were guided through all the six framework steps individually by introducing the respective activity first and then giving the teams time to conduct that activity before moving on to the next step.

Time	Activity
8:30	Arrival and breakfast
09:00	Introduction of speaker and participants General information about CA Introduction of the framework
09:25	Framework part 1 (5 min introduction + working time)
09:40	Framework part 2 (5 min introduction + working time)
09:55	Framework part 3 (5 min introduction + working time)
10:15	Framework part 4 (5 min introduction + working time)
11:35	Break
12:20	Framework part 5 (5 min introduction + working time)
13:25	Framework part 6 (5 min introduction + working time)
15:30	Preparation of presentation of CA results
15:55	Break
16:05	Presentation and discussion of results (3 minutes presentation and 2 minutes feed-back)
16:55	„I like, I wish“ – feedback Answering the questionnaires
17:10	Closing

Table 52: Workshop agenda

4.4.3.3 Data points

As data sources the following data are collected and analysed within the business plan competition setting:

- A submitted CA per team after the input session on CA. That equals a CA influenced by the E-School coaches' input session and the exposure to the artefact to be developed. The participants' CAs were handed in between 18. and 20.07.2018 as a powerpoint or pdf file with note section.
- The used, i.e. filled out artefacts per team. The frameworks were used between their handout at the respective input session on 05.07.2018 and the submission deadline of 19.07.2018 and were submitted between 18. and 20.07.2018. They were handed in as manually filled out hardcopies (4) or as digitally edited versions as pdf (5). Thereof, the SU16 team explained later, that they used the framework on paper, and only submitted a digital version for enhanced legibility.
- One interview with eight of the teams after the submission of the influenced CA and usage of the artefact. One team (SU 17) was only available for written feedback. Up to two members per team participated in the interviews. The interviews are accompanied by a questionnaire to be filled out. Table 53 summarizes the conducted eight interviews.

In sum twelve team members have been questioned, each filling out a questionnaire, thereof eleven interviewed in 04:13 hours. On average one team member of the eight interviewed teams has been interviewed in 31 minutes. The interviews were conducted between the 20th and 26th of July 2018.

Team code name	Team members interviewed	Interview length (hh:mm:ss)	Filled out questionnaires
Startup 12	1	00:30:31	1
Startup 13	2	00:24:30	2
Startup 14	2	00:49:47	2
Startup 15	1	00:39:14	1
Startup 16	1	00:19:48	1
(Startup 17)	1 (written evaluation)	(written evaluation)	1
Startup 18	1	00:45:23	1
Startup 19	2	00:29:33	2
Startup 20	1	00:15:11	1
Sum	12	04:13:57	12
Average	1,33	00:31:45	

Table 53: Interviews case studies - Gamma evaluation

As data sources the following data are collected and analysed within the workshop setting:

- Nine filled out questionnaires, thereof one questionnaire needed to be omitted, because the participant didn't work actively in the workshop with the framework. Thus, eight questionnaires had valid answers. The questionnaires are identical to the business plan competition questionnaires. However, since no accompanying interview was conducted to explain the choices made, the questionnaires provided comment fields, that could be filled out additionally for each question.
- "I like, I wish" feedback notes from the end of the workshop.
- Notes about observations made by the author with regard to the workshop.
  The workshop was conducted on 6.10.2018.

4.4.3.4 Data collection and analysis method

The mixed methods approach with regard to the data collection and analysis described in chapter 4.2.3.4 to evaluate the Alpha Version is used again to evaluate the Gamma Version. With this in mind, qualitative interviews are combined with quantitative assessment questions.

Accordingly, the data analysis is conducted in a twofold way taking into account the quantitive and the qualitative data obtained as described in chapter 4.2.3.4. The interview process and preparation of the guideline follows the process as described in the chapters 4.1.2.4.1 and 4.1.2.4.2. However, since the goals of the framework have been adapted since the first iteration, the functional requirements and, thus, four evaluation questions with regard to the

functional requirements needed to be added, indicated with * in Table 54. Moreover, due to observed problems of understanding in the first iteration cycle, nine questions have been re-formulated, indicated by italic notation in Table 54.

Questionnaire Alpha Version Evaluation	**Questionnaire Gamma Version Evaluation**
Functional requirements	
Rate the extent to which you agree with each statement 1 -5 (strongly disagree, neutral, strongly agree). Please explain your choice. 1. The framework supports conducting a structured CA. _____ 2. The framework provides clear guidance on the process of CA. _____ 3. The framework helps to identify competitors. _____ 4. The framework helps to collect relevant knowledge about competitors. _____ 5. The framework encourages to use diverse information sources. _____ 6. The framework provides clear guidance on how to analyze competitors. _____ 7. The framework helps to validate my current business model. _____ 8. The framework helps to generate business model options for my own business. _____ 9. The framework either leads to confirmation or adaption of a current business model component. _____ 10. The framework helps to understand the market. _____ 11. The framework supports informed decision-making. _____	Rate the extent to which you agree with each statement 1 -5 (strongly disagree, neutral, strongly agree). Please explain your choice. 1. The framework supports conducting a structured CA. _____ 2. The framework provides clear guidance on the process of CA. _____ 3. The framework helps to identify competitors. _____ 4. The framework helps to collect relevant knowledge about competitors. _____ 5. The framework encourages to use diverse information sources. _____ 6. The framework provides clear guidance on how to analyze competitors. _____ 7. The framework helps to validate the current business model. _____ *8. The framework helps to generate business model options.* _____ 9. The framework either leads to confirmation or adaption of a current business model component. _____ 10. *The framework helps to position the product in the competitive environment. _____ 11. *The framework helps to position the company in the competitive environment. _____ 12. *The framework supports to find relevant points of differentiation. _____ *13. The framework helps to understand the competitive environment.* _____ 14. *The framework supports creating a competitor database. _____ 15. The framework supports informed decision-making. _____
Environmental requirements	
12. Overall, I believe that the framework is easy to use. _____ 13. Learning to use the framework is easy for me. _____	*16. The framework is easy to use.* _____ 17. *Learning to use the framework is easy.* _____
Effect requirements	
14. Using the framework improves the quality of the CA work I do. _____ 15. Using the framework makes it easier to do my CA job (i.e. conduct a viable CA). _____ 16. Using the framework enhances my effectiveness on the CA job (i.e. conduct a viable CA). _____	*18. Using the framework improves the quality of the CA work.* _____ *19. Using the framework makes it easier to conduct a viable CA.* _____ *20. Using the framework enhances the effectiveness (quality of goal achievement) of the CA job (i.e. conduct a viable CA).* _____

17. Using the framework increases my productivity. ____	*21. Using the framework increases productivity (input to output ratio). _____*
Structural + environmental requirements	
Is there something you want to tell us with regard to the usage/ quality or design of the CAF?	*Is there something you want to tell me with regard to the* • *Usage* • *Quality* • *Content / Added value of the individual parts* • *Design (e.g. available space)* • *Guideline (e.g. legend, explanations)* *Are there parts of the framework that you would like to change? Which? Why?*
Summative evaluation	
Rate the items. 18. Future-Orientation _____ (1 = output is not future-oriented. It may be too anchored in the past or present. 5 = the method is highly future-focused.) 19. Accuracy _____ (1 = the level of accuracy for outputs using this method is low, taking into account the probable sources of data underlying its application. 5 = the requirements of the model lead to the generation of highly accurate outputs.) 20. Resource-efficiency _____ (1 = this method requires a large volume of data, financial, and human resources, and is low in efficacy. 5 = this method is highly efficient in its use of resources and in deriving desired outputs from utilizing lesser inputs) 21. Objectivity _____ (1 = provides low levels of objectivity due to its inability to reduce the presence of biases and mind-sets in its application. 5 = the potential for biases and distortions can be minimized through effective use of this method.) 22. Timeliness _____ (1 = method that requires a great deal of time to properly complete. 5 = method takes little time to successfully complete.)	This part remains unchanged.

Table 54: Questionnaire for the evaluation of CAF - Versions in comparison

4.4.3.5 Findings

The findings are displayed according to the quantitative and qualitative data obtained. Relating to the goals of formative and summative evaluation, descriptive statistics are discussed and a qualitative analysis using the Gioia Method is performed.

4.4.3.5.1 Descriptive statistics

In a first step, the quantitive data obtained through the survey among the teams of the business plan competition 2018 are analysed and compared to the evaluation of the teams, that used the artefact in its Alpha Version. Table 56 displays the average ratings of the evaluation

questions in the Alpha and the Gamma version of the artefact as well as the absolute change and change in percent in the evaluations. Figure 55 illustrates this development of the evaluation items of the artefact from Alpha to the current version.

Overall, a major improvement can be observed. Every single rating of the formative evaluation part, which is interpreted as the usefulness of the artefact, has changed to a higher rating. The ratings improved by 2% to 31%. The average rating of the formative evaluation part (question 1 to 17) increased by 14% from 3,6 to 4,2, the median rating even by 18% from 3,6 to 4,3. The best ratings (on average >=4,0) in the formative evaluation part were now assigned to 17 of the 21 evaluation items, i.e. 81% (in Alpha Version: 4 of 17, i.e. 23,5%), meaning that the participants agreed or strongly agreed with the respective statement. This change represents an improvement of 325% in the ratings of above 4,0. At the same time mediocre and bad ratings decreased by 50% and 78% respectively. Since the median evaluation is already in this range of the best ratings, mediocre ratings are defined as valuations that are the higher as the median valuation of the Alpha version of 3,6 but below 4,0. Mediocre ratings were given to two evaluation items (Alpha version: four), namely the support of the business model validation and improvement of productivity. Thus, these statements were rated on average as neutral to agreed. Ratings lower than 3,6 were assigned to two evaluation items (Alpha version: nine), namely usage of diverse information sources and identification of competitors. No average rating was below 3,1, meaning that at least on average the statements were assessed as neutral. The newly introduced evaluation items, such as support for positioning of product and company, identifying relevant points of differentiation and creating a database, have been assigned a rating of 4,1 or better. Table 55 summarizes these findings.

Formative evaluation	**Alpha Version – number of ratings** (percentage of 17 evlaution items)	**Gamma Version – number of ratings** (percentage of 21 evlaution items)	**Change absolut** (in percent)
Good ratings (>=4,0)	4 (23,5%)	17 (81%)	13 (325%)
Mediocre ratings (=>3,6 - <4,0)	4 (23,5%)	2 (9,5%)	-2 (-50%)
Bad rating (<3,6)	9 (52,9%)	2 (9,5%)	-7 (-78%)

Table 55: Formative evaluation - classification of ratings

Evaluation part	Question	Alpha	Gamma	Absolute change	Change in percent
Functinal requirements (usefulness)	Structured CA	4	4,5	0,5	13%
	Clear guidance on the process of CA	3,6	4,3	0,7	18%
	Identification of competitors	2,8	3,1	0,3	10%
	Collection of relevant knowledge	3,5	4,6	1,1	31%
	Usage of diverse information sources	3,4	3,6	0,2	5%
	Clear guidance on the analysis of competitors	3,8	4,3	0,5	12%
	Validation of current business model	3,5	3,8	0,3	10%
	Generation of business model options	4	4,1	0,1	2%
	Confirmation or adaption of a current business model component	3,8	4,0	0,2	5%
	Positioning of the product		4,4	4,4	
	Positioning of the company		4,1	4,1	
	Relevant points of differentiation		4,4	4,4	
	Understanding of competitive environment	3,5	4,3	0,8	24%
	Creating a database		4,5	4,5	
	Support of informed decision-making	3,9	4,3	0,4	9%
	Average	**3,6**	**4,1**	**0,5**	**15%**
Environmental requirements	Ease of use	3,4	4,0	0,6	18%
	Ease of learning to use	3,5	4,0	0,5	14%
	Average	**3,5**	**4,0**	**0,6**	**16%**
Effect requirement	Improvement of the CA work quality	4	4,4	0,4	10%
	Improvement of the CA job effort	3,8	4,7	0,9	23%
	Enhancement of CA job effectiveness	4,1	4,3	0,2	4%
	Improvement of productivity	3,3	3,8	0,5	14%
	Average	**3,8**	**4,3**	**0,5**	**12%**
Average (median) of overall formative evaluation/ viability		**3,6 (3,6)**	**4,2 (4,3)**	**0,5 (0,7)**	**14% (18%)**
Summative	Future-Orientation	3,3	3	-0,3	-9%
	Accuracy	3,5	3,9	0,4	11%
	Resource-efficiency	4,1	3,6	-0,5	-12%
	Objectivity	3,5	3,8	0,3	9%
	Timeliness	3,6	2,5	-1,1	-31%

Table 56: Average rating of evaluation parts - Alpha and Gamma Version in comparison

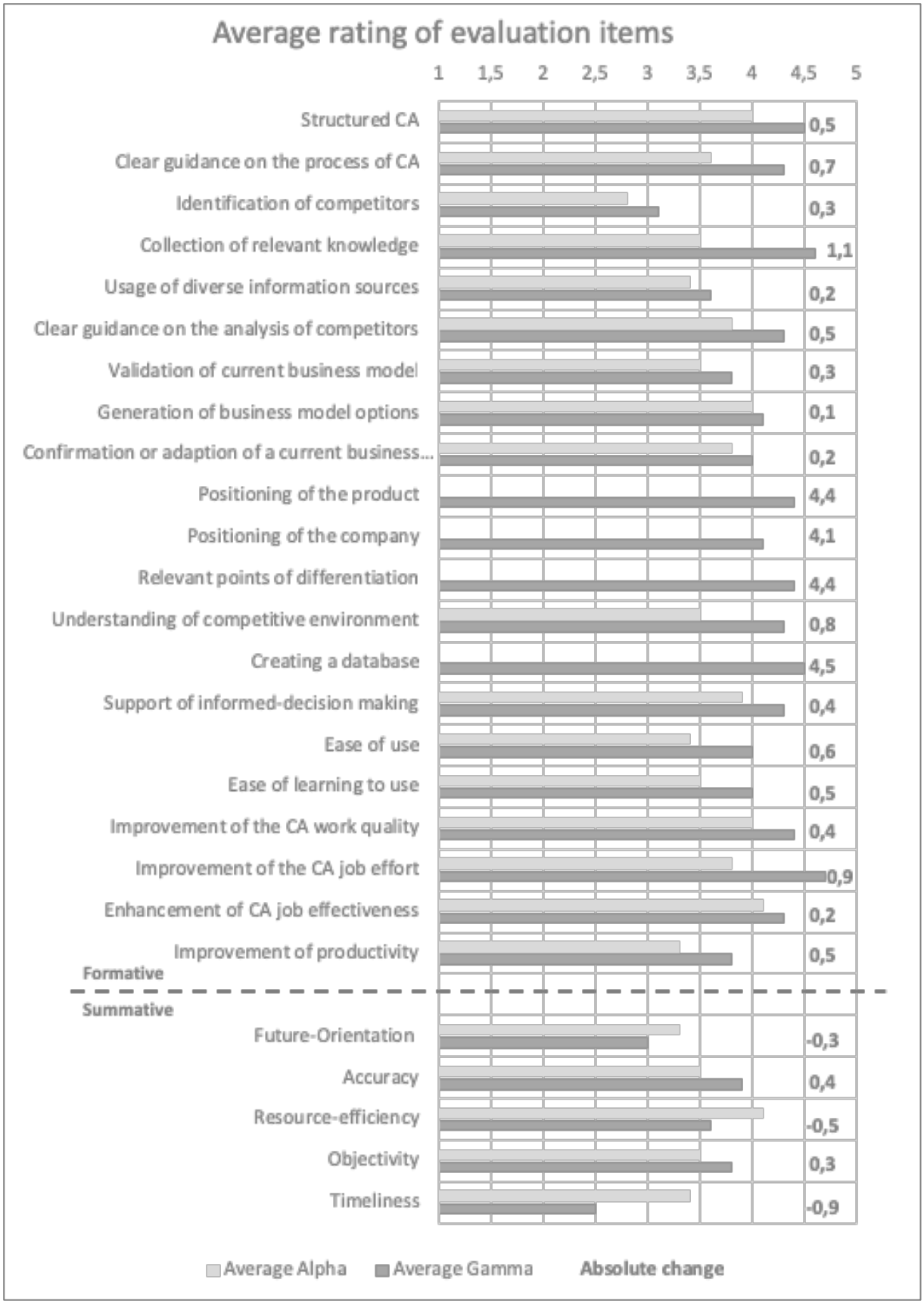


Figure 55: Average rating of evaluation items - Alpha and Gamma Version in comparison

With regard to the summative evaluation, three evaluation items were assigned a lower rating than in the Alpha Version. These are future-orientation, resource-efficiency and timeliness. However, accuracy and objectivity were rated about 10% higher than before. It can be stated that a trade-off between accuracy and objectivity on the one hand and resource-efficiency and timeliness is explainable and also acceptable for the usage of the CAF. With regard to the poor rating of future-orientation further analysis is necessary.

The descriptive analysis of the workshop questionnaires supports the findings of the BPC, as the ratings are similar. In general, the ratings are lower, but only minimal. The overall formative evaluation is 4,0, which is still a high rating. Moreover, it must be noted, that the results can be interpreted even better, when considering that six out of the seven workshop teams were present only with one team member. Thus, the intended use of the framework to discuss options in a team critically could not be met entirely. Also, the one-day workshop gives only limited time to search for and interpret data about competitors, thus, it is plausible, that for example the effect on the collection of knowledge and generation of business model options is minimized. Interestingly, the two formative questions that were rated worst in the BPC, received higher ratings in the workshops. Also, future-orientation was rated significantly higher. Table 57 summarizes the comparison of the average evaluations in the BPC and workshop usage.

As an interim result, one can state that the CAF was perceived as useful for the users, both for the usage with and without accompanying personal instructions, either as stand-alone tool for the self-use with upfront short introduction or as workshop tool.

In order to understand in-depth, how the framework was used, how it was helpful, what worked and what didn't, and to identify potential further improvement, an additional analysis of the qualitative data collected in the business plan competition and workshop setting were analysed using content analysis.

Evaluation part	Question	Gamma Workshop	Gamma BPC	Absolute change
Functional requirements (usefulness)	Structured CA	4,1	4,5	-0,4
	Clear guidance on the process of CA	4,0	4,3	-0,3
	Identification of competitors	3,6	3,1	0,5
	Collection of relevant knowledge	3,6	4,6	-1,0
	Usage of diverse information sources	4,3	3,6	0,7
	Clear guidance on the analysis of competitors	3,5	4,3	-0,8
	Validation of current business model	3,8	3,8	0,0
	Generation of business model options	3,3	4,1	-0,9
	Confirmation or adaption of a current business model component	3,6	4,0	-0,4
	Positioning of the product	4,5	4,4	-0,1
	Positioning of the company	4,4	4,1	-0,3
	Relevant points of differentiation	4,0	4,4	-0,4
	Understanding of competitive environment	4,1	4,3	-0,2
	Creating a database	4,3	4,5	-0,3
	Support of informed decision-making	4,3	4,3	0,0
	Average	**4,0**	**4,1**	**-0,1**
Environmental requirements	Ease of use	3,5	4,0	-0,5
	Ease of learning to use	4,1	4,0	0,1
	Average	**3,8**	**4,0**	**-0,2**
Effect requirements	Improvement of the CA work quality	4,3	4,4	-0,1
	Improvement of the CA job effort	4,5	4,7	-0,2
	Enhancement of CA job effectiveness	4,4	4,3	0,1
	Improvement of productivity	3,9	3,8	0,1
	Average	**4,3**	**4,3**	**0,0**
Average (median) of overall formative evaluation/ viability		**4,0 (4,1)**	**4,2 (4,3)**	**-0,2 (-0,2)**
Summative	Future-Orientation	4,0	3	1,0
	Accuracy	3,6	3,9	-0,3
	Resource-efficiency	3,8	3,6	0,2
	Objectivity	3,9	3,8	0,1
	Timeliness	2,8	2,5	0,3

Table 57: Average rating of evaluation parts - Gamma Version in BPC and workshop usage in comparison

4.4.3.5.2 Qualitative analysis

The data is coded according to the Gioia Method and categorized into positive, negative, and neutral codes, as well as suggested improvement codes. Since the details are of particular importance, the display of the representative data is made according to first-order categories, not as usual on a second-order theme basis. Since the overall quantitative rating of each

statement was high, a special focus of the qualitative evaluation has been placed on the evaluation of the individual parts of the framework. Moreover, the two ratings lower than 3,6, namely usage of diverse information sources and identification of competitors, can be assigned to specific parts of the framework (step 2 and step 3). Thus, it is reasonable to sort the respective first-order categories according to their affiliation to a particular part of the framework.

In general, the qualitative data support the overall positive impression gained by the quantitative data. Table 58 presents quotes from each of the case studies in the business plan competition expressing an overall usefulness of the framework. Additionally, the overall first impression of being overwhelmed, was only expressed twice, whereas in the Alpha evaluation this feeling was expressed by eight of the startups.

Representative first-order data for overall positive perception of the framework
„also ich fand wirklich alles hilfreich. Ich finde es insgesamt super komprimiert. Ich denke, es ist nichts überflüssig davon. Wir haben das jetzt sehr, sehr komprimiert auch ausgefüllt. Wir haben dazu auch ein anderes Dokument. Wir können dazu Fragen jederzeit beantworten. Also ich finde, es ist wirklich gut so, wie es ist.“ (SU12)
„ All important aspects are covered”, “It provides valuable new ideas to conduct a CA” (S17)
„wenn ich es jetzt nochmal machen würde, würde ich auch wieder das Framework als Guidance heranziehen“ (SU14)
„ich finde, am Ende als Endprodukt so ein Sheet zu haben, wo alles so drauf ist, das ist gut“ (SU13)
„Also, dass es die Qualität steigert, bin ich, […], schon der Meinung, dass es… da es halt einen relativ strukturierten Ansatz bietet“ (SU19)
„Also man ist nicht in fünf Minuten fertig, man braucht schon seine drei, vier, fünf Stunden, das ordentlich durchzugehen. Aber man hat dann auch viel geschafft sozusagen.“ (SU20)
„Struktur verbessert, glaube ich, immer die Qualität, würde ich sagen“ (SU18)
„Also es ist schon ganz cool, wenn man dann praktisch das irgendwie an der Wand hängen hat und sich das so ein bisschen vor Augen führen kann“ (SU15)
„ich fand es allgemein ein sehr hilfreiches Tool. Es war zwar sehr zeitintensiv, aber dadurch war es halt… ja, das macht es halt letztlich so hilfreich, weil man halt strukturiert die Punkte durchgeht. Das heißt, man hat die ganzen Informationen am Ende dann halt auf einen Blick und halt strukturiert und übersichtlich.“ (SU16)

Table 58: Representative first-order data for overall positive perception of the framework

Table 59 gives evidence as representative first-oder data for negative and positive first-order categories for each of the framework parts. When analyzing the interviews in detail it becomes evident, that five of the six steps of the framework were assigned specifically positive, as well as specifically negative codes. This leads to the assumption, that each step does at least provide a value in individual cases, e.g. specific situations, knowledge levels or starting situations. As such, parts as the company statement at the start, the variety of options in step 4 and in the excel table, as well as the positioning matrix, were used as justification for either a good or a bad rating. In addition, it must be considered, that the interviewees naturally tend to explain why they haven’t given the full score, thus, elaborating more on negative characteristics. Meaning that, the lack of a positive comment about a specific part, does not by implication mean, that this part is perceived as useless.

Framework step			
Negative first-order category	Representative first- order data	Positive first-order category	Representative first- order data
Section 1			
Not useful	"Start [...] das hat bei uns nicht so gepasst" (SU15)	Useful	„wenn ich es nochmal machen würde, würde ich Punkt 1 benutzen, Punkt 4, 5 und 6“ (SU13)
Unsure how to use the phrase	"Also ich habe mich ein bisschen schwergetan damit, weil es keine konkreten Fragen sind, sondern man eben diesen Satz da ausformulieren soll" (SU14)		
Phrase is not suitable for the specific case	"Also wir haben zum Beispiel am Anfang dagestanden, hier Start, und haben uns gefragt, Problem versus Need. So, wir hatten das Gefühl, wir haben eher einen Need, haben wir halt wirklich ein Problem. Das war hier who has and wants to und ich habe mich gefragt, ob es tatsächlich immer beides gibt und ob das" (SU11)		
Section 2			
Not useful/ not useful on the sheet	"Also ich finde 2 zum Beispiel kann man rauslassen" (SU13) „Ich würde es mir gut vorstellen, dass man das auslagert irgendwie [...]. Nummer 2, [...], das muss da nicht drauf.“ (SU20)	Encouragement is good	„Es hat definitiv encouraged, diverse Information Sources zu benutzen.“ (SU20)
Information sources not specific enough	“das waren für mich so total offensichtliche Sachen. Das war so, okay, das haben wir jetzt sowieso schon alles gemacht, ich mache da irgendwie meine Haken, aber das hat mir überhaupt nichts gebracht, was da stand“ (SU14)	Good sources	„Very smart to ask customers of competitor” (SU17)
No financial resources available	“Ist auch wieder die Frage, an wen sich das richtet, weil ich meine Financial, wir haben einfach keine Ressourcen, um jetzt irgendwie eine Competitor Analysis durchzuführen“ (SU13)		
Section 3			
Distant/ close scale not helpful/ unclear	" Ich wusste nicht, ob man das jetzt binär sehen soll, also entweder es ist distant oder es ist close oder ob man jetzt dann noch den Zeitstrahl verwendet und dann		

	die irgendwie dann noch irgendwie anordnet und darüberlegt. Das war mir in dem Moment dann nicht so ganz bewusst" (SU14)		
Not specifically helpful for identifying	"Ich hätte jetzt nicht gesagt, dass das Framework an sich mich dabei super unterstützt hat" (SU20)		
No guidance for identification	„Also das ist, wenn ich schon irgendjemanden identifiziert habe, dann kann ich irgendwie überlegen, in welche Kategorie fällt der letztendlich. Aber wie finde ich überhaupt Konkurrenz, also wie gehe ich da vor, was sind so die Kanäle, nach was…?“ (SU14)		
15 min not enough time	"am Anfang, gab es eine Sache, da waren nur 15 Minuten vorgesehen und wir […] waren dann irgendwann bei, na ja, dann ging es mehr so gen eine Stunde" (SU18)		
Problems with classification into the 3 categories	"Ist das historical, ist das current, also das ist manchmal ein bisschen schwierig zu differenzieren ehrlich gesagt." (SU13)		
Section 4			
Not useful on the sheet	" Genau, 4. könnte man einfach, glaube ich, als Zettel danebenlegen und sagen, es muss nicht auf ein Canvas, weil damit machst du auf dem Canvas ja nichts." (SU5)	Useful	"Also vier fand ich sehr gut für Easiness of Use. Das hat das Ganze sehr klargemacht und sehr pointiert, was man da machen soll "(SU13)
Not enough guidance	"ich musste das ganze Framework einmal komplett durchspielen, um zu verstehen, wo am meisten Aufwand später ist und ich meine das jetzt rückwirkend so gesehen zu haben, dass überall eine Zeit angegeben wird und bei dem vierten nicht." (SU14)	Gives good hints	„weil es eben eine gute Vorgabe hatte, was suche ich denn über die Leute, was versuche ich rauszufinden. Natürlich findet man auch nicht alles raus, aber hat gute Hinweise gegeben“ (SU20)
Structure of excel and step 4 are not similar enough	"aus meiner Sicht [haben sich] diese zwei Strukturen von dem Excel-Sheet und dem Papier-Sheet […] aus meiner Sicht eher unterschieden“ (SU14)	Excel table good as orientation	“erstmal durch diese Struktur fand ich es ganz gut, […], dass man halt erstmal gesagt kriegt, worauf man achten soll. Da würde mir das Poster an sich nicht reichen, sondern da habe ich die Excel-Tabelle verwendet“ (SU15)
Not enough selection options for	“Ich denke aber, dass da sogar noch mehr Sachen stehen könnten oder das auch noch		

relevant information	weiter erklärt werden kann in so einer Frage.“ (SU14)		
Excel table: the adaption of the table was not clear enough/	"Also ich glaube, was da helfen würde, wäre, wenn man einfach auch ein bisschen mehr, na ja, Freiheiten gibt oder vielleicht sich die Kategorien irgendwie vorgibt und dann sagt man halt, okay, dann sagt man vielleicht, es gibt sechs Kategorien und wählt davon vielleicht die... halt irgendwie ein Subset aus, die für euch irgendwie wichtig sind oder macht noch eine eigene Kategorie. " (SU18)		
Section 5			
Not enough space	" Ja, generell fand ich bei 5 fast ein bisschen wenig Platz" (SU15)	Useful through structure and overview	"5 Present and Capture, die Art und Weise, wie die Information da nochmal aufgegliedert war [...] fand ich echt super, das hatte ich so jetzt auch noch nicht gesehen. Value Architecture und das Thema Finance, denke ich, sind super starke Punkte, die nochmal so aufzubereiten, ich glaube, das hätten wir sonst nicht gemacht. " (SU10)
		Usefulness of first insights	"Generell fand ich diese first Insights ziemlich gut, also bei der Nummer 5. Da ist halt irgendwie, da ist man frisch von der Analyse " (Su15)
Section 6			
Not enough space	„Also gerade wenn man Post-Its irgendwie haben möchte, dann ist eigentlich alleine 5 und 6 jeweils auf A0 zu haben, ist fast Minimum, damit man da was draufpappen kann“ (SU19)	Step 6 as most helpful part	“Punkt 6 fand ich mit am hilfreichsten“ (SU13)
Not enough hints for how to find differentiation	“Da war manchmal nicht so klar, wie finde ich denn jetzt raus, was mein Differentiation-Teil sein soll. Das hat ein bisschen länger gedauert. Deswegen würde ich da eine Vier eintragen. Da könnte man vielleicht noch irgendwie Hints geben auf wie differenziere ich mich jetzt, wenn ich noch nicht sehr differenziert bin.” (SU20)	Usefulness of the “understand” section	“ Also ganz besonders gut fanden wir die Tabelle 6 Synthesize and summarize und da die linke Spalte 1 bis 4. Da geht es um competitive Environment, Bases of Competition, Industry Standards and critical Success Factors.” (SU12)
		Usefulness of market-type hypothesis	"Das [markt-type hypothesis] fand ich eigentlich ganz nett.

			[...], dass man sich mal überlegt, was macht man da." (SU15)
		Usefulness of critical success factors	"critical Success factors [...] finde ich persönlich jetzt für uns super, super wichtig [...] weil wir jetzt ja in einen Markt eintreten, der im ganz, ganz frühen Stadium ist und zu sehen, was Wettbewerber, [...] was die erfolgreich macht, also worauf es aktuell für uns auch ankommt, worauf wir wirklich achten müssen und was wir einfach auch schon lernen und kopieren können von anderen" (SU12)
		Usefulness of "Partner and complementary products"	"ich fand das eben total sinnvoll und hilfreich, anhand der Business-Model-Components die Wettbewerber durchzugehen" (SU3)
Positioning matrix: wrong use/ not used as intended/ guidance not helpful	"Na ja, aber da dachten wir halt wie im Sinne von wir sollen [...] uns vergleichen mit dem Durchschnitt." (SU13)	Usefulness of positioning matrix	„da hat halt auch diese Abbildung ganz gut... war ganz hilfreich, wo man die da auf diesen Skalen sozusagen einordnen musste, die verschiedenen Competitors" (SU16)
		Usefulness of repetition of the company statement	"Also ich finde es gut, dass es nochmal kommt, weil wir haben bei uns schon so ein bisschen iteriert für dieses Company Statement." (SU15)

Table 59: Representative first-order data for positive/negative codes per framework step

Similar to the process used in the Alpha evaluation Figure 56 shows the data structure of the findings with regard to the negative categories, i.e. the perceived problems and difficulties the users experienced with the artefact, as well as expressed improvement suggestions and requests. The three main dimensions of the analysis are depicted (aggregate dimension), as well as the representative four second-order themes and 29 first-order categories that constituted these themes. The findings will also be presented in a findings narrative.

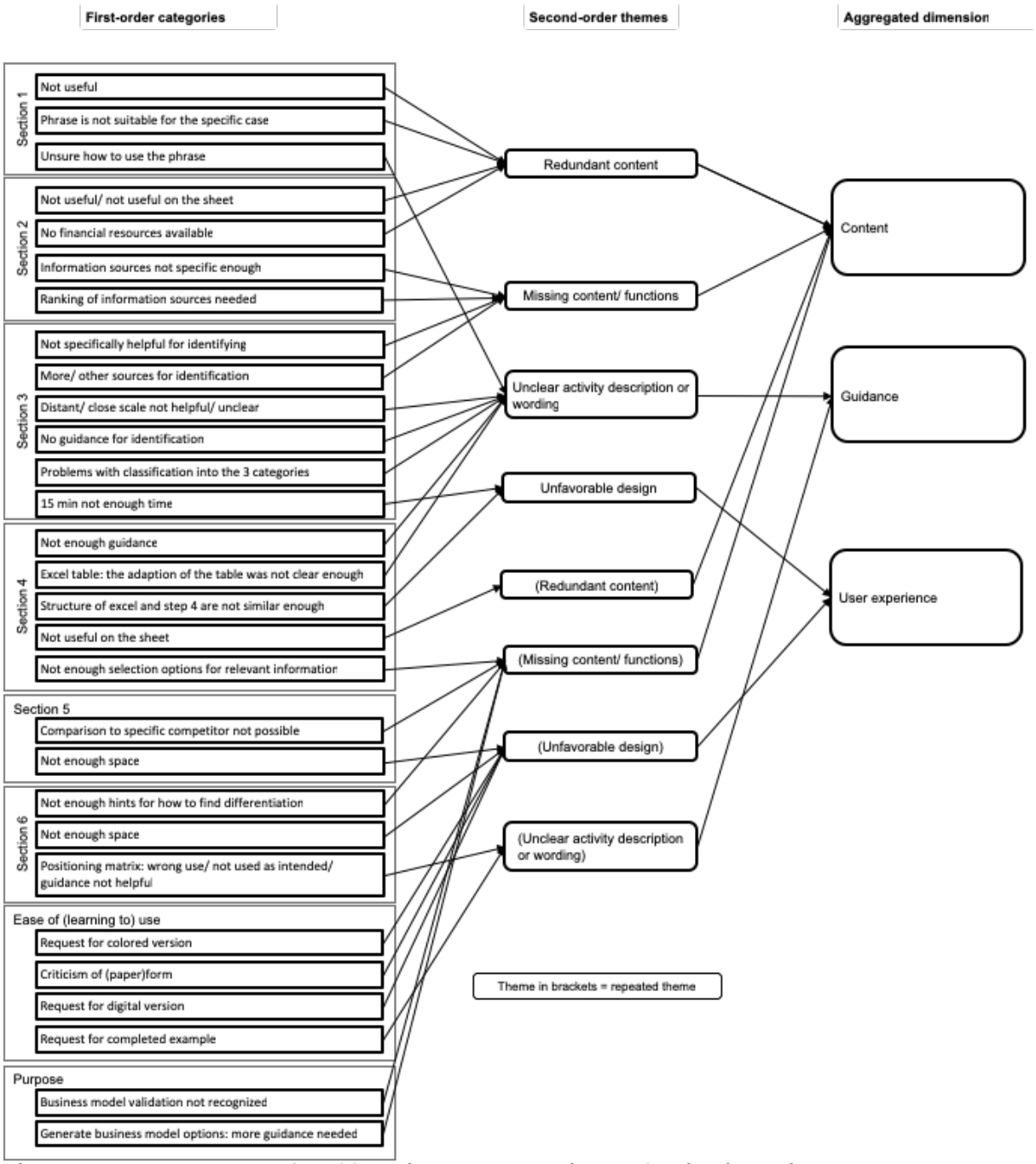


Figure 56: Data structure of problems in Gamma Version evaluation interviews

The expressed problems and requests can be aggregated into the dimensions of relations to user experience, guidance, and content, which also constitute potential improvement areas.

User experience. With regard to the usage, the format was again a recurring theme of discussion. However, also here contradictory statements were made. For some of the users, the visual use of the framework in paper form, and to have all information on one page was perceived as useful, even though the format is bulky. For example, SU16 states, "that at the end you have all the information at a glance and structured and clearly arranged." Also, in the I

like, I wish session from the workshop, the general usage of a framework was appreciated. Other users claimed that a digital version is more suitable to be able to work remotely together (SU14). This finding is supported by the submission form of the CAF. Five teams submitted as pdf, four in paper form. However, SU 16 only submitted digitally, but used the paper form for the actual analysis, stating that "I then filled it out on the PC so that it is clearer. That's why it was a bit small, but I think it's a good idea to have it all at one glance on such a large sheet of paper." It can be observed, that the teams, that used the DIN A1 format, had the most comments about the limited available space (SU14, SU16, Su20). Only one team, that used the DIN A0 format, experienced "slightly not enough space in 5", but acknowledged, that "The post-its worked out pretty well. You have to cut them to size, but that actually worked quite well" (SU15). On team requested a colored version of the CAF. Also, one team that used the framework digitally expressed available space problems.

In the workshop setting it was observed, as well as expressed by two teams in the competition setting, that the identification part takes longer than the indicated 15 minutes. On team (SU14) find, that the structure of the excel table and section four of the framework were too different.

Guidance. In general, the guideline was perceived as helpful as mentioned by five of the BPC startups. This became especially evident in one case (SU3), in which during the interview it turned out, that one of the founders didn't read the guideline and was complaining about specific missing guidance aspects, that were actually explicated in the guideline. In general, the framework and the guideline were perceived as easy to use, e.g. SU16 states, that "the guideline was also very self-explanatory and easy to understand". However, the request for a completed example was also mentioned in this evaluation by four BPC startups.

Specific missing guidance was experienced in section one, two, three, four and six. Especially with regard to the identification of competitors and the usage of the positioning matrix the missing guidance became evident. Section three was more used to classify already known competitors, than to identify them. Also, the distant/ close scale, as well as the three categories are still not clear enough. In section six, the usage of the positioning matrix was judged ambivalently. On one hand very positive experiences where made, for example by SU12, which states that "the positioning of the competitors and my own company in such a matrix, I thought that was great" or by SU17 explaining that, "I normally used a matrix, but I will use this form from now on". On the other hand, however, it was observed, that the use differed from the intended use. SU13 for example displayed only their own startup. Others didn't use lines, only entered data points, which is not leveraging the full potential of the matrix, since a profile is not easily recognizable. Here, the guidance was not perceived as helpful. In section four the missing guidance statements were related to the lacking time indication with the reasoning that "I have not

understood why there is no time indication, although this is actually the part that lasts the longest. So, I would have needed this guidance at the beginning" (SU14). However, it was only one startup that expressed this concern. And in section one one startup was unsure how to use the phrase in terms of how it relates to following parts of the framework, two more had problems formulating a sentence.

Also, a completed example was requested by four teams in the competition setting in order to easier understand how the different parts should be used.

Content. With regard to the purpose, the validation of a current business model was worst rated. However, the qualitative data shows, that this might also be a problem of the questionnaire, since SU12 answered: "I think in order to be able to answer this question [...], what I am a little short of is a very, very clear distinction of the individual Business Model Components", indicating a problem of understanding. Also, the interviewees stated, that there were not enough hints for finding options or points of differentiation, such as SU20 states "There might be some hints on how to differentiate myself, if I am not very differentiated yet." However, on the other hand additional effects were mentioned, such as

- Inspiration and learning; SU12 states that it is important to know "what is important for us at the moment, what we really have to pay attention to and what we can simply learn and copy from others."
- Enable/ Maintain critical thinking and questioning of assumptions; SU14 states that "intensive engagement with potential competitors makes you think about your own assumptions and also think in new directions". This finding underlines the positive effects on accuracy, and objectivity and indicates, that the selected design supports the envisaged validity of the CA, since criticalness, was identified as necessary trait for a valuable analysis (Gorman & Howard, 1997).
- Discussion and building a common understanding within the team, such as SU13 states "We didn't agree on what to do... [...] what are the relevant business models or what is the customer segment that we mainly want to target at the beginning, and that's what we've been discussing a lot about."

With regard the purpose of the framework, it is necessary to clarify that the presentation of CA results remains an unsolved problem. It became clear during the workshop setting, that a presentation of the CA results with direct feedback was highly appreciated, and that the visualization of the knowledge gained through using the CAF remains a challenge for the teams.

Some users find that, the framework does not provide enough hints for how to find a relevant differentiation ("There might be some hints on how to differentiate myself, if I am not very differentiated yet" SU20). The adaption of the information collection options (in section

four) did not become clear. Also, section one, two and four (start, set up and information collection options) were considered irrelevant or at least not useful on the sheet. However, as already outlined before, there were also opinions expressing the opposite. Identification of competitors is still not regarded as being highly supported. Here, more and more specific information sources are requested, or rather the connection between the source determination in section two and the identification activity was not recognized. Moreover, the teams mentioned different sources, such as pitching the ideas to others, for identifying competitors (SU19). One team also requested that the sources should be ranked according to its reliability and that this ranking should be reflected in the results. In section five, a request for a direct comparison to one specific competitor was expressed.

4.4.3.6 Implications

Again, the findings carry important implications for the further course of this project. On the one hand, they show that the framework was highly appreciated, and that it supported the startups to conduct a viable CA. The overall average usefulness increased from 3,6 to 4,2. Only three out of the 15 functional requirements were rated on average below 4,0, namely identification of competitors, usage of diverse information source, and validation of current business model. The highest average valuations of 4,4 to 4,7 were given to the structure, the collection of relevant knowledge, the positioning of the product, and the creation of a database, Also the effect requirements of improvement of CA work quality and CA job effort were rated in that range. Thus, one can infer, that the created artefact is in general fulfilling its requirements adequately.

However, the qualitative data shows, that there is still potential for minor improvements. Thus, a final version of the CAF will be developed with improvements based on the identified dimensions. The findings of the third evaluation will be assessed and evaluated to derive concrete improvements. The adaptions and their rationale will be discussed in detail in the design of the Delta version.

This design science project will end with the development and communication of the Delta Version. This last version will not be subject to another evaluation cycle, since as determined in the application of the FEDS framework to guide the evaluation of this DSR projects (see chapter 4.2.3.1) the process ends with an evaluation where no new information is expected to be obtained from further data. The FEDS framework is applied in this thesis to conceptualize and implement the evaluation rigorously. It is not expected, that further cases do promise any new information content for theory formation, besides individual adaptations and special requests for, it is assumed that theoretical saturation is reached (Glaser & Strauss, 1967).

4.5 SUMMARY OF DSR PROJECT ELEMENTS

As the evaluation of the artefact is completed with the last evaluation, a summary of the data elements of the DSR project episodes that led to the final version is given in Table 60. Five main episodes led to the development of four versions of the artefact. In total, 38 startup teams and six experts were involved in the development and evaluation of the artefact in combination with systematic and supplementary literature review. Thereby, interviews in the total length of 15:44:49, 31 questionnaires, and over 50 additional documents have been analysed by content analysis and descriptive statistics. Along the development process to the final artefact, 15 interim designs of the artefact have been assessed.

DSR part / Element	Problem specification	Creation of archival knowledge base	Development of Alpha Version	Evaluation of Alpha Version	Development of Beta Version in six design iterations	Evaluation of Beta Version	Development of Gamma Version in four design iterations	Evaluation of Gamma Version	Development of Delta Version in four design iterations
Method	Case studies	SLR + Supplementary LR		Case studies		Expert interviews		Case studies	
Number of cases/ experts	11 startups	Not applicable		11 startups		6 experts		16 startups	
Setting	BPC 2017	Not applicable		Usage of artefact in BPC 2017		Presentation of artefact		Usage of artefact in BPC & Accelerator workshop 2018	
Main data points	• 11 Submitted CA before CAF • 11 interviews (2:56:29 length)	78 studies from 43 journals + textbooks and practitioner books		• 11 Submitted CA after CAF • Emails • 11 Filled out artefacts • 11 interviews (4:43:46 length) • 11 questionnaires		• 6 interviews (3:50:47 length) • Emails		• 9 submitted CA after CAF • Emails • 9 filled out artefacts • 8 Interviews (4:13:57 length) • 20 questionnaires • Memos	
Data analysis method	Content analysis (Gioia method)	Content analysis (Aldebei & Avison, 2010)		Mixed method approach: • Content analysis (Gioia method) • Descriptive statistics of questionnaire		Content analysis (Gioia method)		Mixed method approach: • Content analysis (Gioia method) • Descriptive statistics of questionnaire	
Chapter	4.1.1.4	4.1.1	4.2.2	4.2.3	4.3.2	4.3.3	4.4.2	4.4.3	4.6

Table 60: Summary of DSR project episodes

4.6 DESIGN AND DEVELOPMENT OF THE DELTA VERSION

The definition of the solution space is not necessary given the high results of the quantitive assessment. None of the qualitative data indicates that a revision of the purposes and functional requirements of the framework. Thus, the development of the Delta version will be performed within the already defined solution space on the basis of the last evaluation, and also accounting for insights of prior evaluations and the generated archival knowledge base.

4.6.1 The design process

On 12.02.2019 a two-hour workshop with a second researcher was conducted to analyse the evaluation of the Gamma Version in-depth and derive adjustments for the Delta Version. In a first step, the first-order categories of the qualitative analysis are assessed with regard to their impact for conducting a viable CA for startups taking into account the quantitative data as benchmark to determine critical ones and those, that can be considered for minor adjustments. In the course of this step, it was also decided which first-order categories will be considered for the design process of the Delta Version of the artefact, and which are neglected by discussing their reasonableness, accordance with the aims of the artefact and the requirements derived for the artefact. Thereby, some of suggestions, were assessed as to be neglected, and some as being potentially interesting extensions of the artefact in the future.

Table 61 displays the result of these categorizations. None of the 29 first-order categories were assessed as critical for the support of conducting a viable CA for startups. Due to the overall high quantitative ranking, one can infer, that all major aspects for conducting a viable CA are covered. 20 categories were assessed as not critical, but considered for minor improvements, one was assessed as potential option for future extensions, and 8 were rejected to be used for adaption considerations.

Area	First-order category	Assessed as			
		Critical	Considered for minor improvements	Potential option for future development	Not to be considered
Section 1	Not useful				x
	Unsure how to use the phrase		x		
	Phrase is not suitable for the specific case				x
Section 2	Not useful/ not useful on the sheet				x
	Information sources not specific enough		x		
	No financial resources available				x
	Ranking of information sources needed				x
Section 3	Distant/ close scale not helpful/ unclear		x		
	More/ other sources for identification		x		
	Not specifically helpful for identifying		x		
	No guidance for identification		x		
	15 min not enough time		x		
	Problems with classification into the 3 categories		x		
Section 4	Not useful on the sheet		x		
	Not enough guidance: due to missing time indication				x
	Structure of excel and step 4 are not similar enough		x		
	Not enough selection options for relevant information		x		
	Excel table: the adaption of the table was not clear enough		x		
Section 5	Comparison to specific competitor not possible		x		
	Not enough space		x		
Section 6	Not enough space		x		
	Not enough hints for how to find differentiation		x		
	Positioning matrix: wrong use/ not used as intended/ guidance not helpful		x		
Ease of (learning to) use	Criticism of (paper)form				x
	Request for colored version				x
	Request for digital version		x		
	Request for completed example			x	
Purpose	Business model validation not recognized		x		
	Generate options: more guidance needed		x		
Sum		**0**	**20**	**1**	**8**

Table 61: Assessed first-order categories (Gamma evaluation)

After the initial assessment, the individual implementation options for the design adaptions are discussed. Figure 57 shows a picture of the whiteboard used in this part of the design workshop session.

Figure 57: Picture of a whiteboard used in a design session for the CAF on 12.02.2019

After the initial workshop session, the derived design requests are sent to the professional designer. In three more design iterations between 13.02.2019 and 07.03.2019, in which the design requests are implemented by the designer, discussed and evaluated and new design requests are made, the Delta Version of the artefact was developed. To ensure a high-quality also with regard to the language and to ensure the use of professional terms, the artefact was reviewed by a professional and native English-speaking proofreader.

In the following, the design adaption options, that were neglected, considered for future extension, and the implemented design options are described in detail and a justification for their implementation or non-implementation is given.

4.6.2 The neglected design adaptions

Eight categories were evaluated as not to be considered for adaptions. Different reasoning led to their exclusion.

In half of the cases a dissenting opinion among users could be identified. Section one and two, for example, were assessed as not useful. The same applies to the disclosure of financial resources in part two, as well as the chosen format of the CAF in paper form. However, opinions to the contrary have also been expressed. Thus, a part that was perceived as helpful

in some cases is not considered redundant and cannot be removed. Rather the adaptability for specific cases should be pronounced, to make clear that the user should adapt the framework for their specific case in order to maximize the benefits. One also needs to accept that not every user will perceive each part as equally helpful, and that it is not possible to build a tool that is equally useful for each case. Even though the participating startups are comparable in terms of size and life-cycle stage, they are different with regard to their aspired business model, industries, prior startup, industry, management, and CA experience, as well as to their preferred working methods and mindsets. Thus, it is unavoidable, that there will be parts that are perceived as more or less useful for one or the other. As such, the paper form will still be maintained given the reasoning, that visualization and the encouragement and opportunity of discussions provide a high value add.

Area	**First-order category - neglected**	**Justification**
Section 1	Not useful	• Dissenting opinions among users: a part that is perceived as useful for others will not be deleted • Rather the adaptability for specific cases should be pronounced
	Phrase is not suitable for the specific case	• It is not possible to cover all individual cases. • It is recognized that teams struggle to formulate clearly their business idea and value proposition. This might not be a problem of the CAF
Section 2	Not useful/ not useful on the sheet	• Dissenting opinions among users/ prior evaluations: a part that is perceived as useful for others will not be deleted
	No financial resources available	• Dissenting opinions among users: some users actually inserted financial resources
	Ranking of information sources needed	• Individual request/ mention • Would make the artefact too complicated without high value added • Out of scope • Sources can already be captured in the excel, and ranked if desired
Section 4	Not enough guidance: due to missing time indication	• Individual request/ mention • The duration is variable and individual depending on the selected collection sources, methods, the time frame of the overall CA project • Too strong restriction is not intended. • Individual request/ mention
Ease of (learning to) use	Criticism of (paper)form	• Dissenting opinions among users: visualization and discussion of information, as well as an overview at a glance has been perceived as positive
	Request for colored version	• Initial design decision for Alpha and Beta version: reproduction via printing cost-effective and without loss of quality or legibility; impression of serious working tool, common layout standards
Sum	**8**	

Table 62: Neglected design adaptions and justifications (for Delta Version)

The acceptance of the incompatibility with all cases also applies to individual requests made, such as that the company statement at the beginning is not suitable for the specific case,

or that the ranking of information should be included. For the former, one can state that it is a challenge in itself to formulate the business idea and value proposition in a concise way and this might not be a problem of the CAF. The latter was also neglected because of complexity reasons and the already existing possibility to implement a ranking of sources in the excel if desired. Moreover, the missing time indication for section four, and the request for a colored version were neglected. The reasoning for a colored version, that was decided for the Alpha and Beta Version was upheld, that the reproduction via printing should be cost-effective and without loss of quality or legibility, the impression of serious working tool should be created, and that, common layout standards for business tools in the entrepreneurial landscape are adopted.

Table 62 summarizes the neglected design adaptions and the reasons for their refusal.

4.6.3 The future design extension options

In this evaluation, only one category was assessed as potentially providing valuable support for conducting a viable CA, but are out of scope for this research project, namely the request for a completed example. As already outlined in the Beta evaluation, a fully completed example of the artefact after the artefact is fully developed, and good use cases are available, is regarded as good support for understanding and using the artefact.

4.6.4 The design adaptions

On the basis of the identified 20 categories considered for improvements, design options are discussed and evaluated. All of the adaptions are considered as minor and serve to strengthen the already fulfilled requirements further, offer further support, and make the use even easier and more intuitive. However, this is to be achieved without interfering in the design to a large extent, due to the already satisfactory survey results. In total, 32 minor design adaptions were implemented.

Section two is adapted by reducing the box for entering who is performing the analysis, while integrating the option to specify a person external to the startup whom can be involved. The space is not needed to enter CA performers, but for more information sources and methods, which were requested for and can give additional support. This is supposed to support further the encouragement to use diverse information sources, which was among the worst ratings with an average of 3,6. More information sources include e.g. specifications of internet search, such as databanks, intelligence reports, news blogs, forums, podcasts, special websites (homepage of competitor, comparison portals). Instead of using a kind of gapped sentence,

guiding questions are used to indicate what needs to be entered in the fields of section two. This approach resembles more to the rest of the framework.

In section three, the time indication is extended from 15 to 20 minutes, as it became clear that more time was needed in the competition as well as in the workshop setting. Also, the processing instructions, as well as the guideline was adopted to highlight the connection to the determined sources and methods in section two and the statement information in section one. This adaption is also supposed to give additional support for the identification of competitors, which received the worst average rating of 3,1. Besides, recommended approaches for the identification of competitors in each dimension (historical/ current/ potential) are added. This further supports the encouragement to use diverse information sources. One of the guiding questions in the historical dimension "Why did they fail?" was moved to the critical success factor assessment in section six, because the assessment of failure reasons is an analysis part. A visual adaption of the columns of the respective dimensions is supposed to clarify their weighting and scope, i.e. historical is smaller and current broader, since there will be more current than historical competitors. The guideline is also adapted to make clear the connection to the sources and methods in section two and the clarification of the distant/close scale and its connection to section one. As such the guideline in this part now reads as follows: "Which ones are more distant/ closer to you in terms of addressing the same customer segment/ solving the same problem/ satisfying the same need/ providing the same benefits?"

Section four is revised by adding checkboxes to select information to be collected about competitors. This clarifies the adaptability and transforms it from a static, purely informative part to an actionable task, thus, making it more valuable as part of the framework. As requested, more information options are added in the framework and excel. Since the selection option is more pronounced, an information overload should not occur, and the finding of relevant information is further supported. Moreover, the processing instruction of section four is revised, again to make clear the connection to the determined sources and methods in section two.

Section five was also a subject to minor changes. The processing instructions are revised to make clear the connection to section four. Moreover, one of the rows for entering competitor information was reconfigured in order to allow for entering information about the user's own startup. This should support the validation of the own business model through direct comparison.

Section six is renamed into "Synthesize and Conclude" to clarify the content. Guiding questions are added and adapted in the "understand" part for clarification purposes and to give more support to analyse the competitive environment. The finding of points of differentiation is further supported by adding processing instructions based on the four actions framework by

(Kim & Mauborgne, 2005). As such, the instruction reads as follows: " options about how to differentiate your product and/or your company. Think about factors of the industry standard, that should be eliminated/ reduced below the industry's standard or created/raised above the industry's standard." This also highlights the connection to the "understand" part and meets the request for more hints on how to find differentiation. The inspiration for further differentiation options is also supported by the adaption of the guiding questions, that refers to the business model components. The processing instructions for the positioning matrix are also revised to clarify usage and include now an illustrative example. Since not all of the boxes for entering differentiation points have been used by six of the competition teams, one of the boxes was deleted, the matrix was shortened, and the boxes were enlarged. During the discussion of the Gamma evaluation, the positioning assessment became a major subject, even though none of the startups mentioned this point in the evaluation. It was decided, to adapt the assessment of the positioning, by reversing the order of the content and adapting the assessment points. It will not be further distinguished between positioning and differentiation, since this seemed an artificial distinction, that makes no difference for the user. The assessment of the positioning as being "clear" is deleted, because it cannot be clearly distinguished from the "distinctive" requirement. Also, the assessment now refers to the positioning matrix, highlighting the iterative and sequential procedure. On the other hand, an additional assessment is added, to assess whether the positioning is leading to a value that is superior to alternative value offerings inspired by (Kotler & Armstrong, 2008, p. 207). To adapt to the natural reading flow subsection II and IV swap positions. This was inspired by the proofreader who found the sequence confusing and pointed out that the arrow from section II to V adds to that impression. At the end of section six, more points of action are added, such as "Validate the assessment of your positioning with customers and investors or "Create pitch deck slide about competition and get feedback" to clarify the limits of the CAF output, and highlight the iterative procedure. The points of action were clustered into their association with either the startup itself or relate more to the competition.

With regard to the ease of use and ease of learning to use the framework eight more adaptions are made. The guideline should include an overall time indication to manage expectations of users and support the planning of performing CA further. Also, the guideline should include more hints for the sequential and interdependent structure of the CAF to clarify the usage. As such, the guidance for the separate steps partly refers to other other steps, especially the determined information sources. Further indications with regard to the output of the CAF as being input for a pitch deck presentation not the presentation itself, are supposed to set expectations appropriately and clarify the content limits. The visual consistency is critically checked, as well as the wording used in the CAF adapted after proofreading by a professional

native English speaker to ensure a professional style and ease of understanding. More space is gained by reducing margins. The "by" box in the top of the framework is deleted due to duplication of the information in section two.

Table 63 summarizes the chosen design adaptions, the associated improvement area (user experience, guidance, content) and the justification for the adaption. Whereas, it must be noted that an adaption may have an impact on more than one improvement area, although the categorie they might be based on from the interviews were only classified into one.

Area	**Adaption**	**Justification**	**Associated with dimension**		
			User experience	Guidance	Content
Section 2	"Organizational" box reduced by half	Adaption to usage behavior (space not needed) Make space for sources	x		
	Addition of more source options	Comply with request Give additional support Encouragement to use diverse information sources			x
	Addition of more collection methods	Comply with request Give additional support			x
	Addition of option to specify which outsider can be involved	Content consistency		x	x
	Adjustment to guiding questions for each box	Consistency to other sections	x	x	
Section 3	Time adjustment to 20 min	More time was needed	x	x	
	Adaption of processing instruction	To make clear the connection to the sources and methods in section 2 and to the statement in section 1		x	
	Addition of recommended approaches for identification for each column (historical/ current/ potential)	To make clear the connection to the sources and methods in section 2 Encouragement to use diverse information sources		x	x
	Moving of guiding questions from historical to section 6	The assessment of failure reasons belongs to the analysis			x
	Visual adaption: historical column narrower	Clarify weighting	x		
	Adaption of guideline	To make clear the connection to the sources and methods in section 1 and the statement in section 2 Support the understanding of the distant/close scale		x	
Section 4	Adaption of processing instruction	To make clear the connection to the sources and methods in section 2		x	
	Addition of checkboxes for information selection	Clarify adaptability Make the part an actionable point in the framework	x		
	Addition of information options in the framework and excel	Comply with request Support the finding of relevant information			x

Section 5	Adaption of processing instruction	To make clear the connection to section 4		x	
	Assignment of one of the rows for entering own business model	To support the validation of own business model through direct comparison		x	x
Section 6	Renaming	Clarify the content	x	x	
	Swap of position of IV and II	Alignment with natural reading flow from left to right The arrow to section V is more plausible after IV	x	x	
	Addition/ Adaption of guiding questions in "understand" part	Clarification Give more support to analyse the competitive environment		x	x
	Addition/ Adaption of processing instruction and guiding questions in "differentiation" part	Give more support to find PODs Solve usage problems/ Requested Connection to preceding part		x	x
	Adaption of processing instructions for positioning matrix (with illustrative example)	Clarify usage Solve usage problems	x	x	
	Adaption positioning matrix (less & bigger POD boxes)	Adaption to usage behaviour	x		
	Addition and clustering of points of action	Clarification of content limits Highlight the iterative procedure More hints for possible next steps		x	x
Ease of (learning to) use	Adjustment of the guideline: Overall time indication	Expectation management Planning support	x	x	x
	Further harmonization of the design across all sections	Visual consistency	x		
	Wording adaptions in CAF and guideline after proofreading	Professional style Ease of understanding	x		
	Adaption of guideline with regard to the interdependent connection between the parts	Solve usage problems Clarify usage	x	x	
	Declaration in the guideline as content input for a pitch deck slide (not the presentation itself)	Expectation management Clarification of content limits		x	
	Adaption of icons (prompts/ time)	Visual consistency	x		
	Gaining more available space	Solve usage problems	x		
	Deletion of "by"- box	Duplication with section 2	x		
	Digital version	Requested	x		
Sum	**32 adaptions**		**17**	**18**	**11**

Table 63: Adaptions for the creation of the artefact's Delta Version

4.6.5 The design

Through the implementation of revisions, the Delta Version of the artefact was created. Since no further adaption of the design will be executed within the course of this DSR project, it is necessary to describe the final artefact comprehensively. Johannesson & Perjons (2014, p. 13 f.) state that "an artefact can be described by specifying:

- The function of the artefact, that is, what the artefact can do for its users.
- The structure of the artefact, that is, the inner workings of the artefact, the components it consists of, and how these are related.

- The environment of the artefact, that is, the external surroundings and conditions in which the artefact will operate.
- The effects of the artefact, that is, how the use of the artefact will change its environment. Effects can be divided into intended effects and side effects."

4.6.5.1 The function of the artefact

The CAF is a working tool that supports conducting a viable CA through a structured process of competitor identification and analysis for early-stage startups. It provides clear guidance on the process of CA and the analysis of competitors. It supports to collect relevant knowledge by encouraging to use diverse information sources, and thus supports informed decision-making in general.

In particular, the CAF can be used for:

- developing an understanding of the competitive environment,
- positioning a focal startup's product and company in the competitive environment by finding relevant points of differentiation,
- creating a database containing information about the focal startup's competitors,
- establishing a basis for iterating a business model by validating, confirming, or adapting of a focal firm's current business model components and generating business model options, and
- producing input for creating a pitch deck slide or business plan section about competition.

However, it is necessary to clarify that the presentation of CA results remains a task, that the users might still struggle with. It became clear during the last evaluation in the workshop setting, that a presentation of the CA results with direct feedback was highly appreciated, and also necessary in terms of the type and significance of the feedback given. Thus, the visualization of the knowledge gained through using the CAF remains a challenge for the teams.

With regard to the summative evaluation based on the FAROUT method (Future-Orientation/ Accuracy /Resource-efficiency/ Usefulness/ Timeliness) created by Fleisher & Bensoussan (2003, 2015), one can categorize the CAF as follows:

1. Future-Orientation: The method is neither not future-oriented nor highly future focused. It comprises future elements, but is more anchored in analyzing current data.
2. Accuracy: The method is able to provide a high level of accuracy, if the user is willing to use the proposed information sources and collection methods intensely and maintains an open mind and critical thinking attitude. However, since the analysis

of competitors is a selective information processing activity, it may always be incomplete and fraught with risk (Steinmann et al., 2013, p. 164).

3. Resource-efficiency: The resource-efficiency is on a high level. Usually, the teams express that the method consumes a lot of time, as the main resource in an entrepreneurial team, but that the effort is worth the outcome.
4. Usefulness: The application of the CAF delivers valuable output on a high level with regard to the derived functional requirements.
5. Objectivity: The CAF provides a high level of objectivity, if applied properly. The same requirement with regard to the attitude as for accuracy is needed to minimize biases and distortions.
6. Timeliness: The method requires a medium to a great deal of time to properly complete.

4.6.5.2 The structure of the artefact

The artefact consists of a framework as hardcopy in DIN A0 to be used with pen and/or sticky notes, a one-pager user guideline in DIN A4 and an Excel template for creating a competitor database. The framework was additionally developed as editable pdf document. The CAF provides a step-by-step procedure through the six distinct steps. Each section in the framework represents one step including one or more tasks to be performed. The sections are sequential and build on each other, i.e. the output of each step is used as input for a consecutive step. However, the user may want to go back in the process, to reiterate or repeat a step with more or altered information, which is also possible. Figure 58 shows a schematic representation of the process underlying the CAF.

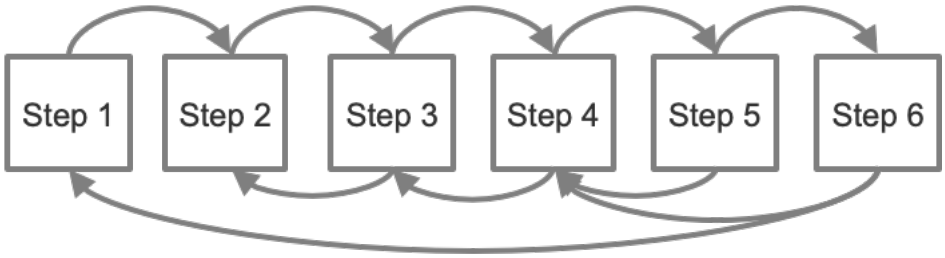


Figure 58: The process of the CAF

The steps are numbered consecutively in the framework and provide uniform processing instructions. In terms of the visual design, the framework is designed in clear, very tidy, factual, and timeless way reflecting the seriousness of the topic and providing clear orientation, following the design principle of form follows function (Hagen & Golombisky, 2013, p. 2 f.).

Throughout the framework icons are used to distinguish between processing instructions and guiding questions. Four more icons indicate how much time is suggested for a

specific step, and who should be involved in performing the task. Figure 59 shows the icons used in the CAF as displayed and explained in the guideline.

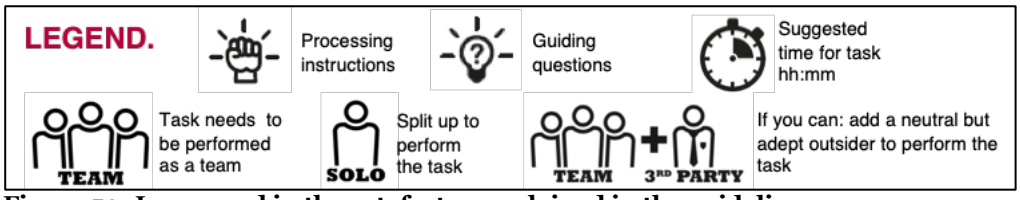


Figure 59: Icons used in the artefact as explained in the guideline

Step one sets the foundation for the analysis by writing down a company statement that addresses customer segment, problem and need, the (future) product's name, it's product or market category, the underlying technology, and the key benefits, mainly inspired by the company positioning statement of Blank & Dorf (2012, p. 294 ff.).

Step two is the planning of the analysis. The parameters are set with regard to duration, timeframe, budget, storage of information, information sources and methods, and persons involved in the analysis. The planning should set expectations but also inspire to use more than Internet desk research as a search strategy for information about competitors.

The identification of competitors distinguishes between current, historical, and potential competitors and gives hints on how to find these, including guiding questions as well as recommended search strategies. The identified competitors then shall be placed in the graphic according to their perceived similarity to the performing startup.

Step four provides a list of options that leads the user to select what information to collect by ticking the boxes. The excel table shall support the creation of a database. Information options are related to general information and business model information.

Step five supports the discussion function and team communication by providing a place where the gathered information can be shared and seen in total. This facilitates the comparison of business models of competitors as well as with the users' startup.

Step six comprises the actual analysis of the gathered information and the conclusion upon the analysis. This step consists of six subsections, i.e. subsection I to IV include understanding (of the competitive environment), differentiation (options), positioning, and an assessment of the positioning. Subsection V and VI conclude upon the analysis by rephrasing the company statement from the beginning by adding information about the competitors and key differentiators, and by defining next steps. An understanding of the analysis is achieved by posing questions about the competitive information environment in general ("How are the competitors distributed (how many/few)? What is their size (small/large)? How old are they (new/ established)? How strong is the competition (strong/weak)? Are there dominant players? Who is driving the market? Can you build groups of related/similar competitors?"), as well as about the basis of competition and industry standards, critical success factors, potential

partners and complementary products, a view into the future, and the market-type hypothesis (mainly based on (Blank, 2013, p. 71 ff.; Blank & Dorf, 2012, p. 112 ff.). The differentiation options are gathered divided into company and product options. The hints to find options are related to the business model components and include questions from the four actions framework (Kim & Mauborgne, 2004). The visualization of the positioning is inspired by the Strategy Canvas (Kim & Mauborgne, 2004).

Figure 60 and Figure 61 show the CAF Delta Version and the corresponding guideline. The adjusted excel template is displayed in Figure 62 and Figure 63. A digitally usable version of the framework as editable pdf is available at KITopen by the following link https://publikationen.bibliothek.kit.edu/1000098363. KITopen is the central repository of the Karlsruhe Institute of Technology. The guideline and excel template are available upon request from the author.

Figure 60: Competitor Analysis Framework Delta Version

COMPETITOR ANALYSIS FRAMEWORK

Understand your competition and position your startup

ANALYSIS FOR | DATE | ITERATION

1. START

00:15 | TEAM

Write down your current value statement to start your analysis.

FOR (customer segment)

WHO HAS (customer problem)

AND WANTS TO (customer need/reason to buy)

OUR OFFERING (product name/brand)

IS A (product category/market category/technology)

THAT PROVIDES (key benefits)

2. SET UP

00:15 | TEAM

Have a look at the framework as a whole and discuss the parameters for your analysis.

TIME (Duration)
- How much time do you plan to commit to the analysis?

TIMEFRAME
- When do you plan to perform the analysis?

FINANCIAL
- What is your budget to carry out the analysis?

IMPLEMENTATION
- How and where will you store the information (tools/software)?

INFORMATION SOURCES
- Pick at least three.
- ☐ (potential) Customer
- ☐ (former) Competitor (employee)
- ☐ Competitor's customer
- ☐ Non-customer (denier of an industry's offering)
- ☐ Industry expert
- ☐ Investor
- ☐ Internet
  - ☐ Databases
  - ☐ Intelligence reports
  - ☐ News blogs, forums, podcasts
  - ☐ Special websites: homepage of competitor, comparison portals
  - ☐ Search engines, keywords
- ☐ Team, family and friends
- ☐ Other: _____

ORGANIZATIONAL
- Who will be involved in performing the analysis (inside and outside your startup)?

INFORMATION COLLECTION METHODS
- Pick more than one.
- ☐ Interview
- ☐ Desk research
- ☐ Self-test of competing products
- ☐ Ideapitching
- ☐ Conferences and fairs
- ☐ Imitation of a customer
- ☐ Other: _____

3. IDENTIFY

00:30 | TEAM

Use the information sources and collection methods to identify your competitors/groups of competitors. Think about companies in and outside your industry with the same technology, distribution channel, production process, which fulfill the same basic customer function, or which are substitutes, or which offer products with similar benefits. You can combine multiple competitors in the matrix.

HISTORICAL
- Which companies have failed?
- Recommended: Interview an industry expert

CURRENT
- What does your customer buy, when your product doesn't exist? How does the customer solve the problem now (status quo)? What is the next best alternative for the customer? Which products perform the same function (substitute)?
- Recommended: Perform internet desk research // Interviews with/ Idea pitching to customers and/or experts

POTENTIAL
- Which companies may become competitors? Which companies may expand their market or product? Which companies may expand their value chain forward or backward?
- Recommended: Interview competitor employee // Desk research of industry/technology experts

DISTANT (low similarity) → CLOSE (high similarity)

YOUR STARTUP

4. COLLECT

00:10+2€ | SOLO

1. Determine what information to collect. Set up a database.
2. Start collecting the information using the determined sources and methods.

GENERAL INFORMATION
- ☐ Location
- ☐ Short description
- ☐ Number of employees
- ☐ History
- ☐ Key events
- ☐ Major transactions
- ☐ Market share
- ☐ Vision
- ☐ Strategies
- ☐ Ownership structure
- ☐ Investors
- ☐ Other: _____

VALUE PROPOSITION
- ☐ **Customer Segments**
  - Serviced country
  - Number of customers
  - Type of customers
- ☐ **Value Proposition**
  - Problems solved
  - Needs satisfied
  - Cost reduction
  - Design
  - Performance, e.g. speed
  - Price
  - Reliability, e.g. freakishness
  - Usability
  - Compatibility, e.g. operating system
  - Customization
  - Services, e.g. maintenance, installation training, technical assistance
  - Switching costs
  - Data security
  - Brand
  - Image of company/product
- ☐ Other: _____

VALUE NETWORK
- ☐ **Customer Relationships**
  - ☐ Dedicated Personal assistance
  - ☐ Self-Service
  - ☐ Automated Services
  - ☐ Communities
  - ☐ Co-creation
- ☐ **Channels**
- ☐ **Key partnerships**
  - Key partners
  - Key suppliers
- ☐ Other: _____

VALUE ARCHITECTURE
- ☐ **Key Activities**
  - Production
  - Problem solving
  - Network
- ☐ **Key Resources**
  - Physical
  - Technology
  - Intellectual (brand patents, copyrights, data)
  - Human, e.g. Top management
  - Know-How, e.g. Technology, Industry
  - Financial/Funding
  - Marketing budget
  - Sales budget
- ☐ Other: _____

VALUE FINANCE
- ☐ **Cost Structure**
  - ☐ Fixed costs
  - ☐ Variable costs
- ☐ **Revenue Streams**
  - ☐ Revenue model, e.g. licence sales, subscription, retail, advertising
  - ☐ Pricing model, e.g. differential pricing, billing unit (user, usage, workstation, entity)
- ☐ Other: _____

5. PRESENT AND CAPTURE

01:00 | TEAM | 3RD PARTY

Have a look at your database, present the information to your team and explore the key points/findings. Complete the chart and define next steps.

GENERAL INFORMATION	VALUE PROPOSITION	VALUE NETWORK	VALUE ARCHITECTURE	VALUE FINANCE
Your Startup				
Competitor: _____				
Competitor: _____				
Competitor: _____				
Competitor: _____				
Competitor: _____				

FIRST INSIGHTS

1. Think about what you just heard. What stays with you? What finds resonance? What is different?

SOLO

2. Share first insights and observations.

TEAM

6. SYNTHESIZE AND CONCLUDE

Analyze the information from step 3 and 5. Draw your conclusions and develop your positioning.

ITERATION CYCLE | 1:00 | TEAM | 3RD PARTY

I: UNDERSTAND

00:03

1. COMPETITIVE ENVIRONMENT
- How are the competitors distributed (how many/few)? What is their size (small/large)? How old are they (new/established)? How strong is the competition (strong/weak)? Are there dominant players? Who is driving the market? Can you build groups of related/similar competitors?

2. BASIS OF COMPETITION
- How have existing competitors defined the basis of competition? Is it by product attributes/service?

3. INDUSTRY STANDARDS
- Are there any existing standards? How is performance defined? Which factors are taken for granted?

4. CRITICAL SUCCESS FACTORS
- Which business model components are critical for the competitor's success? Do they have unfair advantages? Why did the historical competitors fail?

5. PARTNERS AND COMPLEMENTARY PRODUCTS
- Have you identified potential partners or complementary products?

6. LOOKING AHEAD
- Have you identified industry trends? What will happen when you enter the market? Which competitor is developing in a way that could become dangerous for you? Which are stale? How could the basis of competition and industry standards change?

7. BUILD YOUR MARKET-TYPE HYPOTHESIS
- Are you entering
- ☐ **an existing market**
  - You product and business model are known.
  - You adopt/-enhance industry standards
  - **Emphasize product/service improvement compared to industry standard and according to the basis of competition**
- ☐ **a new market**
  - Your company creates a customer base that didn't exist before
  - **Emphasize benefit of your product/service**
- ☐ **a clone market**
  - You copy a business model from another country
  - **Copy the emphasis**
- ☐ **a segmented market**
  - You resegment an existing Market
  - You extend or replace industry standards
  - **Emphasize differentiation to industry standard and basis of competition**
  - ☐ on a cost basis
    - Are there customers at the lower end of an existing market who will buy "good enough" performance" at a lower price?
    - **Emphasize price**
  - ☐ on a niche basis
    - Are there any customers willing to buy a product designed to address their specific needs?
    - **Emphasize segment & product/service differentiation**

II: DIFFERENTIATE

00:20

Gather options about how to differentiate your product and/or your company. Think about factors of the industry standard, that should be eliminated/ reduced below the industry's standard or created/raised above the industry's standard.

1. PRODUCT DIFFERENTIATION
- What differentiates your product/service from existing others? What about value proposition (performance, unsolved problems/unmet needs, price, features, benefits) or targeted customer segment?

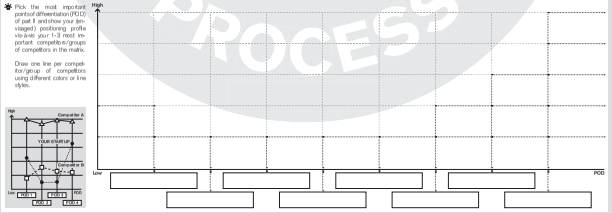
2. COMPANY DIFFERENTIATION
- What differentiates your company from existing companies? What about vision, value network, (relationship, channels, partners), architecture (technology, funding, team, activities) or finance (cost structure, revenue streams)?

III: POSITION

00:20

- Pick the most important pair of differentiation (POD) of part II and show your (envisaged) positioning profile vis-à-vis your 1–3 most important competitors/groups of competitors in the matrix.

Draw one line per competitor/group of competitors using different colors or line styles.



IV: ASSESS

00:10

- Are you able to tick all boxes below?
- Assess your overall positioning by comparing the lines of the positioning matrix in III. Is it
- ☐ Distinctive
- Assess whether the positioning you want to accomplish is leading to a value that is
- ☐ Superior to alternative value offerings
- ☐ Perceived by the customer
- ☐ Important to the customer
- ☐ Not easy to imitate

V: COMPANY STATEMENT

00:10

- (Re)define your company statement.

FOR (customer segment)

WHO HAS (customer problem)

AND WANTS TO (customer need/reason to buy)

OUR OFFERING (product name/brand)

ISA (product category/market category/technology)

THAT PROVIDES (key benefits)

UNLIKE (main competitor/industry standard)

(product/company name)

(key differentiator)

VI: POINTS OF ACTION

00:05

- Define next steps with regard to

YOUR STARTUP
- ☐ Validate the assessment of your positioning with customers and investors
- ☐ (Re)create your business model accordingly
- ☐ Create pitch deck slide about competition and get feedback
- ☐ Explain assumptions and hypothesis
- ☐ Other: _____

YOUR COMPETITORS
- ☐ Determine which competitors you want to monitor closely
- ☐ Agree on monitoring activities of trends, movements and actors in the competitive environment
- ☐ Define open questions
- ☐ Define next iteration cycle. Consider other sources and collection methods
- ☐ Other: _____

Figure 61: Competitor Analysis Framework Delta Version guideline

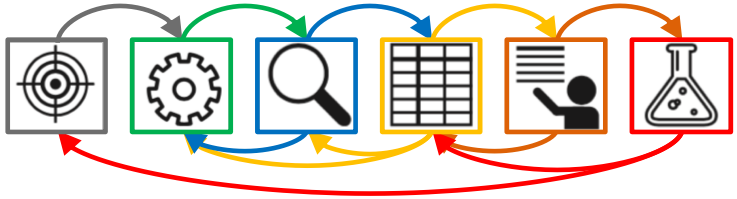
THE COMPETITOR ANALYSIS FRAMEWORK

USER GUIDE

THE PURPOSE. The Competitor Analysis Framework provides a structured process for the competitor identification and analysis for early-stage startups. It is a working tool aimed at supporting team communication, informed decision-making and a startup's identity-building process. The 5 main outcomes are:

1. **understanding** your competitive environment,
2. **positioning** your product and company in a competitive environment,
3. **a database** containing information about your competitors,
4. **a basis** on which you can **iterate** your business model,
5. **content input** for creating your competition pitch deck slide.

THE PROCESS. The process consists of six steps that build upon each other and are to be performed successively. However, you may find it useful to repeat the tasks of one or more previous steps before proceeding. This is open to your judgement. Feel free to adapt the process and content to your specific needs.



BEFORE STARTING. Familiarize yourself with the framework and read the individual steps and contents carefully.

TIME REQUIRED. The suggested total time to complete the framework once is about 4 hours, plus additional time to collect information.

LEGEND.

 Processing instructions

 Guiding questions

 Suggested time for task hh:mm

 Task needs to be performed as a team

 Split up to perform the task

 If you can: add a neutral but adept outsider to perform the task

1. STARTING THE ANALYSIS. Use the boxes to set the foundation for your analysis, based on your startup's company statement. A good analysis relies on truthful answers: Be open and honest and don't lie to yourself (or to colleagues) when performing the analysis!

2. SPECIFICATION OF ANALYSIS PARAMETERS. Set how much time and money the analysis should consume. Also specify who will perform the analysis, how you will store the information you gather throughout the process and which sources and methods you will apply. Think about limitations and constraints.

3. IDENTIFICATION OF COMPETITORS. Use the information sources and collection methods you identified and take a look at the guiding questions to identify current, potential and historical competitors and place them in the graphic. Which ones are more close/distant to you in terms of solving the same problem/ satisfying the same need/ providing similar benefits? The list doesn't need to be completed at once, you can add more competitors during the process.

4. INFORMATION COLLECTION. Collect background and business model information in your database to gain a comprehensive picture of your identified competitors. Add any competitors that emerge during the collection process. You can choose from the proposed properties, adapt them to your needs, and/ or add your own. It pays off to be particularly thorough in this step – it may be cumbersome but valuable!

5. PRESENTATION OF COLLECTED INFORMATION. The member, who collected the information presents it to the team. Use post-its or write directly in this section to capture the crucial information. You may use the the first line to compare the information directly to your own envisaged business model. Afterwards, briefly share your initial observations with your team.

6. ANALYSIS OF INFORMATION AND SYNTHESIS OF RESULTS. Go through the section and use the guiding questions to gain an understanding of your competitive environment, differentiate (if necessary) and position your product and/ or company and (re)phrase and extend the company statement from the first step to formulate your positioning. Then define the next steps.

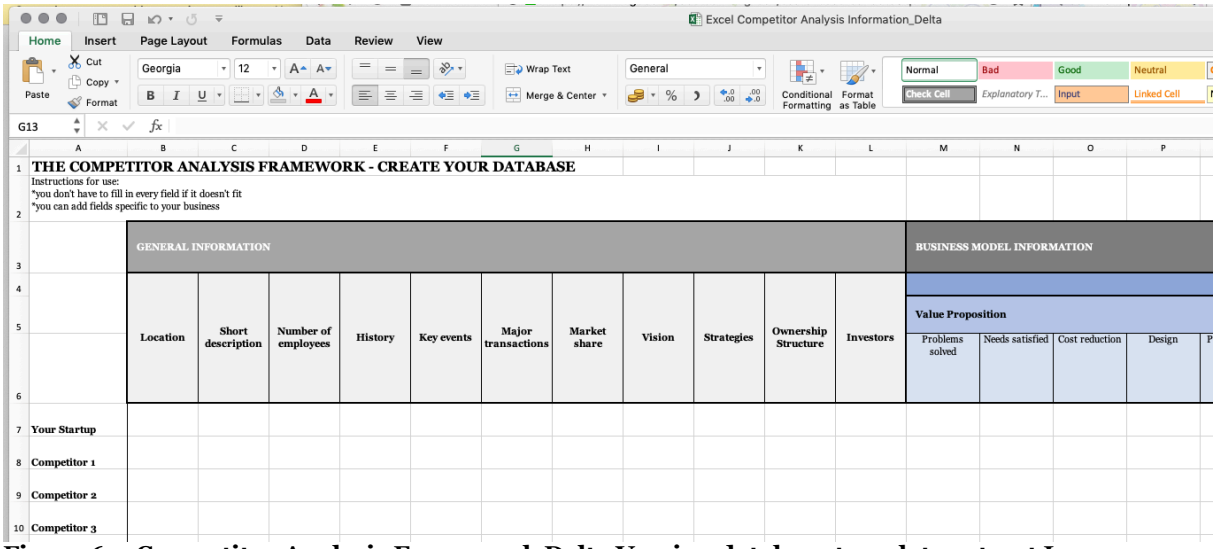


Figure 62: Competitor Analysis Framework Delta Version database template extract I

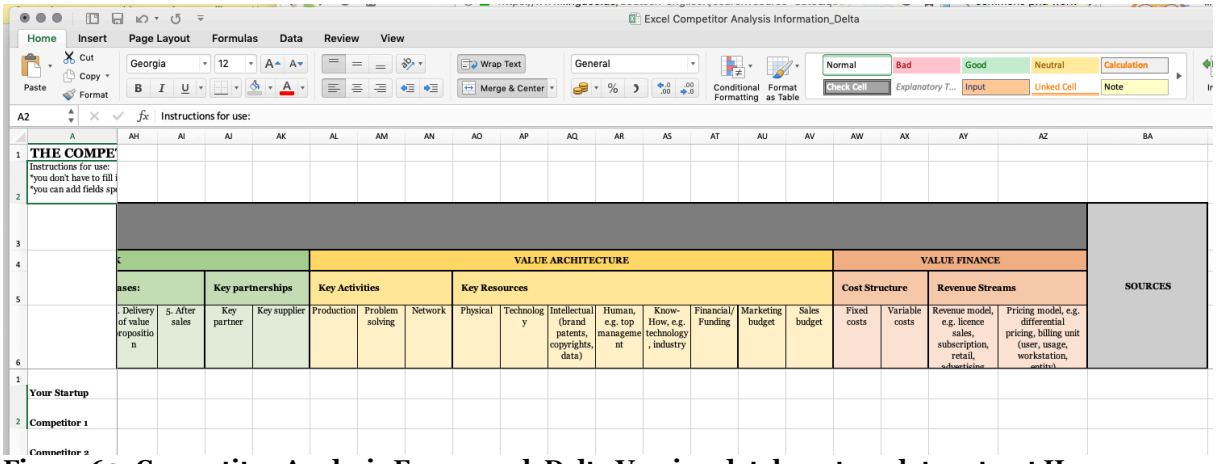


Figure 63: Competitor Analysis Framework Delta Version database template extract II

4.6.5.3 The environment of the artefact

Since a design science researcher "seeks to understand for whom and in what circumstances (contexts) an [...] initiative works through the study of contextual conditioning", it is necessary to study the "contextual conditioning" (Hevner & Chatterjee, 2010, p. 220). In this regard and in line with the findings of the evaluations, several usage conditions can be extracted, in which the CAF provides the most value: timing, prior CA experiences, attitude, team involvement, format, complementarity to other tools, and familiarization with the framework.

Timing. A recurring theme that occurred during the interviews is the notion of the utilization time for the framework. Several users expressed, that it would be preferable to use the CAF for conducting the first CA and not performing a CA and then trying to use the framework. This is indicated by users, that would have given a higher assessment, if "if you hadn't done all sorts of things before, because the main problem for me was really to get all the info in there." (SU19). SU17 for example states, that the framework enhances the effectiveness of the CA job, "if you never did one before, for sure". Performing the CAF after having started to collect

competitor information may lead to using the framework only as a display for the information instead of reflecting on them. The creation of the database also helps to avoid duplication of work, as stated by SU16. Thus, the timing for using the CAF is preferred for the time, "when you are looking for competitors for the first time" (SU9), in order to proceed analytically and structured from the very beginning.

Prior CA experience. One of the best evaluations in the last evaluation was given by a user that hasn't performed a CA before (SU20). As such, one can assume, that the guidance and structure provided by the CAF are especially helpful for inexperienced CA performers. Since the framework "covers all important essential points, which one must undertake for a strategic positioning" (SU12), it also helps to avoid omitting any relevant parts. However, it seems advantageous if the user is at least a little familiar with business model related terms in order to shorten the necessary familiarization time, as indicated by SU9 and SU10.

Prior framework experience. Users who are familiar with the use of other frameworks, find it easier to use, as SU20 states "I found it relatively easy to use. But I've already worked with several canvas, so I think the principle was clear to me."

Attitude. The last evaluation again shows that the prevailing attitude when using the CAF influences the perceived usefulness. Answers, such as "if your team is willing to" (SU17) as an answer to the statement of learning to use the frame is easy and "it [objectivity] always depends on the team, as well as how much I am willing [to admit] my own weaknesses" (SU12). SU20 comments a similar way "if you don't want to be objective, then you'll find ways around it. I wouldn't say that it's a weakness of the tool, it's just a human thing. If you don't want to see what you find out, then you just make it difficult for yourself." In combination with the prior evaluations, one can state that the usefulness is higher for teams, that maintain an open mind and are willing to question their assumptions. Also, a certain motivation to use the tool and recognition of its importance must be present in order to fulfil the tasks thoroughly.

Team involvement. In close connection to the aforementioned condition and in line with prior evaluations, the involvement of the team, instead of a single person performing the CA, ensures the reflection of the gathered information and minimizes effects of a single point of view. Instead of using the CAF as documentation, it is most helpful when it triggers discussions in the team. Four of the BPC teams reported without being directly asked, that the performance of the CAF initiated a discussion. Three of these four teams (SU12, SU13, Su18) are among those, which gave the best overall ratings. Moreover, at the workshop setting only one team had more than one team member present. It was observed, that the single persons struggled to use the framework. Since parts of the framework are designed to use it in a team setting, such as part five, where the information needs to be presented to other team members, this part becomes less useful, when performing the CAF alone.

Format. As already outlined in the findings of the last evaluation, the display of all the information on one sheet is perceived as valuable. In order to make this possible at least a DIN A0 paper form is necessary. A digital version might be suitable to allow for remote but collaborative working. The discussion within the team, however, shouldn't be compromised by the chosen format.

Complementarity to other tools. Since several other tools and methods exist to support the entrepreneurial process, such as the Value Proposition Canvas (Strategyzer, 2019), the Jobs-to-be-Done Framework (Ulwick & Boysen, 2018), the Business Model Canvas (Osterwalder & Pigneur, 2010) or Lean Canvas (Maurya, 2012). It might be useful to position the CAF in the landscape of startup tools, in order to clarify the relationship to these tools. As SU18 states "maybe you could go back [to your persona from the design thinking toolset], you have the customers here now, what are his requirements and from that you derive the product features." The CAF can be positioned after a first iteration of the persona and/or Jobs-to-be-Done Framework, which may help to fill out the starting point of the CAF, derive useful information sources, or substitutes. It is best applied after the first iteration of a Lean or Business Model Canvas, when the team has a first understanding of the business but is open for reiteration and new ideas and inspiration to position the company and product in the environment, which is not covered in these tools.

Familiarization with the framework/ usage of guideline. The familiarization with the framework by reading the guideline and understanding how the parts build on each other is necessary before starting the analysis. This became evident due to the expressed wish of a guideline in the first evaluation by six users. This factor was emphasized in the last evaluation during which it turned out that one of the founders didn't read the guideline and was complaining about specific ambiguities within the course of the interview, that were actually clarified in the guideline (SU3).

4.6.5.4 The effect of the artefact

The intended effect of the use of the artefact is that startups are enabled to perform more viable CAs. The CAF is designed to minimize biases and shortcomings of CA, improve accuracy and objectivity compared to a CA performed without the artefact. The evaluation shows, that the users indeed perceive an improvement of the CA work quality, the CA job effort and effectiveness, as well as productivity. Productivity was, however, rated the lowest, which might be associated with the perceived high time that it takes to use the artefact properly.

Besides the intended functions of the artefact and the intended effects, side effects have been reported throughout the evaluation processes, which can be classified as positive. The participants experienced inspiration and learning, where stimulated to discussions and,

thereby, building a common understanding within the startup's team. Thus, the artefact supports team communication and a startup's identity-building and learning processes.

4.7 COMMUNICATION

Effective communication of design science research to technology- as well as management-oriented audiences has been determined a guideline for conducting good design science research (Hevner & Chatterjee, 2010, p. 12; Hevner et al., 2004). Peffers et al. (2007, p. 56) specifies, that subject to communication activities should be "the problem and its importance, the artifact, its utility and novelty, the rigor of its design, and its effectiveness", not only to "practicing professionals", but also to researchers and other relevant audiences.

At each step of the DSR project, communication to either the practitioner, the research community or both has been conducted in addition to the evaluation-based communication. The feedback received supported the research process in each step. Besides the design workshops with a second researcher to discuss interim and evaluation results, other researchers and practitioners were informally consulted throughout the research process. Formal communication has been conducted with regard to the problem and its importance and the design process in the form of a conference contribution, namely: Hatzijordanou, N. and Bohn, N.: Towards a Competitor Analysis Framework for Early Stage Software Startups, G-Forum 2017, 21th Annual Interdisciplinary Conference on Entrepreneurship and Innovation, Wuppertal. A part of the archival knowledge base, that has been built to conduct the DSR project has also been communicated as conference contribution (Hatzijordanou, N. and Bohn, N.: Systematic Literature Review on Competitor Analysis - Is there anything relevant for startups?, G-Forum 2017, 21th Annual Interdisciplinary Conference on Entrepreneurship and Innovation, Wuppertal), as well as journal publication, namely Hatzijordanou, Nadja, Bohn, Nicolai, and Terzidis, Orestis (2019): A systematic literature review on competitor analysis. Status quo and start-up specifics. In Management Review Quarterly 57 (23), pp. 1–44.

Moreover, the demanded communication of "the artifact, its utility and novelty, the rigor of its design, and its effectiveness" by Peffers et al. (2007, p. 56) is fulfilled by publication of this thesis. In addition, an essayistic version of the DSR project will be a part of the edited volume "Perspektiven des Entrepreneurships", which aims to contribute to the transfer of theory and practice in entrepreneurship research and to highlight benefits for startup practice (Hatzijordanou, Nadja and Terzidis, Orestis (2019): Das Competitor Analysis Framework. Ein Design Science Ansatz zur Entwicklung einer methodischen Wettbewerbsanalyse bei Startups. In: Katharina Hölzle, Victor Tiberius, Heike Surrey (Eds.): Perspektiven des Entrepreneurships. Unternehmerische Konzepte zwischen Theorie und Praxis. 1. Auflage 2019. Stuttgart: Schäffer-Poeschel). Moreover, a current version is available under a Creative Commons

Attribution-NonCommercial-NoDerivatives license upon request or under the following link: https://publikationen.bibliothek.kit.edu/1000098363. The guideline and excel template are available upon request from the author.

5 DISCUSSION

In this chapter five the major research results and their implications for theory and practice are outlined. Furthermore, limitations of the research are discussed and avenues for future research proposed.

5.1 MAJOR RESEARCH RESULTS

Following the DSR paradigm, an artefact was created to improve the way in which early-stage startups conduct CA. The developed artefact consists of a hardcopy framework in DIN A0 (alternatively as editable pdf document), on which entrepreneurial teams are guided through a six-step process of conducting CA, namely setting a starting point for the analysis, specification of the settings for the analysis, identification of competitors, collection of information, presenting this information to the team, and analysis of and conclusions from this information. Each step provides processing instructions and tasks to be fulfilled, gives indications about how much time is to be spent on the task, and about who needs to be involved.

In particular, the artefact is designed to support the understanding of the competitive environment, the positioning a focal startup's product and company in the competitive environment by finding relevant points of differentiation, the creation of a database containing information about the focal startup's competitors, the establishment of a basis to iterate the business model by validating, confirming, or adapting of a focal firm's current business model components and the generation of business model options, and the generation of input for creating a pitch deck slide or business plan section about competition. The artefact further consists of a guideline, that supports the usage of the framework and an excel template, that supports the creation of a database.

The research process also led to interim results, that constitute major research results on their own. En route to the creation of the first version of the artefact and following the DSR process, a SLR and case studies were conducted in order to build an archival knowledge base and derive requirements for the artefact. The SLR not only affirmed, that CA in startups seems to be a relevant process, however, also revealed, that research in the field of CA in startups is scarce. Only 4 out of the 78 examined studies are specifically dedicated to startups. None of the identified CA methods were designed for startups in particular, none of the studies examining how CA is done in practice had startups as the object of investigation. Keeping in mind the differences of startups and incumbents as outlined in the theoretical background, e.g. the limited resources or potentially divergent CA goals, there is no indication as to what extent the identified methods and processes are applicable in a startup context. The SLR also served to

generate a comprehensive view of the status quo in the CA literature. A conceptual framework was derived, that provides a cohesive understanding of the CA concept, and the relationship between CA dimensions, that were elaborated through inductive content analysis. The derived five mutually exclusive but complementary and interacting CA dimensions are: the lens through which CA is studied, the purposes for conducting CA, the process of conducting CA, the validity of CA based on quality criteria or recognition and remedy of shortcomings, as well as the contextual factors influencing the purpose, process, or validity.

The eleven case studies, that were used to specify the problems to be overcome and to derive the requirements for the artefact, provide supplementary insights into the status quo of conducting CA in ESS in particular. The purposes for conducting CA in startups, the process followed, the CA effects, as well as contextual settings were examined. In comparison to the findings of the SLR similarities, as well as differences can be found. Especially with regard to the purposes, a different emphasis of purposes became evident. For startups, learning and inspiration were more pronounced than suggested in the literature review. The problems, that startups perceive were examined in-depth. Among others the unstructured procedure, or that they have only limited use of CA were identified as major problems. This part of the research confirms that, ESS do have their specific needs for conducting CA and that they experience several problems when confronted with the task of conducting a CA.

Since "the key differentiator between professional design and design research is the clear identification of a contribution to the archival knowledge base of foundations and methodologies and the communication of the contribution to the stakeholder communities" (Hevner & Chatterjee, 2010, p. 15), the theoretical as well as practical contributions will be outlined in the following.

5.2 THEORETICAL IMPLICATIONS

The DSR project contributes to theory in three major ways.

First, the designed artefact itself contributes in a major way to the existing knowledge base, as it enables to solve a heretofore unsolved problem (Hevner et al., 2004), namely the performance of a viable CA in early-stage startups. The knowledge contribution of this study according to the DSR contribution framework proposed by Gregor & Hevner (2013) can be classified as an exaptation for the following reasoning. The maturity of the application domain for which the artefact is intended can be classified as being low, as in the entrepreneurship field there is no best practice to conduct a CA and startups struggle to perform CA in a viable manner (see chapter 4.1). On the other hand, one can argue that the solution maturity, i.e. the maturity of artefacts that could be used as a starting point for finding solutions, is rather high as there exist many CA methods and processes in the strategic management and marketing

literature. However, these methods and processes need to be adapted, extended and/or created in a non-trivial or innovative way (Vaishnavi & Kuechler, 2004) according to startup needs, that have "new problems" within this research field. (Johannesson & Perjons (2014, p. 11) state that an exaptation does not only produce an artefact but also a use plan for it, including when and how the artefact should be used. This requirement is addressed by the comprehensive description of the final artefact as proposed by Johannesson & Perjons (2014, p. 13 f.) including not only the function of the artefact, its structure, and its effects, but also the environment of the artefact, i.e. the conditions in which the artefact will be used and provide the most value.

The artefact represents a new "procedure", thus, a "design instrumentality" (Vincenti, 1993, p. 219) or method as a "set of steps [...] to perform a task" (March & Smith, 1995, p. 257), namely to conduct a viable CA. In this regard, the developed artefact has the function to augment startups to perform their CA in a viable manner and can be classified as a tool (Iivari, 2007). This tool itself, thus, contributes "new knowledge to the body of scientific evidence" (Hevner & Chatterjee, 2010, p. 5) and closes "the gap between theory and practice" by "turning real-world problems into questions for entrepreneurship research via the design of entrepreneurial solutions" (Dimov, 2016, p. 27). The developed tool, thereby, contributes not only to strategic management and marketing literature as it provides a new tool for external analysis, but also to organizational learning theory as it addresses all related constructs and processes according to Huber (1991), such as knowledge acquisition, information distribution, information interpretation as well as organizational memory and clearly elaborates, how all of these constructs are relevant for the usefulness of the artefact. The developed CA artefact as an analysis instrument can be added to entrepreneurial management and marketing theory as a starting point for the strategy formulation process. Also, the findings support organizational learning theory, as the building and usage of the database were found to be of high significance for the users.

The major knowledge contribution by the artfact itself is also provided by the empirical knowledge gained about and around the artefact, i.e. its function, structure, effects, usage conditions. With regard to the function the CAF is categorized as a working tool that supports conducting a viable CA through a structured process of competitor identification and analysis for ESS. It provides clear guidance on the process of CA and the analysis of competitors. It supports to collect relevant knowledge by encouraging to use diverse information sources, and thus supports informed decision-making in general. In particular the following functions are elaborated: developing an understanding of the competitive environment, positioning a focal startup's product and company in the competitive environment by finding relevant points of differentiation, creating a database containing information about the focal startup's competitors, establishing a basis for iterating a business model by validating, confirming, or adapting

of a focal firm's current business model components and generating business model options, and producing input for creating a pitch deck slide or business plan section about competition. Also, a classification along the dimensions future-orientation, accuracy, resource-efficiency, usefulness and timeliness is made. The structure of the artefact is elaborated as a framework as hardcopy in DIN A0 to be used with pen and/or sticky notes, a one-pager user guideline in DIN A4 and an Excel template for creating a competitor database. The CAF is structured as a sequential six step step-by-step procedure with one or more tasks to be performed. The effects of the usage are measured, and one can find that startups are enabled to perform more viable CAs and that CA work quality, the CA job effort and effectiveness, as well as productivity are enhanced. Moreover, side effects of the usage are reported. With regard to the environment of the artefact new knowledge is created with regard to usage conditions in which the artefact provides the most value. These specifically concern the following themes: timing, prior CA experience, prior framework experience, attitude, team involvement, format, complementarity to other tools, familiarization with the framework/ usage of guideline. This empirical knowledge created around the artefact are a major knowledge contribution.

Second, the archival knowledge base enhances the understanding of the CA phenomenon in general and for startups in particular. The performed SLR delivers additional theoretical contributions. In contrast to other studies analyzing different aspects of CA in detail, the findings considerably extend the knowledge by examining the relevant field of CA in a comprehensive manner and with a special view on entrepreneurship and startups. The study results in the identification and clustering of CA purposes, methods and processes, as well as quality criteria. The various identified aspects of CA are combined into a unified framework and relationships between these aspects are elaborated, thus, enhancing the understanding of the phenomenon (Whetten, 1989). The derived conceptual framework synthesizes the facets of the CA theme in a novel manner and not only highlights and structures the major facets and subordinated elements related to the CA concept but also reveals their interrelationships. It also provides a foundation and guidance for researchers within this field. It may provide support for the scientific research community since it organizes the CA theme and enables to communicate, compare, classify, analyze, and evaluate their existing and future CA research. The findings also reveal that research within the field of CA and entrepreneurship is scarce, but worth further exploring. The findings extend the existing knowledge base in the domain of CA and may serve as a reference point for future research.

In a similar manner, the performed case studies extend the current knowledge base by providing a comprehensive overview of the status quo of CA in ESS. Thereby, startup-specific purposes are revealed, as well as the effects of CA, how CA is performed, as well as contextual factors influencing the usefulness. The perceived problems during the CA process are

explicated. Thus, this part of the research project further enhances the understanding of the CA phenomenon in startups.

Third, the application of DSR in an entrepreneurial context may be considered as a further addition to the knowledge base, since this is a scarcely researched field and "the creative development and use of evaluation methods [...] and new evaluation metrics provide design-science research contributions" (Hevner et al., 2004, p. 87). The overall DSR project, thus, contributes to developing new methods and contributes to "a richer, more collaborative research ecosystem in which researchers with different philosophical orientations can come together to define problems, enact solutions, and reflect on their consequences" (Dimov, 2016, p. 27). This DSR project therefore stands in line with the first studies that conduct research at the interface of design and science in the entrepreneurship literature (Romme & Reymen, 2018). It may serve as a "frontrunner" to mitigate the expected "substantial resistance in and around management schools" that is likely to be encountered with regard to developing and applying the DSR methodology in this field (Romme & Reymen, 2018, p. 7). The outlined approach with regard to changes of the artefact and their impact on the outcome of conducting a CA indicate a cause and effect relationships between the specification and design details and the results attained in the perception of the users. This creates new knowledge about how well-designed artefacts can support entrepreneurs to solve a relevant problem.

5.3 PRACTICAL IMPLICATIONS

Starting with practical implications of the SLR findings, the new conceptual framework of the CA theme provides a foundation and guidance for educators and practitioners, who aim to gain an overview of the topic and teach or utilize CA. It may also serve as a basis for entrepreneurship programs and education, where the curriculum can be enriched by suitable CA methods, their selection and application. Within the practice community the categories may serve as a reference point for sharing, discussing, comparing and evaluating best-practices. The derived quality criteria might be of help to practitioners for assessing and designing new CA tools in a rigorous way.

The main practical implication, however, relates to the artefact as the main output of the DSR project. Since it is an inherent goal of a DSR project to provide a solution to an "unsolved and important business problem" (Hevner et al., 2004, p. 84), the major practical implication results from the application of the artefact by ESS. The primary effect as shown in the artefact's evaluation is, that startups are enabled to perform more viable CAs, taking into account functional, structural, environmental and effect requirements. This implication alone may increase the chances of their survival while protecting the positive effects startups are supposed to have on the economy. The artefact is designed to minimize biases and

shortcomings, and enhance accuracy as well as objectivity compared to a CA performed without the artefact. The evaluation also shows, that the users indeed perceive an improvement of the CA work quality, the CA job effort and effectiveness, as well as productivity. Positive side effects, that have been reported, were an inspiration and learning experience, stimulations of discussions and, thereby, the building of a common understanding within the startup's team. Thus, the artefact also supports team communication and a startup's identity-building and learning processes. In Germany alone over 50% of the startups are under two years old (Kollmann et al., 2018), and might thus experience the positive effects of using the artefact.

However, beyond the self-application further applications are conceivable, where similar positive effects may occur. The spectrum of potential beneficiaries is considerable: from startup coaches and mentors, investment managers of seed funds, program manager and venture architects in accelerator, company builder, incubator and intrapreneurship programs, to corporate consultants. Again in Germany alone there are over 1.130 active offers to support startups, thereof 121 accelerators, 56 incubators, 141 business plan competitions and 309 technology and founding centers (Zinke et al., 2018). On top of this there are intrapreneurship programs of corporate innovation departments, that might find the artefact useful.

In the context of the "capability gap because of the discrepancy between [the entrepreneurs'] current knowledge and the information that is relevant to the current business environment" (McEwen, 2008, p. 1) the artefact may be used as a tool to close that gap and may further serve to enrich entrepreneurship education curricula. The artefact is, thus, a complementary building block with regard to entrepreneurship teaching and practice in the suggested "adaptive, "toolkit" approach to business planning" (Gruber, 2007, p. 782) and falls in line with recent tools, that can be used along the entrepreneurial process, such as the well-known Business Model Canvas (Osterwalder, 2004; Osterwalder & Pigneur, 2010).

5.4 LIMITATIONS

Each step in the DSR project is designed and performed differently and is therefore considered independently with regard to possible limitations.

To begin with, the conducted SLR has some limitations. The search was organized as a combination of an automatic and a manual search process of a specific set of journals. Relevant studies may therefore be missed due to the omission of potentially relevant journals or articles, and thus this study may lack specific CA methods, purposes, quality elements or reviews. With regard to the selection of journals, especially the focus only on journals ranked B and higher, one can argue that A+, A, and B rated journals might focus more on theoretical rather than practical issues, such as creating or extending CA methods. CA methods treated in C or lower ranked journals or journals, that were not ranked in the VHB JOURQUAL 3 at all, might have

been missed. However, the effects of the limitations due to the inclusion of only major international journals are countered through the forward and backward search and the supplementing review of textbooks and practitioner books. One cannot be sure that all important publications are included in the search because their title or abstract lacked the applied keywords or they were not cited in any of the identified papers. Additionally, it cannot be excluded that the list of keywords is incomplete. Thus, the results of this study may not be exhaustive.

For the selection of candidate studies within the search procedures, two researchers decided which studies to include or exclude. After several jointly conducted data extractions to ensure basic consensus among the researchers, the suggestion by Brereton et al., 2007 is followed in the way that one researcher acted as data extractor and the other as data checker. Discussions among the researchers helped in clearing up ambiguities and inconsistencies in terms of mutual understanding of the process, quality and inclusion criteria, as well as data extraction. Erroneous data collection and analysis cannot be ruled out. With respect to the omission of relevant studies, given the subsumption of CA within the broad topic of strategic management, it is more likely to have erred on the side of caution by including studies that were not specifically dedicated to CA. It is acknowledged that the validity of the SLR is based on the discussion and agreement among the researchers involved and that inaccurate categorization is possible.

It was also acknowledged, that not all of the knowledge about CA might be represented in journals. With this understanding an additional literature review going beyond scientific studies and including textbooks and non-scientific sources that deal with CA was conducted to further enrich the necessary archival knowledge base, especially with regard to existing methods.

With regard to the performed case studies according to Yin (2014, p. 45 ff.)[10] construct validity, internal validity, external validity, and reliability need to be addressed.

Construct validity: One must identify correct measures for the concepts. Construct validity will be addressed through data triangulation, in terms of including different evidence, such as interviews and pitch deck slides. The evidence is stored systematically, and a chain of evidence is established. In several cases, it was also possible to interview more than one team member. Also, whenever possible existing measures from the literature where used or adapted to the specific requirements of this study. This was specifically applied with regard to the evaluation of the artefact.

Internal validity: A causal relationships must be established. This concept is not relevant for exploratory studies and will thus not be further discussed for these. However, for the

[10] For a critical note of applying validity concepts to qualitative research see (Norris, 1997).

formative and summative evaluation of the artefact the internal validity will be reflected. The internal validity concept is also referred to as "truth value" (Lincoln & Guba, 1985, p. 290) and relates to the quality criteria in qualitative research "credibility" (Döring & Bortz, 2016, p. 109). Schou et al. (2012, p. 2090) propose the following checklist for the compliance with this criterion: "The purpose is described clearly. The method is described. Arguments for choice of method have been made. The method suits the purpose. There is a description of how data were registered. Triangulation has been applied. The research process is described." All of these suggestions are fulfilled. In particular with regard to triangulation different triangulations have been included in the research process. the perspective triangulation included the performer of CAs, the assessors of the outcome of CA, and the potential user of the artefact (as coach or as founder). That also represents the perspectives of opportunity creation and evaluation. Also, triangulation is applied in research design, data collection and data analysis methods, including quantitative and qualitative elements. The consultation of a second researcher at all sense-giving and interpretative phases of the research process also ensures the internal validity and can be referred to as triangulation of researchers.

External validity: The findings of a study need to be generalized in a certain field. This is achieved by including multiple startup cases, as well as a mixture of startups from a B2B and B2C background to account for differences in the focus of the products. However, the special interest of this study is to explore the early-stage of the startup cycle. Therefore, all of the cases (startups) were comparable with regard to their life-cycle stage.

The proposed checklist of Schou et al. (2012, p. 2090) with regard to transferability of findings as follows was ensured: "Selection of informants or sources is described. There is a description of the informants. It is argued why these informants are selected. The context (place and connection of research) is described. The relationship between the researcher(s) and the context (in which the research takes place) and the informants is described."

Reliability: It must be ensured that the procedures of the study are repeatable and lead to similar results. In order to achieve a high level of reliability, processes are documented transparently via an interview protocol, a semi-structured interview guideline prepared, a case study database created, and the data collected archived. Furthermore, the participant bias and researcher bias are addressed. The research background is explained initially. All questions of the participant can be asked at the beginning of the interview and then understanding problems can be resolved. All interviews are done in a team-only constellation in a private location. Furthermore, confidentiality as well as anonymity are assured to the participants. There are no identifying names on the interview transcripts; as they are coded, and the key kept locked away. Researcher error will be decreased by performing the first interviews with two researchers and reviewing the available information (submission documents for the business plan

competition and the preliminary CA) before the next interviews are performed. Moreover, data triangulation will be performed, including different sources of information and different analysis methods. With regard to the analysis process, cross-validation with at least one academic colleague is performed in which the data structures, as well as the final models and design adaptions derived from the evaluation were iteratively refined. However, with regard to responses in the interview process response biases cannot be fully ruled out as may general disadvantages from interviews persist (Schnell et al., 2013, p. 346 ff.). Especially the social-desirability-response-set may have influenced the responses having in mind that the interviewees participated in a business plan competition and might have felt the need to give positive answers. In order to remedy such tendencies, the interviewees were informed that their responses would not be evaluated in connection with the BPC and are independent of their further participation in the competition. Furthermore, it was not disclosed who the author of the framework was to avoid pleasing answers.

In the problem identification phase, one could argue that the identified problems might be attributed to the fact, that the participants were simply unaware of existing methods, and that the non-utilization could be easily solved by teaching existing methods. However, considering the team composition of the included case studies, it became evident that some teams included team members that have a business background. Moreover, one of the questioned team members in an evaluation cycle even obtained a master's degree in strategic management and gave one of the best evaluations for the framework (SU12). On that note and given the fact that at least Porter's Five Forces is a standard part in entrepreneurship textbooks and thus accessible to every informed founder, one can argue, that the non-utilization of existing methods is a conscious decision.

Overall, it can also be argued that the total number of questioned persons and included cases is still low. However, since the time for a DSR project performed in the context of a doctoral thesis is limited, and CA in startups was scarcely researched at the beginning of the project, it was necessary to conduct qualitative research. It was attempted to ensure a high quality of the research by triangulation of researchers, perspectives, research design, data collection and data analysis methods. Moreover, the evaluation of the artefact ended with an evaluation where theoretical saturation was reached (Glaser & Strauss, 1967). Meaning that, no new information is expected to be obtained from further data and that further cases were not expected to promise any new information content for theory formation, besides individual adaptations and special requests. However, it might still make sense to evaluate the artefact in a large context, e.g. in a quantitative study.

One can also argue, that in the requirement phase more stakeholders should have been involved to gain a more comprehensive picture of the requirements. These could have been,

investors, coaches, incubator or accelerator coaches or educators. However, this limitation is countered by the second evaluation, where investors, academics and coaches have been included, which indeed led to major revisions.

Limitations of the artefact also became evident. The visualization of the knowledge gained through using the CAF remains a challenge for the teams. Also, the application of the artefact is no guarantee for success. Much relies on the effort put into the usage, the attitude towards the necessity of conducting CA, and the openness to new insights therefrom, that potentially threaten the current self-conception.

5.5 FUTURE RESEARCH

This project develops an artefact to support ESS to conduct a viable CA and constitutes the foundation for further research in this field offering a multitude of research opportunities.

First, one can consider extended evaluation procedures. For example, it can be tested, how much value is generated through the hardcopy framework in comparison to a simple task list. It might also be possible to evaluate the usefulness of the artefact by comparing CA results. However, one needs to keep in mind the mentioned visualization problem, meaning that even though startups have the knowledge of their competitors a pitch deck slide or business plan part might still be poorly prepared. A/B tests with reference groups could yield valuable results. Similarly, other evaluation research designs such as action research, meaning that the researcher actively participates in using the framework or observes without interference the usage, may provide additional insights. Moreover, a quantitative study could further help to either evaluate the artefact, specify the context in which it is useful, or further establish the classification with regard to the applied summative evaluation.

Second, extensions of the artefact might be considered. Such supplementary tools and aids, that have been partly identified during the evaluations through expressed users' requests, could be: (1) References to more detailed information sources and which information can be obtained where; (2) Other options for the display of the positioning. Since the problem of converting the analysis into a presentation slide is not solved, a guide to visualizing the knowledge and aspired positioning might be a fruitful extension of the artefact. (3) Other format options, for example single sheets for each step to support workshop processes, facilitate potential corrections, or having more space available to work with sticky notes; (4) A glossary to make the usage easier for users without general business education; (5) A fully completed example of the artefact to support the understanding and usage of the artefact; (6) Interview questionnaires for the information collection phase; (7) Special versions for different industries or types of startups, e.g. non-IT-associated startups; (8) Special versions for different life-cycle stages; or

(9) Transition to specific strategic decision such as market entry strategies (McDougall & Robinson, 1990).

Third, the application of the DSR process to other areas. The DSR field in the entrepreneurial context, including the understanding of the problems and specific requirements of startup teams is not limited to CA. Other management tools, processes or artefacts are also worth exploring with regard to their suitability and improvement potential for startup purposes. An example might be the financial planning and budgeting for startups, as running out of cash is also one of the most common reasons for startup failure (CB Insights, 2016).

6 CONCLUSION

Starting from the problem centered initiation to enter a DSR project, this thesis strives to answer the question: *How can early-stage startups perform a viable CA?* To rigorously develop a relevant artefact, "an object made by humans with the intention to be used for addressing a practical problem" (Johannesson & Perjons, 2014, p. 7), the study starts with specifying the problem further and developing an "archival knowledge base" to draw "from a vast knowledge base of scientific theories [...] that provides the foundations for rigorous design science research" (Hevner & Chatterjee, 2010, p. 15, 17). An SLR, a supplementary review of textbooks, as well as performed case studies served this purpose. Building on that, functional, structural, environmental as well as effect requirements for the artefact were formulated and the viability concept clarified.

In three iterations four versions of the artefact have been developed, through design and evaluation cycles. The developed artefact, named the Competitor Analysis Framework, is a working tool that supports conducting a viable CA through a structured process of competitor identification and analysis for ESS. It provides clear guidance on the process of CA and the analysis of competitors. It supports to collect relevant knowledge by encouraging to use diverse information sources, and thus supports informed decision-making in general.

In particular, the CAF can be used for: (1) developing an understanding of the competitive environment, (2) positioning a focal startup's product and company in the competitive environment by finding relevant points of differentiation, (3) creating a database containing information about the focal startup's competitors, (4) establishing a basis to iterate its business model by validating, confirming, or adapting of a focal firm's current business model components and the generation of business model options, and (5) producing input for creating a pitch deck slide or business plan section about competition.

A classification of the artefact has been made along the dimensions future-orientation (neutral), accuracy (high), resource-efficiency (high), usefulness (high), objectivity (high), and timeliness (medium to a great deal of time).

The artefact consists of a framework as hardcopy in DIN A0 (alternatively as editable pdf document), a one-pager user guideline in DIN A4 and an Excel template for creating a competitor database. The CAF provides a step-by-step procedure through six distinct steps, that are sequential and build on each other.

Several usage conditions were extracted, in which the CAF provides the most value: Time of use should be before the first CA is carried out; previous CA experience helps to understand the process, but the CAF provides the greatest added value for inexperienced CA

performers; experience with other frameworks helps to understand the CAF more quickly; the benefits for teams that have an open mind and are willing to challenge their assumptions and have a certain motivation to use the CAF are higher; the framework has been perceived as particularly valuable when team discussions arose, so team participation is beneficial; having all information on one sheet is perceived as helpful; complementarity with other tools should be clear; and familiarization with the framework, or the use of the provided user guideline is mandatory.

The artefact improved the CA work quality, the CA job effort and effectiveness, as well as productivity. The users also experienced inspiration and learning, where stimulated to discussions and, thereby, building a common understanding within the startup's team. Thus, the artefact supported team communication and a startup's identity-building and learning processes.

The DSR project contributes to theory in three major ways. First, the designed artefact itself, as well as the knowledge about its usage, contributes in a major way to the existing knowledge base, as it enables to solve a heretofore unsolved problem (Hevner et al., 2004), namely the performance of a viable CA in early-stage startups. Second, the archival knowledge base enhances the understanding of the CA phenomenon in general and for startups in particular by providing a comprehensive overview of the status quo of the CA literature and how CA is performed in ESS. Third, the application of DSR in an entrepreneurial context as research at the interface of design and science in the entrepreneurship literature may serve as a "frontrunner" to mitigate the expected "substantial resistance in and around management schools" that is likely to be encountered with regard to developing and applying the DSR methodology in this field (Romme & Reymen, 2018, p. 7).

In addition to the theoretical implications, further no less important practical implications are outlined. The main practical implication is associated with the artefact as main output of the DSR project as it provides a solution to an "unsolved and important business problem" (Hevner et al., 2004, p. 84). The primary effect as shown in the artefact's evaluation is, that startups are enabled to perform more viable CAs, which at the end may increase their chances of survival. Beyond the self-application in entrepreneurial teams further applications are conceivable in the working environment of startup coaches and mentors, investment managers of seed funds, program manager and venture architects in accelerator, company builder, incubator and intrapreneurship programs, to corporate consultants and intrapreneurship programs of corporate innovation departments.

On top of that, the artefact may also be able to enrich current entrepreneurship education curricula. The artefact, thus, constitutes a complementary building block with regard to entrepreneurship teaching and practice in the suggested "adaptive, "toolkit" approach to

business planning" (Gruber, 2007, p. 782) and falls in line with recent tools, that can be used along the entrepreneurial process, such as the well-known Business Model Canvas (Osterwalder, 2004; Osterwalder & Pigneur, 2010).

In addition to that, potentially fruitful avenues for future research are proposed. Not only in the field of additional evaluation and conceivably useful extensions of the developed artefact in this study more research might be conducted. Especially in the field of further establishing the DSR method in entrepreneurship and management research to close "the gap between theory and practice" by "turning real-world problems into questions for entrepreneurship research via the design of entrepreneurial solutions" (Dimov, 2016, p. 27) appears highly promising.

APPENDIX

APPENDIX A: Example of consent form used for the evaluation cycles

DATA PROTECTION AGREEMENT

Participation in research project is voluntary. It pursues the following object:
Development of a framework for competitor analysis in software startups.
For this purpose, we aim to understand how software startups currently conduct their competitor analysis. The findings (among other inputs) will be used to develop this framework.

For the implementation and scientific analysis of the interviews are responsible:
Interviewer: Nadja Hatzijordanou und Nicolai Bohn (Hasso-Plattner-Institute).
The responsible parties shall ensure that all data collected will be treated strictly confidential and will only be used for purpose agreed upon.

The interviewee agrees to the audio recording and scientific analysis of the interview. Further, he/she agrees, that documents that were submitted during the HPI business plan competition may be used for scientific purposes as part of this work. The interviewee has been informed that the participation or non-participation in this research project has no influence on the success of the mentioned business plan competition.

For maintaining data protection, the following provision shall apply:
1. Audio recording
    a. The audio recording will be kept locked away and deleted after the completion of the work, at the latest after two years.
    b. The interviewer, project supervisors and assistants for the analysis will have access to the audio record.
2. Analysis and storage
    a. For analysis purposes a written copy of the audio record will be taken. Names and locations mentioned will be made unrecognizable.
    b. In publications, it must be ensured that an identification of the interviewee is not possible.
    c. The anonymized protocol will be electronically stored as scientific document respecting the data protection requirements.
    d. The interviewee has at any time the option of aborting the interview, rejecting more interviews or withdrawing the consent to audio recording or a written protocol without reprisal.
3. Results of the research project
    a. When the research project is completed, the interviewee will be informed about the results.
    b. The interviewer holds the copyright of the interviews.

With the signature the interviewee confirms, that he/she was informed about his rights and the research project. Further he/ she declares himself/herself willing to participate in the research project. The Interviewee may revoke this agreement in whole or in part within 14 days.

Potsdam, (date)
Interviewee(s): ..... Interviewer: .....

APPENDIX B: Eidesstattliche Versicherung

Eidesstattliche Versicherung
gemäß § 6 Abs. 1 Ziff. 4 der Promotionsordnung des Karlsruher Instituts für Technologie für die Fakultät für Wirtschaftswissenschaften.

1. Bei der eingereichten Dissertation zu dem Thema *Towards Conducting Viable Competitor Analysis in Early-Stage Startups: A Design Science Approach* handelt es sich um meine eigenständig erbrachte Leistung.
2. Ich habe nur die angegebenen Quellen und Hilfsmittel benutzt und mich keiner unzulässigen Hilfe Dritter bedient. Insbesondere habe ich wörtlich oder sinngemäß aus anderen Werken übernommene Inhalte als solche kenntlich gemacht.
3. Die Arbeit oder Teile davon habe ich *bislang nicht* an einer Hochschule des In- oder Auslands als Bestandteil einer Prüfungs- oder Qualifikationsleistung vorgelegt.
4. Die Richtigkeit der vorstehenden Erklärungen bestätige ich.
5. Die Bedeutung der eidesstattlichen Versicherung und die strafrechtlichen Folgen einer unrichtigen oder unvollständigen eidesstattlichen Versicherung sind mir bekannt.

Ich versichere an Eides statt, dass ich nach bestem Wissen die reine Wahrheit erklärt und nichts verschwiegen habe.

Nadja Hatzijordanou

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