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Understanding the heterogeneity of corporate entrepreneurship programs

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4 A systematic approach to analyze CE programs

The aim of this chapter is (1) to derive *design elements* that are suited to define and distinguish CE programs and (2) to develop a *systematic approach* for analysis of our data set. This aim forms the basis for answering RQ1 - *What are the different types of CE programs?* The investigation of organizational designs has been a topic of interest since the early days of CE research and is still a relevant topic today (e.g., Gutmann, 2018; Burgelman, 1984).

In Section 4.1, the CE programs discussed in the literature will be re-arranged in an overview of the current knowledge. Section 4.2 will focus on deriving design elements from (a) the existing literature and (b) our data set. These two sets of design elements will be harmonized in Section 4.3. In Section 4.4, the systematic approach that was developed to analyze CE programs will be presented.

4.1 CE programs and unclarities regarding their definitions

One aim of our research is to understand the heterogeneity of the organizational designs of CE programs. It can be observed that in the past years, the heterogeneity of organizational designs is increasing due to the emergence of novel types of CE programs (see, e.g., Kurpjuweit & Wagner, 2020; Shankar & Shepherd, 2019; Peter, 2018; Selig et al., 2018). To ensure a good theoretical embedding of our results and to build on the existing knowledge about the various CE programs, this section will provide a brief overview of the previous research conducted on CE programs.

In Subsection 4.1.1, we will describe the CE program types that have already experienced a larger number of empirical studies. In Subsection 4.1.2, the more novel CE program types and the accompanying ambiguities will be discussed. Subsection 4.1.3 will briefly summarize the different CE program types.

4.1.1 Established types of CE programs

Below, we briefly describe the four CE program types that have received considerable attention in previous studies and are thus considered well-established organizational designs in research. Since only well-established CE programs are described, this list does not aim for any completeness. The four CE program types are (1) internal corporate incubator, (2) external corporate incubator, (3) external corporate accelerator, and (4) corporate venture capital.

(1) *Internal corporate incubators***,** sometimes also termed intrapreneurship programs (see Chettipally, 2020; Rule & Irwin, 1988), are focusing on the support of innovation ideas from intrapreneurial employees (Becker & Gassmann, 2006a). An internal corporate incubator is structured as an organizational entity that provides an environment that is supportive for the creation of rather discontinuous innovation or non-core business innovation (see Weiblen & Chesbrough, 2015; Ford et al., 2010). The programs mostly support cohorts of intrapreneurial teams by providing them access to resources and support services for a limited period of time. The start and end points are often clearly defined according to a batch logic. At the end of each batch, a jury (often made up of senior management representatives) evaluates the ideas and decides whether the project is to be terminated or continued. In case of continuation, the ideas are either (a) re-integrated into the core organization, e.g., by creating a new department, or (b) by being spun-off into a new organization (Ford et al., 2010).

(2) *External corporate incubators* are programs similar to their internal counterparts, but with a major difference, viz. that the focus is set on working with external startups instead of intrapreneurial teams (see Eckblad & Golovko, 2016; Becker & Gassmann, 2006b). External corporate incubators support their startups with different resources and services, ranging from office spaces, mentoring & coaching, and access to a corporates' resources like expertise, know-how, and network (Becker & Gassmann, 2006b). In addition to that, they mostly act as a seed investor (investing startups with an early stage) and thereby provide funding for the program participants (Kupp et al., 2017)[12]. The focus on rather early-stage startups comes in hand with a comparably long program duration of typically more than one year to support the startups until market readiness (Cohen, 2013). Companies run external corporate incubators for several reasons, such as (a) insights into trends and new technologies, (b) accessing innovative solutions from startups, and (c) leveraging existing technologies into a new field of application through the participating startups (Eckblad & Golovko, 2016).

(3) *External corporate accelerators* are focusing on collaboration with external startups. Similar to external corporate incubators, they do also support startups with resources and services such as the companies' expertise, network access, office spaces, coaching, and

[12] In this publication Deutsche Telekoms Corporate incubator hub:raum is described as an accelerator. However, according to the understanding about CE programs in this work and the self-conception of hub:raum's website, it is more likely an external corporate incubator than an external corporate accelerator.

mentoring (Kohler, 2016). Hence, it is not surprising that they are sometimes described as a new generation of corporate incubators (Pauwels et al., 2016). However, there are four key distinctions compared to external corporate incubators. *First*, the shorter duration of the accelerator program, which typically ranges from three to a maximum of six months (Moschner et al., 2019). *Second*, the program organization typically follows a batch logic, meaning the program phase has fixed starting and ending dates and is run multiple times per year (see Kohler, 2016; Weiblen & Chesbrough, 2015). *Third*, the maturity of participating startups, which are more mature as the aim is to accelerate their growth of already existing products (Selig et al., 2018). *Fourth*, the funding that is provided by external corporate accelerators does not necessarily cover an equity investment into the startups. Studies have identified different modes of external corporate accelerators and different types of value creation, e.g., testing innovative solutions (Kohler, 2016), positive impact on the brand (Moschner et al., 2019), or talent acquisition (Kanbach & Stubner, 2016).

(4) *Corporate venture capital* units are initiated to invest a minority stake in promising startups to create strategic or financial value for the core organization. Corporate venture capital is one of the most renowned CE programs and has been the subject of investigations for several decades (see, e.g., Dushnitsky & Lenox, 2006; Sykes, 1990; Winters & Murfin, 1988). Besides the difference in their focus (strategic vs. financial), corporate venture capital units can also vary regarding their organization and structure. While some companies invest directly into startups, others may pursue indirect investment through an external venture capital fund (see Maula, 2007; Miles & Covin, 2002). Furthermore, the objectives of why companies pursue corporate venture capital activities show a broad variety. The objectives can range from gaining access to new technologies (see Benson & Ziedonis, 2009; Markham et al., 2005), via learning about trends and developments (Markham et al., 2005), and exploring options to enter new markets (Chesbrough, 2000) towards changing the company's culture (Sykes, 1990).

Established types of CE programs and their successors

The four CE programs described above have experienced a broad base of empirical investigations over the past five years. It is important to have a clear understanding of them since (a) they are the most commonly used concepts in research on CE and (b) many novel types of CE programs show a relationship to these four CE program types (see Shankar & Shepherd, 2019; Pauwels et al., 2016). The novel types of CE programs will be discussed in the next subsection.

4.1.2 Novel types of CE programs

With the increasing interest in CE, it can be observed that novel CE programs are emerging in practice. Four examples are (a) startups supplier programs (Peter et al., 2018), (b) corporate company builders, (c) internal corporate accelerators, and (d) venture client models (see, e.g., Kurpjuweit & Wagner, 2020; Peter, 2018; Selig et al., 2018; Gimmy et al., 2017).

Still, these rather novel CE program types either (a) lack a broader base of empirical research or (b) do not yet have a clear definition because the same CE program type is discussed under different names, or the same name is used to describe different CE program types. Due to these two reasons, ambiguity regarding the organizational designs of CE programs exist.

Discussion and ambiguity

For CE programs that are focusing on engagement with startups, this ambiguity can be observed. Here we note that at least three *different* names are currently used to describe the same organizational design. The two terms, *startup supplier program* and *venture client*, are both used for describing a CE program that focuses on scouting innovative startup solutions that can solve current business problems (see Kurpjuweit & Wagner, 2020; Gimmy et al., 2017). Aside from using different terms for the same organizational design, the researchers seem to agree that this is a novel type of CE program that is distinct from existing ones. Other scholars, however, follow the understanding that this is a manifestation of the external corporate accelerator, but not a novel CE program type (see Shankar & Shepherd, 2019). This example on startup engagement highlights the *ambiguities* that currently exist regarding the organizational design of CE programs and underlines the *need for a systematic approach* to analyze and compare CE program types. We will present such an approach in Section 4.4.

4.1.3 Structure and overview

Figure 4.1 covers the four CE program types from Subsection 4.1.1 (numbered 1 - 4) and three examples for novel CE programs (dotted lines) that were discussed in Subsection 4.1.2. In the figure, the CE programs are subdivided according to their locus of opportunity (internal vs. external), which describes to what extent they are either focusing on (a) supporting internal innovation ideas[13] of their employees or (b) sourcing external innovation ideas from startups.

The fact that a broader base of empirical research does not yet exist for nearly half of the CE programs (included in the figure) highlights the need for more research on the organizational designs of CE programs. In addition, many of the well-established CE programs and their understanding have grown historically, and in some cases, are already outdated (see Pauwels et al., 2016; Becker & Gassmann, 2006b).

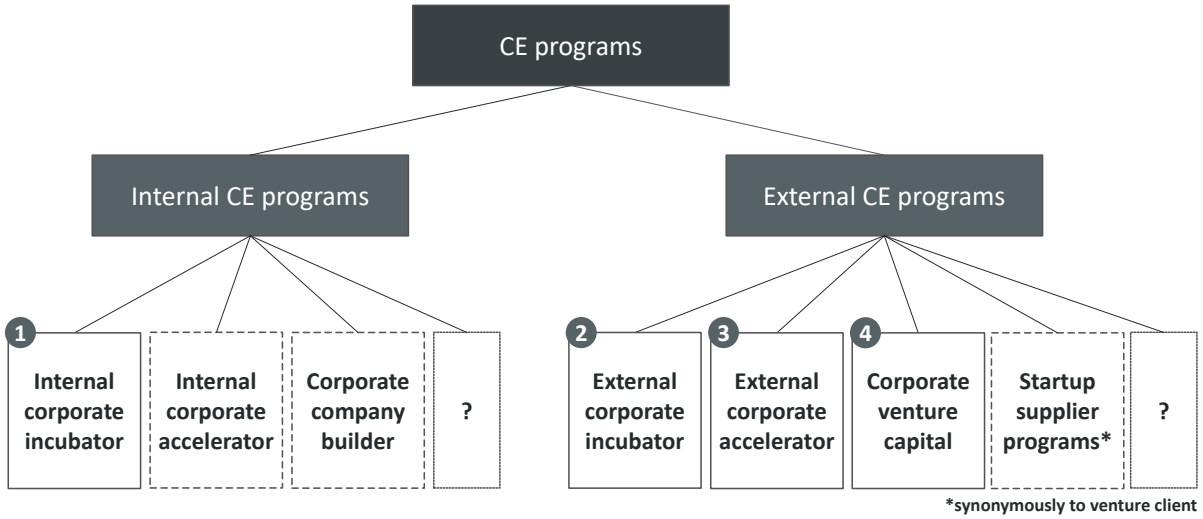

Figure 4.1: Different types of CE programs described in the literature

Understanding the variety of CE program types that are currently discussed in the literature is also important for deriving the design elements that are suited to define and distinguish the different types of CE programs. All CE program types from Figure 4.1 will be considered when reviewing the literature for design elements, which will be done in Section 4.2.

[13] Innovation idea is used as an umbrella term for ideas, concept as well as corporate ventures and independent ventures, which are involved in the work of the CE program.

4.2 Design elements of CE programs

In this section, the focus is set on deriving the design elements that are suited to define and distinguish the different types of CE programs. In the course of this work, a design element is understood as follows.

> **Definition 4.1** *Design elements* are defined as the various elements that are describing the strategy and the structure of an organization that are suitable for characterizing its organizational design.

As outlined in Section 4.1, regarding the investigation of organizational designs of CE programs we can see on the one hand a broad base of empirical investigations for some well-established CE program types and, on the other hand, a lack of investigations and ambiguities for rather novel types of CE programs. Based on this classification, we have decided to apply a hybrid approach to derive the design elements from (a) the existing literature on CE programs (13 studies – see Appendix 4) and from (b) the cases covered in our data set (54 cases – see Subsection 3.2.2) that includes both established and novel CE program types.

Figure 4.2 below illustrates our methodology to identify design elements, in which we combine design elements from (A) the literature and (B) our data to derive the ones that answer RQ1. Subsection 4.2.1 describes Steps 1 & 2, which focus on deriving the design elements from literature, based on 13 studies. Next, subsection 4.2.2 describes Step 3, which focuses on deriving the design elements based on our data (54 cases). Although the steps are described sequentially, it is important to note that an iterative approach was used to derive the design elements in Step 2 and Step 3, as this is crucial for aligning them. In Section 4.3, Step 4 will be described, which focuses on combining them to create the final set of design elements that are suited to define and distinguish CE programs. After the harmonization of the design elements, we will present an approach to systematically analyze the organizational designs of CE programs in Section 4.5.

Each of the four steps that are described in Figure 4.2 results in a set of design elements (see Set I to Set IV in Figure 4.2). For a detailed description of the sets, a separate Table is provided that describes the respective design elements within the set (see Table 4.1 to Table 4.4).

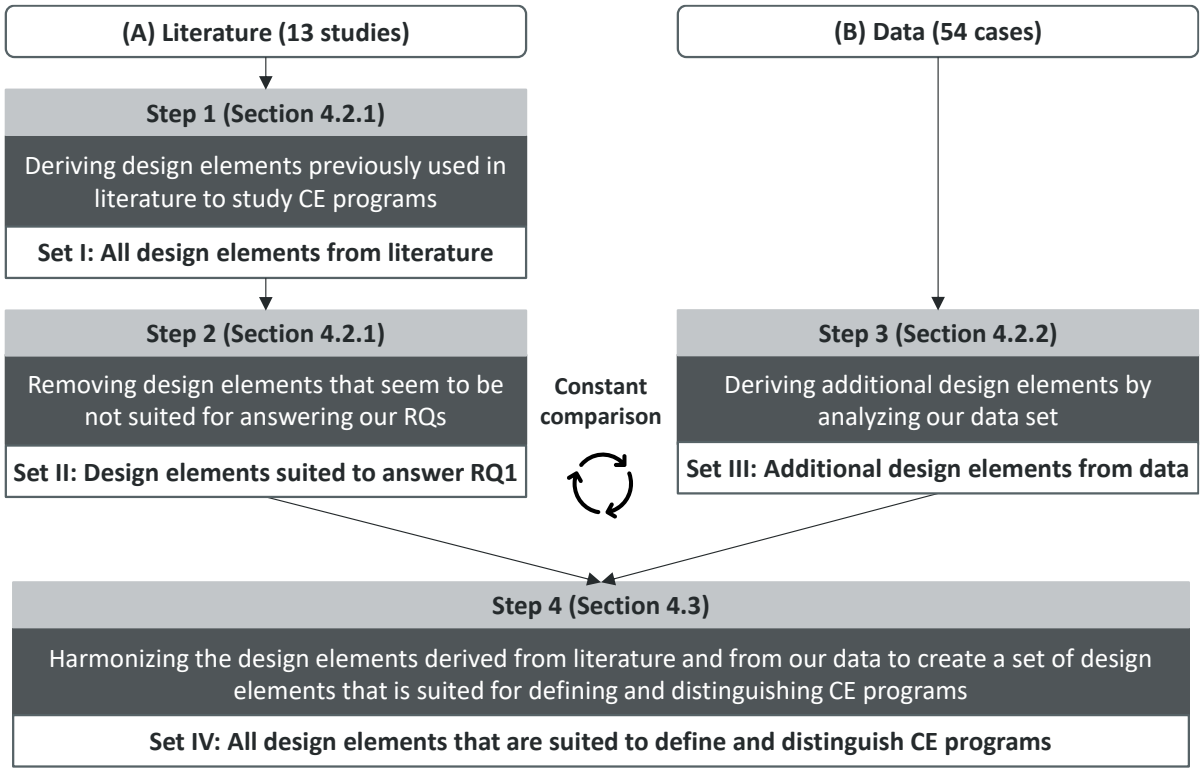

Figure 4.2: Four steps for deriving design elements as a basis to answer RQ1

4.2.1 Design elements derived from literature

For analyzing the literature on the organizational design of CE programs, we did focus on all studies that investigated the CE programs by using design elements. Generally, two types of studies can be identified: (a) studies that are using typically two design elements to create a rather broad categorization of organizational designs of CE (Hill & Birkinshaw, 2008) and (b) studies that are using multiple design elements (more than two) to provide a more detailed description or comparison of them (Weiblen & Chesbrough, 2015). Since RQ1 focuses on defining and distinguishing the different CE program types, we excluded studies that have a scope on broad categorizations of CE programs as it can be expected that the design elements used are not suited for defining the different CE program types.

Reviewing the literature led to 13 studies that did use multiple design elements in their investigation of CE programs. An overview of these 13 studies is provided in Appendix 4, which presents (a) the focus of the study, (b) the design elements that were applied, and (c) the respective reference. In total, these studies cover 103 design elements that were used. Analyzing the 13 studies shows that they can be grouped into four different types of studies according to their focus of analysis.

1) **Single CE program studies:** Studies that focus on a single CE program in their study and use organizational design elements to define it. With six out of 13 studies, they reflect the majority of the studies. Mainly the two CE program types of the external corporate accelerators and corporate venture capital are subject of investigation.
2) **Comparing similar CE programs:** Studies that are comparing rather similar CE programs, such as external corporate accelerators vs. startup supplier programs (Kurpjuweit & Wagner, 2020). In total, three out of 13 studies show this focus. They are using design elements to highlight differences between the CE programs.
3) **Comparing internal and external CE programs:** Studies that compare multiple internal and external CE programs. Studies that focus on the comparison of heterogeneous CE program types are most similar to our study and have been examined two out of 13 times in the reviewed studies (e.g., Gutmann, 2018; Weiblen & Chesbrough, 2015).
4) **Theoretical typologies:** Studies that are using design elements to theoretically distinguishing CE activities into different typologies. Three out of 13 studies show this scope, which is more high level than the ones focusing on specific CE programs.

For selecting design elements that are suited to answer the first RQ of our study, we focus on the studies that are comparing different CE programs. Hence, the ones that investigate only one CE program type at a time (type 1) and the studies that focus on a rather broad range of CE activities (type 4) are excluded. This is done since studies that focus on one CE program use design elements that are too narrow and specific for the scope of our research. In contrast, the studies that focus on typologies for many CE activities use design elements that are expected to be too broad for distinguishing the various CE programs. Removing these studies leads to four studies that are remaining with 42 design elements (Set I) as a result of Step 1.

An overview of all design elements that are derived from literature is provided in Table 4.1. They are grouped into two dimensions, viz. *strategy* and *structure.* The grouping is according to the configuration theory that is applied as a theoretical perspective (see Section 2.3). The strategy dimension focuses on all design elements that are describing the scope and orientation, whereas the structure dimension is focusing on design elements that are describing the governance, processes, and embedding of the CE programs.

In addition to the grouping according to strategy and structure, the design elements in Table 4.1 are also grouped regarding their *content*. Design elements that describe the same content

are listed in the same row within the table. For example, (4) *main goals* and (5) *program objective,* (6) *initial purpose*, and (7) *prioritization of objectives,* which are all focusing on the objective of a CE program, are listed in the third row of Table 4.1.

Dimension	Design elements (Set I)
Strategy elements (11)	(1) Locus of opportunity, (2) focus of activities
	(3) Innovation flow
	(4) Main goals, (5) program objective, (6) initial purpose, (7) prioritization of objectives
	(8) Strategic logic, (9) ambidexterity strategy
	(10) Project focus (result)
	(11) Innovation focus (types of innovations)
Structure elements (31)	(12) Operational relatedness, (13) strategic relatedness, (14) structural relatedness
	(15) Closeness to core business, (16) link to the corporate firm
	(17) Integration with core business, (18) integration of business units
	(19) Organizational setup
	(20) Main contact, (21) organizational anchoring
	(22) Top management involvement
	(23) Time horizon of involvement, (24) duration
	(25) Level of investment intermediation
	(26) Probe-and-learn process
	(27) Co-creation, (28) implementation strategy
	(29) Completeness of startup support, (30) value proposition to startup
	(31) Provided resources (financial, educational, networking, product-related)
	(32) equity involvement
	(33) Scale (# of startups), (34) number of startups
	(35) Startup type, (36) startup maturity
	(37) Value capturing, (38) exclusivity (access to innovation)
	(39) Application procedure, (40) evaluation process, (41) use of standardized approaches
	(42) End of program

Table 4.1: Design elements used in prior studies to compare different CE program types (Kurpjuweit & Wagner, 2020; Gutmann, 2018; Alänge & Steiber, 2018; Weiblen & Chesbrough, 2015)

Due to the circumstance that the studies differ in their subject of investigation, the level of detail of the design elements covered in the table can vary. For example, studies analyzing rather similar CE programs, such as external corporate accelerators vs. startup supplier programs (Kurpjuweit & Wagner, 2020) use more detailed elements than studies that compare CE program types with a higher degree of heterogeneity in their organizational designs (Weiblen & Chesbrough, 2015).

In Step 2, the 42 design elements (Set I) will be further aligned to be able to answer RQ1, which aims at defining and distinguishing CE programs. For this purpose, similar design elements (shown in the same row in Table 4.1) were aggregated and adjusted to describe the organizational design of a CE program. This was done to ensure that all design elements derived from the literature have the same level of analysis. Furthermore, design elements were removed if they were unsuited to answer RQ1, which is the case if they meet at least one of the three criteria below. We call them *removal* criteria.

1) **Redundancy:** The content of the design element is already covered in another one. For example, (1) *locus of opportunity* describes the origin (internal vs. external) of the ideas targeted by a CE program. However, this information is also covered in (3) *innovation flow*. This design element describes the origin and the remaining of the idea. Hence, the locus of opportunity design element can be removed due to redundancy.
2) **Simple count:** A design element does not have the intention to define and distinguish the different CE program types. For example, (33) *number of startups* supported by the CE program. These design elements may be suited to describe a concrete case. However, it does not show the structural difference between CE program types.
3) **Scope:** A design element is either too general or too narrow to define and distinguish across the different organizational designs. For example, (26) *probe-and-learn process*, which is describing how learning is achieved in the respective CE program.

Applying the three *removal* criteria resulted in 15 design elements (Set II) that are remaining. Set II consists of the design elements derived from the literature that are suited to define and distinguish CE programs. In Table 4.2, the 15 design elements will be briefly described. It is important to note that their harmonization was done in iteration with the derivation of design elements from the data to ensure that they were well aligned (see Figure 4.2).

Design element (Set II)	Description
1. Orientation	The main orientation of the activities which follow either a strategic or a financial objective
2. Strategic logic	The underlying learning mode behind the activities either focuses on exploring new knowledge or exploiting existing one
3. Innovation type	The type of innovation that is pursued by the innovation ideas that are participating in the CE program
4. Innovation flow	The direction of the innovation flow, describing the place where the idea originated and the embedding after the program
5. Application process	The procedure how innovation ideas are being selected to participate in the CE program
6. Starting point	The organization of the starting point for the program, which either is on a rolling basis or at specific times
7. Duration	The way in which the duration of the program is determined, based either on a specific time or on the progress of the content
8. Program end (content)	The stage of the innovation idea that should be achieved at the end of the CE program
9. Governance mode	The structural design and the organizational embedding of the CE program
10. Power promoter	The responsible role under which the program is organizationally integrated
11. Key points of contact	The main points of contact for the program within the core organization
12. Type of funding	The type of funding provided for the innovation ideas in the program
13. Key value proposition	The main added values that the program offers as a support to the innovation ideas
14. Program participants	The type of participants of the program who work on the innovation ideas
15. Idea maturity	The typical maturity of innovation ideas at the start of the program

Table 4.2: Overview of the design elements derived from the literature (Set II)

The 15 design elements (Set II) from Table 4.2 represent the ones derived from literature to define and distinguish CE programs. It is important to note that they are not a full list of all design elements that are generally conceivable to describe the organizational design of CE programs. Instead, the design elements (Set II) cover only the ones that are suited for comparative analysis across the different organizational designs. In the next subsection, we show the result of the process of deriving the design elements from the cases in our data.

4.2.2 Design elements derived from data

In this subsection, we will focus on the design elements that were derived empirically (see Step 3 in Figure 4.2). In general, the investigation of organizational designs can be distinguished into typologies and taxonomies. They differ in that a typology is based on theoretically derived elements while a taxonomy is based on elements that have been empirically derived (Dess et al., 1993). It means that the dimensions used to create typologies are based primarily on theoretical concepts rather than empirical design elements. In contrast, taxonomies use empirically-based elements that are *observable* and *measurable* within data (Smith, 2002). Using a taxonomic approach is recommended for research that focuses on discovering novel organizational designs, while typologies are useful for testing theoretical configurations (see van de Ven et al., 2013).

Mirroring the taxonomic approach to the context of CE programs, we then see that the focus of our research underlines the need for using (a) both designs elements that are derived from literature and (b) from our data. On the one hand, there are various prior studies that have investigated the organizational designs of CE programs which provides a rich basis we can build on. On the other hand, the emergence of novel organizational designs that are not well investigated (see Subsection 4.1.2) demands a taxonomic approach to discover and define novel CE program types. In particular, we see that some of the novel CE program types show clear differences to the well-known ones, e.g., a corporate company builder (see, e.g., Peter, 2018; Rathgeber et al., 2017).

For these novel CE program types, it can be expected that they require additional design elements for defining and distinguishing their organizational designs. Furthermore, only three out of the 13 studies from Subsection 4.2.1 focus on the simultaneous investigation of internal and external CE programs. Consequently, the design elements (Set II) derived from literature are not intended to be used in the investigation of the full heterogeneity of CE programs. Such an investigation demands a hybrid approach that combines design elements from previous studies with novel design elements that are derived empirically.

For deriving the design elements based on our 54 cases, we applied a grounded theory approach in order to investigate new concepts of the organizational design of CE programs. The open coding phase explored all concepts belonging to the organizational designs, the strategy, and the potential relationships between them. The open coding resulted in a total number of 89 concepts identified as potentially relevant for understanding the organizational design of CE programs.

In the axial coding, the concepts were compared with those derived from the literature (design elements Set I and Set II) to ensure a good theoretical embedding of the results (see Gioia et al., 2013). The iterative comparison and alignment of the design elements from literature and data did finally result in the identification of eleven additional design elements (Set III) that were empirically derived (Step 3 from Figure 4.2).

Each of the eleven design elements (Set III) consists of multiple *element characteristics* reflecting the various practical manifestations. We will use two element characteristics that belong to the design element *business relatedness* (describing the scope of the innovation ideas targeted by the CE program) to illustrate the different practical manifestations of it.

The two element characteristics in our example are (a) *improve core business* and (b) *adjacent to core business*. The element characteristic *improve core business* is describing that the scope of the CE program is set on the optimization and improvement of the existing business, e.g., by automating processes in the production. The element characteristic *adjacent to core business* is describing a different scope of the CE program, which aims at developing new businesses that extend the core organization into new fields, e.g., by leveraging an existing technology into a new field of application.

The eleven design elements (Set III) are briefly described in Table 4.3.

Design element (Set III)	Description
1. Business relatedness	What is the scope of the innovation ideas of the CE program? Are they aimed, e.g., to improve or complement the core business?
2. Innovation demand	Who is the driver of the innovation demand, is, e.g., is it pushed by the CE program itself or by the core organization?
3. Number of phases	In what type of phases is the CE program structured and what is their focus regarding business development?
4. Preferred exit path	What is the preferred exit path of the innovation idea after the program's end? (e.g., transfer to a department in the core organization or creating a spin-off)
5. Location	Where is the CE program geographically located in relation to the core organization?
6. Funding source (during program)	Who (which organizational entity) is funding the innovation ideas during the CE programs phases?
7. Funding source (post-program)	Who is providing the funding after the innovation ideas have left the CE program?
8. Key activities	What are the main activities that are pursued to operate the CE program?
9. Different innovation formats	What types of different innovation formats are run by the program? (e.g., acceleration, hackathon, or ideation)
10. Platform openness	By whom is the CE program operated? Is it an exclusive program or are multiple players involved?
11. Key functions	What different roles are employed in the CE program itself? (e.g., Does it have its own technical specialists or innovation scouts?)

Table 4.3: Overview of the empirically derived design elements (Set III)

The empirically derived design elements (Set III) are complementing the ones derived from the literature (Set II).

4.3 Harmonizing the design elements

In this section, we will focus on harmonizing the design element. Starting with the process of harmonizing the 15 design elements (Set II) that are derived from literature with the eleven

design elements (Set III) that were derived empirically (Step 4 from Figure 4.2). After a more detailed explanation of this process, we will present the harmonized set of design elements.

It is important to note that for reasons of comprehensibility, the derivation of the design elements was presented separately (see Subsection 4.2.1 and 4.2.2). However, the practical realization was an iterative process in which the results from the literature and the data were consistently compared and aligned. For selecting the design elements that are suited to answer RQ1, we applied the following two criteria.

1) The design elements must be applicable across the different types of CE programs.
2) The design elements must be suited to differentiate rather similar CE program types.

Furthermore, to create a harmonized set of design elements that are suited to answer RQ1, we had to align the design elements regarding (a) their *content* and (b) their *level of analysis*. For aligning the content, the design elements with a similar focus (see Table 4.1, the design elements summarized in the same row) were either merged into one design element or are split into multiple design elements that have a clear distinction from each other. For aligning the level of analysis, the design elements were re-formulated in their focus to be applicable across the different CE program types. This was necessary since the studies building the basis for deriving the design elements from literature did have a different subject of investigation. For example, studies comparing rather similar CE program types use narrower defined design elements (Kurpjuweit & Wagner, 2020) than the ones that cover more heterogeneous CE program types (Gutmann, 2018; Weiblen & Chesbrough, 2015).

Applying the different aspects led to the list of design elements that were already presented in Subsection 4.2.1 (design elements Set II) and Subsection 4.2.2 (design elements Set III). Combining the design element from Set II (15 design elements) and Set III (eleven design elements) leads to the final set of design elements that consist of 26 different design elements (see Table 4.4). The 26 design elements were grouped into eight design categories based on thematic similarities to improve the clarity further. Table 4.4 provides an overview of the design elements, the design categories to which they belong, and their link to the dimensions of strategy and structure.

Dimension	Design category	Design elements (Set IV = Set II + Set III)
Strategy	*Purpose*: Strategic direction of the program	- Orientation - Strategic logic
	Scope: Type of ideas that are in the focus of the program	- Innovation type - Business relatedness - Innovation flow - Innovation demand
Structure	*Process*: The course and key aspects of the program	- Application process - Starting point - Duration - Number of phases - Program end - Preferred exit path
	Governance: Embedding of the CE program into the core organization	- Governance mode - Location - Platform openness - Project funding (during program) - Project funding (post-program) - Power promoter
	Operations: Activities that are performed to run the program	- Key activities - Different innovation formats
	Support type: Type of support for the innovation ideas by the CE program	- Key contacts - Type of funding - Key value proposition
	People: Program employees and the participants for the ideas	- Program participants - Key functions - Idea maturity

Table 4.4: Overview of organizational design elements to define CE programs

The 26 design elements (Set IV) presented in Table 4.4 form the basis for developing an approach that allows a systematic analysis of the organizational designs of CE programs.

4.4 General morphological method for CE programs

In this section, we will focus on the approach to allow a systematic analysis of the 54 cases from our data set. In this regard, the *general morphological method* will be described as a potential approach for a systematic analysis of the organizational design of CE programs.

The general morphological method is a problem-solving and creativity technique that was developed by Fritz Zwicky (see Ritchey, 2011a; Zwicky, 1967). It has been applied in various fields such as organizational development, technical design, or innovation management (see, e.g., Duczynski, 2017; Álvarez & Ritchey, 2015). Using morphological analysis is recommended when the subject of investigation is characterized as (a) complex, (b) multi-dimensional, and (c) non-quantifiable (Ritchey, 2006).

Mirroring the characteristics of CE programs and their organizational design with the three aspects described above shows the following.

a) The design elements of a CE program are interrelated, which makes them a rather complex subject of investigation, as changes in one design element may affect several other design elements.
b) CE programs are multidimensional organizational units that encompass a wide range of different design elements (see Section 4.2).
c) It is unclear which design elements are best suited to define and distinguish the different types of CE programs. This lack of understanding requires further qualitative efforts to develop a deeper understanding of the subject of investigation.

These three aspects overlap with the recommendations of when to use a morphological analysis (Ritchey, 2006), which makes it an appropriate approach to systematically analyze the organizational design of CE programs.

The basic principle of the morphological analysis is illustrated in Figure 4.3. It is used to identify element characteristics that show a high frequency of occurrence (marked in darker colors) and that are commonly occurring together. By identifying these element characteristics, we can derive potential solutions for a problem, which reflect in research on organizational designs the different configurations that are possible.

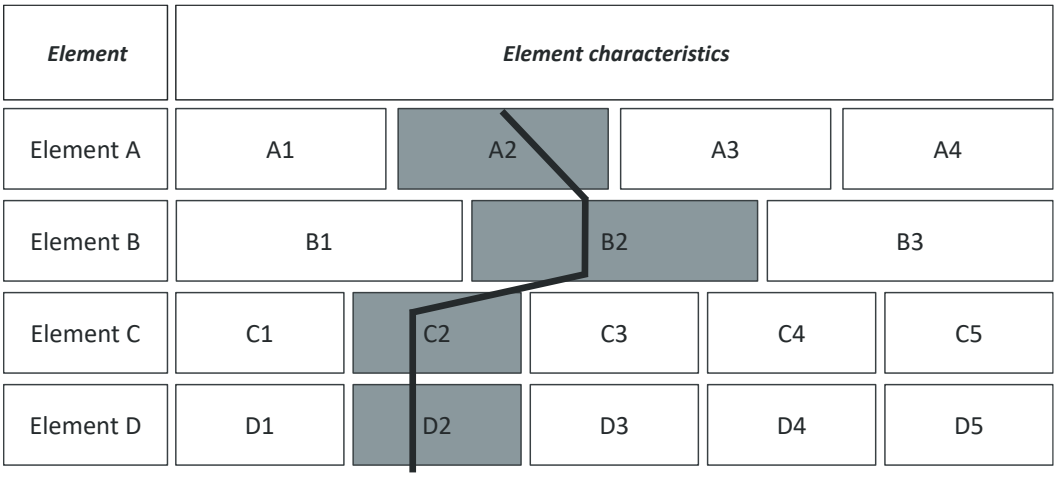

Figure 4.3: Using a morphological box to derive a configuration or solution

In general, for applying a morphological analysis, the following four steps must be performed.

1) Identification and definition of all elements (A-D in Figure 4.3) that are describing the problem or the subject of investigation.
2) Identification of the different characteristics (A_n, B_n, etc.) that the respective elements can exhibit in practice to understand the heterogeneity of each element. As shown in Figure 4.3, the number of element characteristics can vary per element.
3) Create a matrix based on the elements (first column) and the characteristics behind each element (in the same row), as shown in Figure 4.3. Depending on the characteristics of an element, the number of columns can vary.
4) Connecting the element characteristics across all rows to identify the possible solutions (illustrated in Figure 4.3 with the line connecting the element characteristics that are highlighted in a darker color).

Applying this approach to the cases on the data set leads to the identification of the solutions that are generally possible. In addition, the approach can be used to reveal relationships between the elements that contribute to a better understanding of the subject of investigation. An example is provided with Figure 4.4 on the next page.

Creating a morphological box for CE programs

For creating a morphological box that can be used to analyze the organizational designs of CE programs, two things are required, namely the design elements and the element characteristics. The 26 design elements that were presented in Section 4.3 (see Table 4.4) form the basis for creating the first row of our morphological box. In addition to them, the

respective element characteristics are required for each design element, which reflects the practical manifestation the design element can have. An example for such an element characteristic was provided in Subsection 4.2.2 with the design element *business relatedness* and its element characteristics like *improve core business* or *adjacent to core business*. The element characteristics are used on an operational level to define and distinguish the different CE program types.

Deriving the element characteristics did follow an iterative process. The 54 cases were analyzed regarding the 26 design elements and the respective element characteristics the design element did show in each case. With each additional case, either (a) already known element characteristics were found or (b) novel element characteristics were identified. Based on the identification of the elemental characteristics, the morphological box was continuously adjusted with new elemental characteristics simultaneously with the analysis of the cases. At the end of the analysis, a total number of 138 element characteristics were identified, which also reflect the entirety of the element characteristics of the final morphological box. Due to the large number of design elements and element characteristics, the full morphological box must be split into two pages. The 138 elements with a brief description can be found in Appendix 5. Figure 4.4 serves as an illustration of how the morphological box is generally structured.

Design dimension	*Design category*	*Design element*	*Element characteristics*				
Strategy	Scope	Innovation type	Process	Service	Product	Business model	
		Innovation flow	Inside-in	Inside-out	Outside-in		
		Innovation demand	Push by intrapreneur	Pull by core organization	Moderated pull	Push by top management	Push by CE program
		Business relatedness	Improve core business	Complement core business	Adjacent to core business	Cannibalize core business	Independent new business
…	…	…	…	…	…	…	…

Figure 4.4: Extract of morphological box used for the systematic analysis

For each of the 54 cases, a morphological box was created that is reflecting the configuration of the organizational design. These boxes are used to investigate the organizational design of

the 54 cases in order to answer RQ1. The identification of distinct CE program types did follow five steps which are summarized below.

1) The cases were grouped according to the rather general CE program categories, which are internal CE programs, external CE programs, and radical innovation units.
2) Within the three categories, cases were first grouped according to their self-conception, which followed mainly the CE program types presented in Section 4.1. This results in several subgroups within each CE program category.
3) The cases within the subgroups were investigated regarding the similarities of their organization design which was done by comparing the morphological boxes of each case. This comparison led to the identification of a certain set of design elements that were characteristic for the respective group.
4) If a case did not fit this set of design elements, it was excluded from this subgroup and compared with the other subgroups. This either resulted in (a) the assignment of the case to another subgroup or (b) the creation of a new subgroup if the case did not fit any of the existing ones.
5) The comparison of the morphological boxes was repeated until all cases were assigned to a group, and the respective group did have a certain set of design elements that shared the same characteristics.

Applying these five steps to our 54 cases resulted in different subgroups that are characteristic of a certain type of organizational design. An example using the same morphological box as in Figure 4.4 is provided with the description of our first CE program type in Chapter 5 (see Figure 5.1). It is important to note that each of the types can have a different set of design elements and that only a subset of the 26 design elements is being used. This subset of design elements and the respective element characteristics allowed a clear and systematically derived definition of the CE program types. The next chapter will present the results from the systematic analysis of the organizational design and provide an answer to RQ1.