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A conceptual framework of corporate entrepreneurship and management control

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***Abstract*—Research credits corporate entrepreneurship (CE) with enabling established companies to create new types of innovation. Scholars have focused on the organizational design of CE activities, proposing specific organizational units. These semi-autonomous units create a tense management situation between the core organization and its CE activities. Management and organization research considers control as a key managerial function for help. However, control has received limited research attention regarding CE units, leaving design issues for appropriate control of CE units unanswered. In this study, we link management control and CE to illustrate how control is understood in the context of CE. For this, we scanned the CE literature to identify underlying attributes and characteristics that allow specifying control for CE. We identified 11 attributes to describe control for CE activities in a first round and to derive future research paths.**

Keywords—corporate entrepreneurship, corporate venturing, literature review, control

I. Introduction

Corporate Entrepreneurship (CE) has become important for established companies as entrepreneurial activities generate new knowledge and innovation [1]. Many companies now have at least one CE activity [2, 3]. CE activities can take the form of specific innovation initiatives (corporate ventures) or entire units to host multiple initiatives or work with external startups (CE units) [4]. Despite the recent profusion, CE activities bring several challenges [5], e.g., their structural separation from the core organization [4], different working practices, and high uncertainty about the value creation for the core organization [6]. However, many examples illustrate the success of CE activities. To this end, scholars agree on the importance of the appropriate design of CE and strategic alignment with corporate strategy [7, 8].

Scholars describe different types of CE units like corporate incubators, company builders, startup collaboration programs, or corporate venture capital units [9, 10]. The specialization of CE units explains why companies increasingly run multiple ones in parallel [3]. Multiple CE units require coordination between these CE units and between the core organization and each of these CE units separately. First, insights about the former type of coordination are available [3, 11]. We focus on the latter type of coordination. A gap in the extant literature is how to keep such CE units sustainable and coordinated with the core organization [11].

Those semi-autonomous organizational units create a unique management situation, as they are not fully integrated into the core organization like a "standard" business unit and yet not fully independent from it like a startup [12]. They should deliberately innovate differently from the core business and still deliver long-term results to the core organization [8]. The results are only sometimes directly measurable in financial terms [7, 13, 14]. Although it is specified which unit increases the chance to achieve certain outputs, companies, and scholars raise the question of how the CE units can sustainably align with the core organization [15]. Further, the challenges regarding an appropriate evaluation or adjustments still need to be solved and thus bring the topic of control of the CE unit into play.

In practice, CE units have some goal setting and reporting [6]. Both indicate management practices, which, however, seem more of a normative nature with the expectation that having one CE activity is better than none and valuable output will be generated. This assumption arises from a lack of consensus on, e.g., worthwhile goals, measures and integration practices into the corporate strategy [13]. This often leads to false expectations and disappointment about the results [6]. Therefore, a control cycle for CE units could be a remedy. However, many open design questions exist for such a control cycle on aspects like goals, target values, performance measures, mechanisms, and relationships. Thus, this study aims to deal with control for CE and find first answers to the design questions for control of CE units.

Such issues are discussed in the literature as 'management control' (MC). MC is defined as a systematic managerial approach [16] to ensure that the organization's resources are used effectively and efficiently to achieve the organization's goals [16, 17]. The main requirement is to compare current performance against predefined standards, plans, and goals to determine if the performance is consistent and to take remedial actions or decisions ex-ante when needed [16]. For such a control cycle, literature provides various types of control, which can be complementary or mutually exclusive. Depending on the applied framework, they can even have different names. Nevertheless, to give an idea of types of control, one finds examples of process control, output control, personnel control, and cultural control [18].

Some scholars acknowledge the context-dependency of MC [19, 20]. This is also true for different innovation contexts, which in MC literature are found to be purely exploitative, exploratory, or both simultaneously

('organizational ambidexterity') [19]. For exploitation, focus is on efficiency and risk mitigation through output control [21]. For exploration, autonomy, and creativity are important for innovation performance, which might be hindered by output measures [16]. So "soft", more implicit types of control are suggested for new knowledge building, described as personnel and cultural control [22] or other types of performance measuring [23, 24]. For organizational ambidexterity, control must strike a balance between exploration and exploitation and, thus, between fostering creativity and efficiency [16, 25]. For this, some scholars propose to combine mutually exclusive control practices, e.g., formal/informal, central/decentral, or output/process [18, 26, 27]. Thus, a gap is that MC has not been sufficiently studied for different types of innovation [19, 20, 22].

Previous research on MC highlights the dependence on the organizational context of a company [19]. CE activities are organized differently compared to the core organization and assigned with goals that can be distinguished from those in the core business [6]. Thus, it is assumed that if the organizational design and intended goals differ, management and control are also different [19, 20]. This goes along with the assumption that multiple types of control are needed for complex innovation processes [28]. Thus, the question arises, what types of control are important for CE?

To answer the question of appropriate control of CE units, we must first look at the piecemeal evidence available so far. Controlling CE is crucial in available research but needs more empirical evidence and concrete operationalization. This coincides with calls for research for a consolidated view [13, 14] which might allow outlining relevant MC aspects for CE. So, to get one step closer to the implied picture of a control cycle for CE units, we pose two research questions:

1) What attributes and dimensions for the control of CE units can be identified?
2) What types of control for CE units can be described and distinguished based on these attributes?

We have used a systematic approach as a starting point to check what is available in the extant literature on control for CE units. However, we found that the existing literature for this purpose was very small, and we were only able to identify nine articles that could provide answers to our research questions. Since the understanding of the current state of knowledge about controlling CE units is still important, we conceptualized a framework to identify the relevant constructs that describe MC for CE units as well as their relationships, and to suggest the gaps and where further research is needed.

Our conceptual study contributes to the CE literature by a unique consolidated picture that characterizes control of CE based on extant knowledge, a schema to operationalize types of control for CE units, and paths for future research based on identified gaps and disagreements of extant research.

II. Methodology

We started with a systematic literature review that comprised defined search terms, a set of exclusion criteria, and a three-step selection process as we expected to get many hits of articles. Surprisingly we could only find a very small portion of publications on our research goal to understand in detail how literature describes control between the organization and the CE unit. To remain faithful to this goal, we did not extend the literature search to adjacent areas of CE literature, but continued to follow the methodology appropriate for categorizing and describing the current state of knowledge on specific concepts [29] and conducted a conceptual literature review. For transparency, we want to provide an overview of our sampling process which is outlined in the following paragraph.

We began our search with the core interest of our study, understanding MC for CE. Consequently, "Corporate Entrepreneurship" and "Management Control*" were our first search terms. The search was carried out with the *database* Web of Science, complemented by a cross-check with the Google Scholar database [30]. All articles included in the sample were limited by *article type* to academic, peer-reviewed journal articles or conference papers available electronically, by *language* of the articles to English, and by *Web of Sciences categories* to management, business, and economic research to avoid an unmanageable article sample.

For the core search, only three results were recorded. Only five results were found by adding the subcategories of Corporate Venturing (CV) and Strategic Entrepreneurship (SE). We have deliberately excluded intrapreneurship, as our focus is less on informal entrepreneurial activities of individuals [31] but rather on managing formal entrepreneurial activities. Our first approach with only the "key terms" could not be considered comprehensive [32].

Consequently, we pursued an approach that searched for more relevant terms around CE and MC. For all further searches, CE, CV, and SE became the fixed search string component CE' ("corporate entrepreneur*" OR "corporate ventur*" OR "strategic entrepreneur*"). The synonym term for MC, "organizational control", showed four more hits, whereof none met the criteria. The overarching terms "control*" and "steer*" were included to increase the chance of more hits and yielded 128 hits. Extant literature argues that a lack of alignment between corporate strategy and CE activities drives managerial challenges [15]. Thus, the term "align*" was used; however, no suitable hits resulted. Another approach to specifying the interactions between the core organizations' top management and the CE unit management is the concept of coordination. This was included by the term "coordinat*" but did not bring up useful results.

For each of the 159 hits of articles, the researchers performed a stepwise selection process to find explicit attributes of the MC concept for CE units. The researchers were guided by certain criteria that led to the exclusion of articles, which (1) not exclusively address the level of analysis between the core organization and CE units (2) not investigate MC attributes, dimensions, or types; (3) focus on the individual or startup level; (4) investigate the topic in for the research irrelevant industries like non-governmental, public sector, hotel or tourism, and franchise business models.

For each article, we determined the fit according to the defined criteria and screened the title, abstract, or full-text step by step. Thus, eight suitable articles were left. For back- and forward citation analysis, the references of the eight articles were evaluated, and a forward citation analysis using Google Scholar resulted in another relevant article. Finally, the sample included nine articles (see Table 1).

Table 1 Search Terms and Results

Search Terms	Hits	Suitable
Core interest search		
CE & MC	3	0
CV & MC	1	0
SE & MC	1	0
CE' & control*	127	8
CE' & coordinat*	22	0
CE' & steer*	1	0
CE' & organizational control	4	0
Backward / Forward Citation		1
Total	**159**	**9**

Hits: Number of search hits, reduced by exact duplicates
Suitable: Number of suiting hits after detailed analysis

The articles were subjected to a descriptive analysis to examine the level of analysis and methodology, as well as preliminary findings and in-depth content analysis to identify relevant constructs, describe them, and aggregate the information. Thereby, we explored the extent to which a combination of attributes can be found in the literature to develop an approach to identify types of CE unit control. Each article's content was coded following Gioia's suggestions [33].

III. The Role of Management Control for CE

Our findings reveal that control of CE is a diverse concept. CE literature brought forth 11 attributes to characterize control of CE conceptually. In some cases, these attributes appear in combination. The first part of the findings descriptively describes the state of research on CE activities and control. The second part of the findings presents an overview of the identified characterizing attributes for control of CE. The third part of the findings provides a conceptual framework that detects which types of control can be differentiated.

A. Descriptive diagnosis: control of CE units as white spot

From a methodological point of view, the majority of the articles on CE and control are conceptual (56%), while the minority are empirical (11% qualitative, 33% quantitative). As a first finding, only a small amount of literature deals with control of CE at the unit level, even though much research is done on the different organizational designs of CE units. Further, the conceptual studies mainly focus on transferring MC knowledge to CE. Coupled with the higher number of quantitative studies, we claim that research is more concerned with proving MC's relevance for CE than investigating appropriate types of MC for CE. Both points emphasize the wide scientific gap in this field.

The articles examined focus on the organizational (78%) and venture levels. This is striking as the venture level was an excluding criterion. However, the subject of investigation, management of CE units by the corporate management, includes the ventures of the CE unit inevitably and cannot be clearly distinguished from each other. The venture level focuses on evaluating the performance of the startup teams. In these cases, the CE unit itself is not part of the evaluation. This is consistent with the finding that no study explicitly refers to the core organization and its MC intentions on the CE units.

Particularly interesting is that control is considered crucial for CE but lacks empirical evidence and concrete operationalization. The reviewed articles show many different perspectives of control for CE, like measurement, operational control, balance control, or whole management control systems, and each study introduces a new type of control, like input, behavioral, or budgetary control. This results in a heterogeneous, fragmented tangle of control types, lacking information about the underlying dimensions and mechanisms. Identifying and describing relevant constructs, dimensions, and their relationships is necessary for an appropriate design of control for CE. For this, an important first step is a consolidated view of key control aspects for CE.

B. Control taxonomy and dimensions for CE

The in-depth analysis of the 9 sample articles resulted in 11 characterizing attributes for control of CE. To shed light on CE control's characteristics, dimensions, mechanisms, systems, and perspectives, we have either directly identified and described these attributes or implicitly derived them from the context. In the latter case, we named them with matching constructs and themes. Hence, reviewing the articles we collected and clustered those attributes. If some attributes meant the same but were named differently, we aligned them into one attribute. Table 3 provides an overview and description of these attributes.

In general, these characterizing attributes can be divided into three categories, with the attributes describing either the "why", the "what", or the "how" of controlling CE activities. The 'why' category describes the reasons for controlling CE and, thus, the role controlling CE plays. The 'what' category includes the items in terms of content or data of the CE activities that are measured or controlled. The 'how' category describes the different ways of organizing and executing the control of CE activities.

For each attribute, a set of dimensions could be identified that describes control of CE. In total, 11 attributes and 13 dimensions. Each dimension reflects the diverse nature of control. The following is a brief description of the attributes in each category and their key dimensions.

1) Why to control CE activities

Our review reveals different reasons Why to control CE activities. We have tried to group these reasons into superordinate types and describe them based on them. In doing so, we have found that they manifest at different levels of investigation. The organizational level refers to reasons that require control between the core organizations' management and the CE unit. The venture level refers to reasons that require control between the CE unit and individual ventures.

At the organizational level, the reasons are of three types: directing, supporting, and safeguarding. *Directing* reasons have the role of providing direction (where to go) and guidance (in what scope) to the CE activities so that they are designed to contribute to the company's (innovation) strategy. *Supporting* reasons have the role of creating an institutionalized entrepreneurial environment, either by providing hygiene factors like resources or by establishing routines to initiate innovation opportunities. *Safeguarding* reasons refer to controlling a long-running innovation process, even if results are not immediately available. For this, resources should be allocated so that the CE activities are sustained over time and not discontinued prematurely. At the venture level, we found only supporting and safeguarding. Most of the reasons fall into the category of directing at the organizational level and safeguarding at the venture level.

Table 2: Overview of reasons to control CE (Why)

Category	Reasons	Ref.
ORGANIZATIONAL LEVEL		
Directing	Securing strategic alignment between the corporate strategy and the CE units' activities and intended outputs	[14, 34]
	Securing strategic alignment between the core organization management and the CE unit leader	[35]
	Providing strategic direction for CE activities	[13]
	Setting subtle routines and guidelines for CE management and activities	[7, 13]
Supporting	Enabling entrepreneurial thinking, behavior and interactions	[13, 36]
	Identifying windows of opportunities	[14]
Safe-guarding	Establishing a long-term CE process	[7, 13]
	Allocating resources effectively	[14]
...		
VENTURE LEVEL		
Safe-guarding	Selecting ideas with a high innovation potential to be developed towards commercialization	[21]
	Guiding venture teams to develop in terms of strategy and terminate if fit or potential no longer exists (discipline)	[13, 21]
	Monitoring the venture team to achieve its aims	[7]
Supporting	Allocating resources to develop first ideas until their commercialization	[37]
	Motivating and rewarding the venture team to achieve its aims	[7]
...		

2) How to control CE activities

The five identified attributes for How to control CE are: degree of institutionalization, planning horizon, control value, degree of decision authority, and degree of binding.

The *degree of institutionalization* refers to the nature and occurrence of structures, actions, and goals for the CE activities. They can either be very formal, informal, or both. Half of the articles in our sample distinguish between a formal and informal mode of control. Thereby, the dichotomies of tight-loose and flexible-inflexible are mentioned [13] but are not considered synonyms. High administrative formality refers to defined size and scope of actions, processes, and organizational systems [13]. Formal CE control mechanisms are control audits [13], clear goal setting [38], and formalized front-end innovation process [21]. Administrative informality refers to broadly defined organizational boundaries that allow for flexibility and thus grant autonomy in how to design a task and execute it or how to achieve expected outcome [25].

Some scholars argue that control should be highly informal for CE to enable explorative activities alongside the core business [13, 36]. Related mechanisms are rough plans for processes, broadly specified role profiles, and not firmly assigned responsibilities [13]. At the same time, some scholars emphasize that an informal control for CE only works with a certain alignment with the overall corporate strategy ("organizational consistency expected") [7, 13, 21, 36, 37]. This aligns with the finding that some scholars agree on balanced or hybrid degree of formal/informal for CE [13, 34]. "Balance" is described as adding informal mechanisms for CE to the formal, tight ones of the core organization, creating space for new, autonomous activities while "ensuring coordination, consistency and accountability" [13, 36]. This requires more self-control and social control [36].

The *degree of decision authority* refers to whether decision-making power is organized centrally or decentrally and, thus, how much responsibility and decision-making power is assigned to the CE activity. Three of the nine reviewed articles declare the degree of decision authority as a relevant control dimension for CE. The focus should be on decentral control so that roles with innovation knowledge are responsible (bottom-up responsibility) [21]. One scholar proposes even high decentralization [38]. At the same time, clear frameworks regarding routines and boundaries are described as necessary for this type of personal responsibility or division of responsibility for work. [21, 34].

The *planning horizon* refers to whether CE activities' stated actions and goals are primarily planned strategically or operationally. Regarding the strategic planning horizon, scholars also refer to long-term orientation, whereas operational is defined as short-term oriented [7]. Simultaneously, some scholars contrast strategic and financial [7, 36]. Strategic planning focuses on following the right activities and paths [36]. One strategic control mechanism is strategic budget for the investment in CE units and their startups [37]. Operational planning focuses on efficiency, characterized by risk control formality, process control formality, financial and non-financial measures [21]. Risk control refers to minimizing the failure of ventures with clear strategies and formalized incentive compensation system for managers [21, 34]. Process control refers to all types of constraints that allow activities to be pursued that would otherwise be sanctioned by core business controls [21]. Operational types of measures include, e.g., profitability [13], annual plans, or curation activities to promote or terminate innovation ideas [21]. Some scholars place strategic control above operational control [7, 34].

The *control value* refers to whether the actions and goals are defined and measured by financial or non-financial values or both. Financial control for CE is operationalized by tools like budgeting [38], investment intermediation [37], or performance measurement [13]. Examples of investment intermediation are internal venture funds or corporate venture capital. Each influences the achievement of specific investment goals, venture decision authority, and core organization resource commitment [37]. CE performance measurement is defined by financial measures like financial return [7]. Some scholars relate financial control values to efficiency-oriented control, such as short-term cost controls [13, 34, 38]. As such, they are supposed to punish mistakes or unintended outputs rather than encourage experimentation [36]. At the same time, scholars claim that financial control allows for accountability and transparency about potential waste of resources on low-payoff initiatives [13]. Two articles mention non-financial values for uncertain environments and CE. These are "company's progress relative to its competitors" [38], organizational development, and cultural change [37]. A hybrid value is real option development [37].

The *degree of binding* refers to whether predefined subjects of control should be adhered to or whether a certain amount of leeway is granted. Degree of binding represents the dichotomies of flexible-inflexible or tight-loose. Two scholars suggest hybrid mechanisms for each [13, 34].

Flexible-inflexible control is mentioned in terms of planning [7, 13], organizational boundaries [21], (job) roles [13], and autonomy [21]. Flexible roles are associated with employees' task responsibility [13, 39]. Besides autonomy at the individual role level, this is also described at the organizational structure level [21]: Flexible, adaptable structures and organizational boundaries enable inter- and intra-organizational knowledge sharing that drives innovation [40]. The flexible-inflexible balance is subject to no endless flexibility: For flexible roles, create some stability with organizational boundaries ("the need for realistic innovation concepts" or "consistency with overall corporate strategy" [13]). For flexible planned entrepreneurial activities, install "intensive scanning regime" and "short planning horizon" [7].

Tight refers to clear performance measures and loose to employee autonomy or broad guidelines in the form of "resource slack" [13]. Further, tight-loose control is described for budgeting [13]. Loose budgets are pre-determined but can be allocated to emerging innovation opportunities. In addition, looser cost targets allow the CE unit to work less toward meeting interim targets and more toward a final cost target. In the context of budget targets and resource effectiveness, one scholar introduces the concept of "enlightened efficiency" [13]. It states the presence of clear financial measures for accountability, confirmed as tight [34] while maintaining flexibility for content and size of the budget spent if expenses remain within the overall budget. It includes adjustable evaluation periods, financial and non-financial values, incentives tied to organizational success factors, and goal congruence, which is also referred to in [7]. Thus, enlightened efficiency equals a certain balance.

3) What to control of CE activities

Four types of control subjects emerged from the literature: Input, behavior, process, output. Those subjects lean on the value creation process of input, throughput, output [41]. The throughput part covers behavior and process, with behavior referring more to the individual employee perspective and process more to the activities performed.

The *input type of control* is explicitly mentioned in only one of our reviewed articles. Input control refers to subjects defined at the beginning and entering the value creation process (CE activity) without specifying the expected results. Input control includes goal congruence [42], subtle performance evaluation, or deliberate human resource recruitment and development [38]. Goal congruence, in combination with subtle performance evaluation, is understood as auditing and evaluation itself [38]. Subtle means that employees implicitly take over auditing and assessment of, e.g., goals, activities, or behavior. They perceive signals through socialization and awareness of the intended goals and react to them accordingly. However, these signals "cannot be translated into explicitly, verifiable measures" [42]. According to [38], input control is the most appropriate for CE compared to output and behavior control.

The *behavior type of control* is described in almost half of our articles. According to [21], CE behavior control aims to "implicitly sanction innovative behaviors and initiatives, thereby excusing those behaviors and initiatives from critical review". Behavior control manifests by job/task definition, organizational boundaries, and code of conduct. The first are clearly described and assigned tasks/roles for employees, initiatives, or units ("task programmability" [38]) [21]. Some scholars add "job-related expectations" [21, 34, 36] in terms of (explicitly /implicitly) expected role result. In contrast, it seems difficult to define the exact task portfolio for CE upfront because of uncertainty [38]. Regarding organizational boundaries, scholars show mechanisms to either limit or support and motivate CE activities. The former defines rules [43], standards [7], and processes to be followed [21, 34]. The latter specifies incentives that reward long-term innovation activities for the company [34]. The boundaries have a specific purpose: provide guidance and structure for the entrepreneurial activities to act and deliver as intended by the core organization [44]. However, only to the extent that no rule complexity and hierarchy arise for the CE activities [38]. For the code of conduct, one scholar describes "defined acceptable behaviors" for critical scenarios [21] and high employee involvement in planning [7].

The *process type of control* is explicitly mentioned in two sample articles. At the heart of process control is the assumption that a particular process is an enabler rather than an inhibitor of new types of innovation. Innovation outputs are more likely to be generated by a systematic approach than by a random pursuit of individual options [21]. [21] describes high and low process formality. High process formality for CE means that each step of the CE activity is defined in advance ("discipline-based process") [45, 46]. This reduces the uncertainty about task performance but also the autonomy for entrepreneurial behavior [14]. Process control mechanisms are front-end process formality [21] and innovation action plan [34] with goal setting, team formation, and step-by-step planning. Additionally, a strategic fit in process control seems necessary. Only a clearly defined process can be controlled with formal practices, and in turn, a more broadly defined process is difficult to control with formal practices [21].

Output control refers to specific results that should be achieved after a certain period of running the CE activity. These desired results are formulated in advance and in terms of a vision, goal, or indicator [40]. Output controls are mostly operationalized as quantitative data and measures like profit margin or return on invest [7]. [38] mentions that output control depends on "outcome uncertainty" and "outcome measurability". In times of uncertainty about developments in the corporate environment, "traditional" output measures like profit or ROI are described as inappropriate for CE [38]. Supporting outcome reward systems must be designed to identify and support initiatives that demonstrate acceptable risk-return probability [21].

C. Combinations of CE control dimensions

Our analysis reveals that control of CE is not described by the individual dimensions of 'How' and 'What' but by the combination of some dimensions. One part of these combinations is explicitly described in literature, whereas the other could be derived from a detailed analysis of our attributes (implicitly described).

Explicit combinations of 'How to control CE' are (1) planning horizon and control value with financial-strategic and financial-operational; (2) degree of decision power and degree of binding with decentral-loose guidelines and decentral tight-budgeting; and (3) the opposing values of degree of institutionalizing, control value and degree of binding. Implicit combinations of 'How to control CE' are (1) degree of decision authority and degree of institutionalization with decentral-formal, (2) decision authority and planning horizon with decentral-operational, (3) degree of binding and planning horizon by planning flexibility and strategic controls,

(4) planning horizon and control value by operational risk control with entrepreneurial strategy (non-financial) and (5) control value, planning horizon and degree of institutionalization with mechanism of formalized incentive compensation system for managers (non-financial).

In addition to the pure combination of 'How to control', some combinations of 'How' and 'What can be controlled' were identified. We see eight explicit and 12 implicit combinations. The explicit ones include input control with degree of institutionalization (informal), which is supported by the finding that input interacts with social and cultural control [38]; behavior control with degree of institutionalization (formal) and control value (non-financial) as it involves explicitly described structures, processes, and tasks that are not quantified; process control with degree of institutionalization (formal/informal) and output control with degree of institutionalization (formal) and control value (financial) with performance measures [37] such as revenue, resource consumption or budgets result-ratios. The implicit ones include input control with formal, financial control value, strategic planning, and tight binding; behavior control with flexible/inflexible, tight binding; process control with non-financial value and operational planning and output control with strategic planning and tight binding.

D. Introduction of an integrated framework

Scholars and practitioners are in consensus that the effective control of CE depends on creating alignment between the "operative" CE activities and the "strategic" innovation strategy of the whole organization and focusing on financial and non-financial indicators alike [7, 36]. However, many approaches to cluster dimensions in the extant literature are typically broad, covering various CE control modes without necessarily shedding light on the characteristics to distinguish them. As corporates may pursue multiple modes of control for CE, this makes a focal corporate's plan to create, capture and deliver value to the appropriate CE control mode challenge at the very least.

To address some of these limitations, we propose a 2x2 framework. The simplified framework in figure 1 distills characteristics and differences between control types by focusing on *control value* and *planning horizon* attributes. We chose these two because they represent two fundamental dimensions in literature. Three of four possible combinations are named: financial-strategic, financial-operational, strategic-non-financial; strategic-non-financial is missing. Our next aim was to describe the four quadrants. For that, we tried to assign the dimensions of our control modes and subjects to the matrix. In the first step, we mapped the other dimensions of 'How'. However, we only got one additional information: strategic is flexible/loose. Therefore, the dimensions of 'What' were mapped instead.

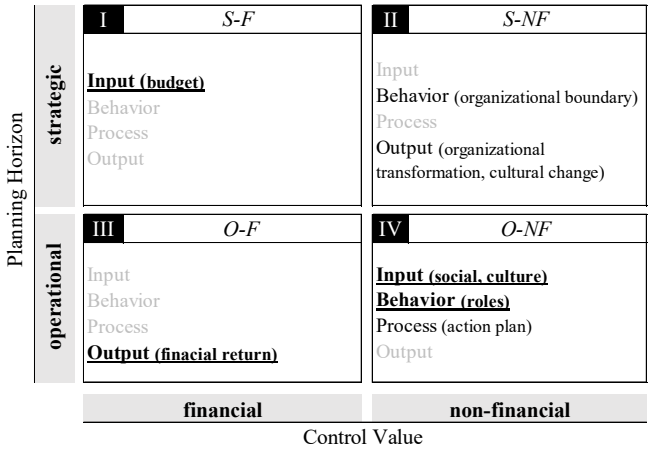

Figure 1 Matrix of types of CE control

Mapping the subjects of control with the matrix reveals that particular subjects of control dominate the four fields. Explicit assignments in figure 1 are marked in bold and underlined, whereas implicit assignments are in "normal" black, and assignments not found are in grey.

- Input control assigned to field I and IV, i.e., measures financials (budgets) in the long-term and non-financials (acquired human competences) in the short-term.
- Behavior control assigned to field II and IV, i.e., can be characterized by non-financial in the short-term (role profile) and long-term (organizational boundaries).
- Process control implicitly assigned to field IV, thus can be applied for non-financial values in the short term.
- Output control assigned to field II and III, i.e., measures non-financials in the long-term (cultural changes) and financials in the short-term (return on invest).

Field-specific occurrences indicate that a particular mode of control is used for specific subjects of control. However, as the same subject of control occupies some fields, there is a broader range of types of control in use. The dominance of non-financial values indicates that financial values are rather difficult to define for the control of CE. Input and output occur in fields I & IV and II & III, implying a hybrid approach for these two subjects and that there is a difference in the type of control between the strategic and operational planning horizon.

IV. Discussion

In this study, we explored how companies can control CE units. That means that we studied CE unit control from the corporate's top-management perspective. We did not look at how the management of the CE unit controls its entrepreneurial initiatives. We explored control of CE units through conceptual literature research and focused on two research questions: (A) What attributes and dimensions can the control of CE be identified? (B) What types of control for CE are described and distinguished based on these attributes? The first question aims to describe relevant aspects regarding control; the second question aims to create a framework by combining aspects. This framework can be used to characterize different types of control in more detail. The main results are described and discussed below.

A. Attributes and dimensions of control of CE

Our results indicate that CE control is a multidimensional concept, something that is already assessed in the general literature on management control [e.g., 16, 25, 26]. The explorative analysis of the nine articles in the sample resulted in characterizing attributes for control of CE. To make sense of these attributes and to distinguish dimensions, we followed the notion as proposed by Whetten (1989) that the main building blocks of theories can be divided in addressing 'why', 'what', and 'how' questions regarding the phenomenon of study, in our case CE control by corporate management. This finding enhances the existing view on MC for CE by using the schema that includes the reasons for the control of CE units in the 'Why' category, CE aspects that can be measured to control in the 'What' category, and different modes to organize and execute CE control in the 'How' category.

We found and labeled three sets of reasons for CE control. We refer to them as directing, supporting, and safeguarding. Directing, supporting, and safeguarding reasons are also apparent in control of other organizational units. However, CE ventures are a special type of project requiring a long-term effort; hence safeguarding (and long-term commitment) is crucial. The dominance of directing on the organizational CE level is supported by the fact that CE, despite its mission to explore new knowledge and innovation, should deliver value for the core organizations' future.

Four types of control subjects emerged from the literature indicating what can be controlled: Input, behavior, process, output. Those subjects of control lean on the value creation process of input, throughput, output. This differentiation is also found in empirics on CE goals [6]. One explanation might be that CE units have the purpose of generating new knowledge and, with this, are part of organizations' value creation process.

Our results indicate that input control is appropriate for CE compared to standard output and behavior control companies use to control their other business units. The reason is that the output of a CE unit is dissimilar from the standard yearly turnover and profit numbers, as CE outputs are uncertain and may take considerably longer than the typical control cycle. CE units' behavior and process differ from standard business units' behavior and process. CE units are created because companies do not master necessary behavior and processes to come to radical change. It is thus difficult for corporate management to use standard behavioral and process aspects to control CE units. We found specific examples of adapted process, behavior, and output control subjects for CE units. In contrast, 'input' is manageable and controllable and, thus, represents an important part of the controlled aspects.

We identified five how to control CE dimensions: degree of institutionalization, planning horizon, measurement value, degree of decision authority, degree of binding. Each dimension consists of two pairs of opposites. Some appear mutually exclusive (e.g., informal/formal), and others complementary (e.g., strategic/operational). A closer look reveals that all of them are important to CE. Therefore, the simultaneous presence of several control modes and their effective balance is useful for CE. So far, however, research focuses on modes like highly decentralized or highly informal. These examples are unsurprising, as CE units tend to be organized semi-autonomously. Additionally, informal organization is intended to foster creativity and new knowledge. This would not be possible in the "formal, always following the rules" organization. These characteristics are realized only to the extent that another counter-mode ensures alignment with the core organization. Although these specifications provide a rough idea for balanced control, they leave open the proportion of the counter pairs and the question of how control should be designed.

B. Types of control for CE

We created a 2x2 framework that improves upon the existing systems. We chose two dimensions (out of the list of five): planning horizon (strategic/long-term & operational/ short-term) and control value (financial & non-financial). An example of a financial-strategic combination of control that we found is provided by controlling the input; this means the budget of, or investment in, the CE unit. It is interesting that in this financial-strategic combination, output is missing. In the long term, CE activities may also yield financial results, e.g., income from sales by startups or turnover from innovations of the CE unit. An example of the financial-operational combination of control that we found is output. Interestingly the short-term manageable input (e.g., venture budget) is not mentioned here.

What is surprising is operational financial in combination with output. In the first years of a CE unit, input can be represented in financial numbers (the budget), but output hardly can. Although not mentioned, we can think of several non-financial operational aspects. For example, corporate management and CE management can agree in the first years when the CE unit is built upon control aspects like building up the CE organization's number of startups hosted per year.

Interestingly, explicit strategic-non-financial combination is missing. For CE units, strategic-non-financial control might be important because CE outputs inevitably refer to major qualitative changes in the company. CE units are often started with the long-term goal of effectuating a renewal in the company. This change may refer to a more entrepreneurial culture in the entire organization, new business models, and hence a fundamental change in organizational structures and processes, or new knowledge and technology at the corporation's heart (e.g., digitalization in manufacturing corporations).

The increased relevance of strategic control is justified by the fact that longer planning horizons entail longer evaluation horizons. If the results are to be presented later, there should be more room for creativity, experimentation, and flexibility [7]. Thus, strategic control is more in line with the time delay of CE activities until they pay off [7, 13, 36]. With a longer period until the evaluation of the results, the "real" results of the corresponding CE activities can be included in the calculation, which incentivizes a sustainable innovation process. The fact that strategic-non-financial is not described and strategic-financial does not control the output suggests that it is difficult to measure the strategic value of a CE unit well. Our results give a first insight into strategic-non-financial control values in the form of goals, such as transforming the core organization – as in practice [6] – or boundaries, such as limiting innovation to a certain industry or the technologies of the core business.

Interestingly, the degree of institutionalization and degree of decision making are not mentioned together. Only more decentralized or more informal is stated important for CE. Simply granting more responsibility to the CE units is to brief an idea as CE activities are not always organized as standalone unit but can be centralized, e.g., under the CEO [37] or decentralized in a business unit [36]. This embedding inevitably raises the question of the degree of institutionalization. The fact that balanced control builds on counter-pair leads to the assumption that decentralized decision-making power might work with formal processes and goals and the other way around: central decision authority with informal processes and goals. One study on exploration control already supports this proposition [48] and thus may be helpful for CE to address the different modes of organizational embedding.

Overall, there is a tendency for non-financial CE control. This is consistent with goals for CE units that we know so far, which are mainly non-financial [6] and understandable given the long-term orientation and the fact that precise financial values are neither available nor easy to estimate. Although, it suggests that aspects of CE are difficult to quantify and assess. At the same time, there are explicit financial controls with traditional measures like budgets and financial return, which are contrary to the many qualitative goals found in empirical data. The lack of alternatives makes companies stick to financial measures they are familiar with.

C. Match and contribution

The subject of investigation, management control of CE units, fits the IEEE ICE 2023 conference call for papers on 'Intrapreneurship Strategy and Process' and 'Innovation and Entrepreneurship'. Our conceptual framework to characterize and distinguish control of CE units provides a new scheme in corporate innovation design. By aligning CE units with the concept of management control, our study fits directly into the IEEE scope of innovation management. The findings on the current state of knowledge on MC for CE at the unit level with a new characterization schema and derived research gaps contribute to a first step in identifying and implementing successful systems, i.e., control systems for entrepreneurial innovation units in established companies.

V. Conclusion & Future research

The literature review aimed to provide a conceptual summary of the relationship between MC and CE units to achieve strategic alignment. Our study adds to the theoretical understanding of MC in the context of CE units. The findings extend the existing view of CE control by integrating different control attributes and types. Although dimensions of these attributes were used in the reviewed articles, we created a categorization that allows us to describe the multidimensional construct of CE control and differences and derive avenues for future research.

Besides the content contribution, we believe that we are also making a methodological contribution. MC for CE units turned out to be a literature field with too few articles for a systematic literature review. Nevertheless, to describe how the small field has been discussed so far, we have continued conceptually after systematic search and sampling. This may be the case for other studies as well. Therefore, our contribution should be understood as a suggestion on how to proceed if a field is not suitable for systematic review.

A. Limitations

The study was not free of limitations. Regarding the method, limitations are introduced by the boundaries of the data collection, selection procedure, and underlying research focus. Therefore, the search was limited to the search engine's yielded results for the given search terms, which was not always comprehensive upon closer analysis of the full texts. In addition, a biased decision to include or exclude articles was unavoidable. This resulted in excluding articles that may have been relevant to this study. Regarding the findings, the resulting matrix should not be seen as a new truth but rather as a first contribution to the extant literature that describes specific dimensions of controlling CE units. The dimensions may not necessarily be mutually exclusive, although we believe these dimensions represent key aspects of controlling CE. Based on this, our classification may suffer from inconstancies or incompleteness.

B. Future research

CE units represent one organizational form for a company to pursue exploration and exploitation and thus are one way to create ambidexterity. Exploring the relationship between MC systems and organizational ambidexterity would be interesting. With this, we can determine under which conditions MC systems or combinations of such systems can foster organizational ambidexterity.

We think the literature only provides a limited answer on how control must be designed to bring separate innovation units into strategic alignment with the core organization. Future research should concentrate on how control can be performed and what are the underlying operationalizing constructs. As results indicate, CE units need different control approaches than the core company. Future researchers should address the interaction between different control needs. More specifically, what differentiates the two control approaches, and how they work together. One alternative avenue for future research could be to explore and operationalize 'Balanced Control'.

After exploring CE control in a conceptual manner, it is now important to start empirical work to validate and enhance this concept of CE control and its generalization.

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