ORIGINAL ARTICLE

Implementing Strategic Resilience Through Cooperation Projects with Start-ups: a Multiple Case Study

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Abstract Strategic resilience is the capacity of organizations to proactively transform and renew through innovation to minimize the effects of unknown future crises. In this context, we know that cooperation plays an essential role as an external innovation strategy, and cooperation projects with start-ups related to innovation are one specific way to implement strategic change. However, research does not provide deeper insights into the process, outcomes, and success conditions of such projects. To help fill this research gap, we use the cases of two established firms using cooperation projects with start-ups related to innovation to enhance their strategic resilience. Based on an in-depth empirical investigation, we developed a framework that describes the specifics of those cooperation projects along their course (i.e., before cooperation, entry-phase into cooperation, during cooperation, and after cooperation) and resulting direct and indirect resilience benefits for the established firms. Thereby, the relationship quality (i.e., balance between formal and informal procedures, improvisation mindset, and appreciation and prioritization) turned out to

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be a central condition for resilience to emerge from those projects. Our framework illustrates how strategic resilience can arise from cooperation projects with start-ups related to innovation and which factors are particularly important in this context. It thus can be used as a guideline for the successful implementation of strategic resilience in practice as well as a basis for future research on the role of cooperation in strategic resilience.

Keywords Strategic resilience · Cooperation projects · Innovation · Start-ups · Strategy implementation · Transformation

JEL Codes M13: New Firms ● Startups · M14: Corporate Culture ● Diversity ● Social Responsibility · O31: Innovation and Invention: Processes and Incentives · O36: Open Innovation

1 Introduction

Many organizations currently find themselves in complex transformation processes triggered by a wide variety of drivers such as political regulations, new technological developments, or major crises (e.g., the COVID-19 pandemic). To remain viable in the long term, organizations cannot wait until the effects of such events become apparent. They need to prepare, take proactive steps, and implement changes before critical events or crises actually occur. The potential of an organization to proactively transform is called strategic resilience (Välikangas 2016). This refers to an organization's ability to "self-renew over time through innovation" (Reinmoeller and van Baardwijk 2005, p. 61) and includes two main capabilities: anticipation and preparation.

Researchers agree that change and innovation help to create strategic resilience (e.g., Granig and Hilgarter 2020; Morais-Storz et al. 2018; Teixeira & Werther Jr. 2013). For example, previous strategic resilience scholars provide insight into the role of innovation management as a proactive resilience strategy (Granig and Hilgarter 2020) and the creation of an innovation orientation within the organization's culture as a capability of resilient organizations (Teixeira and Werther Jr. 2013). Furthermore, Reinmoeller and van Baardwijk (2005) argue that organizations achieve resilience through the combination of internal and external innovation strategies. In particular, external innovation strategies such as inter-organizational cooperation are essential to generate innovation performance (e.g., Garousi Mokhtarzadeh et al. 2020; Najafian and Colabi 2014). Especially inter-organizational cooperation with start-ups seems to be useful as it can supplement the exploitative capability of the established firm with the exploratory capability of the start-up. Start-ups can help established firms to improve organizational competencies, grow their business and create a financial or strategic advantage (Gutmann 2019; Weiblen and Chesbrough 2015). However, about 60% of innovation cooperations fail (David and Bleeke 1993; Faems et al. 2005). Therefore, it is a challenge for established firms to realize innovative outcomes through cooperation; especially with start-ups and their distinct characteristics. In contrast to established firms, they exist for less than 10 years,

focus on highly innovative and often digital business models, products or services with high growth potential, and push for rapid implementation of ideas and learning from results (Bormans et al. 2020).

Our study considers projects as one way to realize cooperation with start-ups. From a systemic perspective, projects are seen as a vehicle that enables organizations to implement strategic and complex change (e.g., Huemann 2022; Lundin and Söderholm 1995). In general, the Project Management Institute defines projects as "[a] temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a beginning and an end to the project work or a phase of the project work" (Project Management Institute 2021). One outcome of projects can be to flexibly change current practices and behaviors of the organization's permanent structures (Lundin and Söderholm 1995). Cooperation projects as one specific type of projects additionally include shared activities among multiple organizations (Jones and Lichtenstein 2008). Only recently, research has begun to link the topics of resilience and projects (Naderpajouh et al. 2020); even highlighting the research potential of cooperation projects (Yang et al. 2022). While one part of this research stream deals with the question of resilience in projects, another part focuses on projects as a vehicle to achieve resilience. We adopt the second perspective and aim to provide insight into how cooperation projects with start-ups related to innovation can strengthen the established firms' strategic resilience. Thereby we answer the following questions: How do established firms implement such cooperation projects along their course? Which resilience benefits result from this process? What are central conditions that foster the realization of resilience benefits?

To reach this goal, we theoretically link the concepts of strategic resilience and inter-organizational cooperation and provide empirical insights into this connection. More precisely, we aim to give deep insights into cooperation with start-ups related to innovation as an external resilience strategy, and cooperation projects as a specific vehicle of implementing this strategy. For this purpose, we applied a multiple case study analysis with two German established firms that execute cooperation projects with start-ups to support innovation and organizational change. More precisely, we collected qualitative data from these two firms, three to four collaborating start-ups each, and one start-up intermediary. Based on these data, we analyzed the specifics of those cooperation projects along their course (i.e., before cooperation, entry-phase into cooperation, during cooperation, and after cooperation) and resulting resilience benefits for the established firms (i.e., direct effects on strategic resilience capabilities and indirect effects via resilience resources). Thereby, the relationship quality (i.e., the balance between formal and informal procedures, improvisation mindset, and appreciation and prioritization) acts as a central condition for resilience to emerge from cooperation projects with start-ups.

With this study, we contribute to the call in resilience research to intensify research on the proactive aspects of resilience (Raetze et al. 2021b). We provide in-depth insights into concrete resilience practices and their implementation (e.g., Duchek 2020) – in our case the realization of cooperation projects as a proactive resilience practice. Further, by showing the link between the cooperation process, relational success conditions, and resilience benefits of the established firms, we contribute to

the understudied concept of resilience projects (Naderpajouh et al. 2020; Yang et al. 2022).

2 Theoretical Background

2.1 Strategic Resilience: Origins and Meaning

Since the 2001 terrorist attack in New York City and the global economic and financial crisis in 2008/2009, the concept of resilience has become increasingly important in organization and management research (Linnenluecke 2017). However, to this day, there is no consensus on what resilience actually means in this context. Most researchers refer to resilience as an organizational ability to respond effectively to adverse events (e.g., Horne and Orr 1998). This includes different things: from maintaining an acceptable level of functioning during crises (e.g., Robert 2010), to recovering from setbacks (e.g., Boin and van Eeten 2013), to advancing organizational processes and capabilities (e.g., Lengnick-Hall et al. 2011). Other scholars argue that anticipation and proactive actions are also part of the resilience construct (e.g., Duchek 2020; Ortiz-de-Mandojana and Bansal 2016; Somers 2009). For example, Somers (2009) states that resilience "involves identifying potential risks and taking proactive steps to ensure that an organization thrives in the face of adversity" (p. 13). A few studies combine these different views arguing that there are different types of resilience, e.g., precursor and recovery resilience (Boin and van Eeten 2013) or proactive and reactive resilience (Raetze et al. 2021b). Our paper clearly focuses on the proactive aspects of resilience, which means the phase before an adverse event actually occurs.

Some scholars paid attention to this specific element of resilience from the beginning and introduced the concept of strategic resilience (Hamel and Välikangas 2003). Strategic resilience can be clearly distinguished from the stability- or recovery-based view on resilience, as it is based on the idea of continuous renewal and transformation (Välikangas 2016). It refers to the organization's ability to proactively change to avoid threatening situations, or at least minimize their impact (e.g., Hamel and Välikangas 2003). Although the concept of strategic resilience has already emerged in 2003, research in this field is still at a preliminary stage. This is even more surprising given that proactive resilience is an important precursor of all manifestations of reactive resilience (Casprini et al. 2022). Just recently, Raetze et al. (2021b) identified proactive resilience as one of three overarching themes of organization-related resilience research and recommended intensifying research in this direction.

The main building blocks of strategic resilience are resilience capabilities and resilience resources (e.g., Duchek 2020; Hillmann and Guenther 2021; Lengnick-Hall and Beck 2005). Resilience capabilities allow for resilient action, while resilience resources are needed to build and apply such resilience capabilities (Lengnick-Hall and Beck 2005; Vogus and Sutcliffe 2007). The main strategic resilience capabilities are anticipation and preparation. Already in 1991, Wildavsky defined anticipation as the "prediction and prevention of potential dangers before damage is done" (Wil-

davsky 1991, p. 77). Later studies summarize that anticipation comprises the abilities to scan the environment, detect critical developments, and adapt proactively (Duchek 2020). Strategic resilience also includes preparation capabilities such as implementing a crisis management system, developing crises plans, or educating employees for a better handling of inevitable crises in the future (e.g., Casprini et al., 2022; Raetze et al. 2021a; Williams et al. 2017).

One of the most important strategic resilience resources is a firm's knowledge base (Duchek 2020). This knowledge base defines a firm's locus of knowledge search (Rosenkopf and Nerkar 2001) and thus enables and hinders the acquisition of new knowledge equally (Cohen and Levinthal 1990). A broad and diverse knowledge base can thus help to anticipate a large variety of internal and external changes. Beyond that, time, financial and human resources are important drivers of effective anticipation and preparation (Duchek 2020). On the one hand, organizational members need time to observe the environment and identify critical developments. On the other hand, financial and human resources are needed to prepare for future events, for example, to develop crisis plans, take proactive actions, and distribute solutions throughout the system.

In summary, for the long-term survival of a firm in a dynamic environment, it requires resilience resources (i.e., knowledge base, time, human and financial sources) to build and realize resilience capabilities (i.e., anticipation and preparation).

2.2 Developing Strategic Resilience: Innovation and Cooperation with Start-ups

Researchers agree that change and innovation help to create strategic resilience (e.g., Ates and Bititci 2011; Granig and Hilgarter 2020; Morais-Storz et al. 2018; Teixeira and Werther Jr. 2013), as innovation creation provides an opportunity for firms to expand their knowledge and resource base (e.g., Brueller Brueller et al. 2019; Cohen and Levinthal 1990; Pan et al. 2018). For example, previous strategic resilience scholars provide insight into the role of metamorphosis and innovation as requisites of resilience (Morais-Storz et al. 2018), innovation management as proactive resilience strategy (Granig and Hilgarter 2020), and the creation of innovation orientation within the organization's culture as a capability of resilient organizations (Teixeira and Werther Jr. 2013). Reinmoeller and van Baardwijk (2005) point to the important role of internal and external innovation strategies in developing resilience. The authors show that firms that dynamically combine these strategic innovation perspectives pursue the exploitation of existing knowledge within the organization, and exploration of new competencies and possibilities in the organizations' environment (Reinmoeller and van Baardwijk 2005).

Many scholars identified inter-organizational relationships as one of the critical success factors in the implementation of innovations (e.g., Garousi Mokhtarzadeh et al. 2020; de Man and Duysters 2005; Najafian and Colabi 2014). To specify inter-organizational relationships, different terms are used in business and organizational studies, such as networks, dyads, partnerships, strategic alliances, corporate ventures, coalitions, cooperative arrangements, or inter-firm collaboration (e.g., Hill and Birkinshaw 2008; Lin et al. 2007; Provan et al. 2007; Russo and Rosamartina

2021; Weiss and Kanbach 2021). In our case, we understand inter-organizational relationships as formal and informal (innovation) partnerships that are characterized by dyadic cooperation. In recent years, the cooperation between established firms and start-ups has gained particular interest when it comes to innovation creation (e.g., Hora et al. 2018; Weiblen and Chesbrough 2015). However, so far, little research has examined the particularities of asymmetric partnerships, i.e., when the cooperating firms differ in size and maturity, such as commercially inexperienced start-up firms, and well-established firms whose activities are spread across multiple business units and geographic locations (Minshall et al. 2010). In this context, scholars mainly deal with cooperation focusing on corporate accelerators and not cooperation related to innovation itself (Islam et al. 2017). We tie in with that gap by taking a look at start-ups that 1) have been on the market for less than 10 years, 2) are character-ized by an innovative business model, product or service, which mostly incorporates digital technologies and scaling potential, and 3) live a mindset of rapid execution of ideas and learning from results (Bormans et al. 2020). In contrast, we under-stand established firms as having 1) well-rehearsed and more complex structures/ routines, 2) an efficient running of a business, and 3) difficulties to make changes and implement new ideas/practices (Weiblen and Chesbrough 2015). Thus, in the cooperation between these entities, large and established firms provide resources for efficient business model operation, while start-ups offer promising ideas, organi-zational agility, risk-taking and ambition (Weiblen and Chesbrough 2015). Mainly, established firms use start-up technologies to improve organizational competencies, to grow a firm's business, and create a financial or strategic advantage through collaboration (Gutmann 2019; Weiblen and Chesbrough 2015; Weiss and Kanbach 2021). However, this form of cooperation also entails challenges such as cultural differences and different organizational speeds (Weiblen and Chesbrough 2015). Projects are a promising means to implement this kind of cooperation and use it for innovation purposes (Hora et al. 2018).

2.3 Projects as a Vehicle to Implement Cooperation with Start-ups

From a systemic perspective, projects are seen as a vehicle that enables organi-zations to implement strategic and complex change (e.g., Huemann 2022; Lundin and Söderholm 1995), ranging "from the more tangible issues such as new product development to the 'softer' aspects such as organization redesign and management development" (Pellegrinelli and Bowman 1994, p. 172). In general, projects are char-acterized by the fact that they are temporary, thus having a beginning and an end, and either stand alone or are part of a program or portfolio (Project Management Institute 2021). They are considered to be an organizational form that operates outside estab-lished organizational processes and hierarchies to flexibly change current practices and behaviors of the organization's permanent structures (Lundin and Söderholm 1995). In particular, cooperation projects represent an example of temporary or-ganization by realizing shared activities among multiple organizations to coordinate complex products/services in uncertain and competitive environments (Jones and Lichtenstein 2008). Thereby, cooperation projects help to address paradoxes in or-ganizations: 1) flexibility versus efficiency, and 2) exploration versus exploitation

(e.g., Abel et al. 2020; Clegg et al. 2020; March 1991). First, this means that due to the time constraints of projects, actions are implemented faster and with fewer resources (Lundin and Söderholm 1995), resulting in flexibility, which is especially needed in innovative and transformative activities (Braun and Lampel 2020). Second, cooperation projects enable exploration (i.e., opportunity-seeking, variation, experimentation, and flexibility in managing future change), which is a prerequisite for the exploitation (i.e., revenue-generating, refinement, and productivity in managing today's business) of permanent structures (Abel et al. 2020; March 1991). Thus, projects provide the stimulus for change, which in turn helps in securing and sustaining the permanent structure (Geraldi et al. 2020). New knowledge and opportunities are thus discovered primarily through project collaboration with new and disruptive partners (Koza and Lewin 1998), whereas recurrent partnerships aim to refine existing knowledge and competencies (Rothaermel and Deeds 2004).

So far, inter-organizational project research has mainly provided conceptual frameworks (e.g., Dille and Söderlund 2011; Sydow and Braun 2018; von Danwitz 2018), which leaves the potential for deeper empirical investigations of this type of cooperation projects (van Marrewijk et al. 2016). Although research gives empirical insights into the involvement of different partners, for example multiple partners in R&D projects (e.g., Cassiman et al. 2009; Mishra et al. 2015), partnerships with start-ups remain understudied (Giglio et al. 2023). As start-ups differ from other firms, for example by showing the willingness to take risks and aspirations of rapid growth (Weiblen and Chesbrough 2015), they are particularly useful to realize projects related to innovation. Projects with start-ups can help established firms to change organizational routines, or build cross-organizational capabilities (Stjerne et al. 2019) in a limited period of time (Lundin and Söderholm 1995).

Only recently, scholars recognized the importance of linking projects to the concept of resilience (Naderpajouh et al. 2020; Yang et al. 2022). While one part of this research stream deals with the question of resilience in projects, another part focuses on projects as a vehicle to achieve resilience. For example, Yang et al. (2022) focus on resilience in cooperation projects and show that this kind of resilience is achieved through joint efforts and relationships of stakeholder organizations. They also argue that research on resilience in cooperation projects needs to be intensified. In contrast to them, we adopt the second perspective and aim to study how cooperation projects function as vehicles to achieve strategic resilience. In general, resilience projects can be defined "as a form of temporary organizing to respond to disruptions and build long term resilience at the level of individuals, teams, projects, organizations, supply chains, or societies" (Naderpajouh et al. 2020, p. 5). In our case, we study how cooperation projects with start-ups related to innovation can strengthen a firm's strategic resilience.

3 Methodology

3.1 Multiple Case Study Research Design

This paper builds upon the analysis of empirical evidence collected from two firms of the German energy industry based on the case study research design (Yin 2014). The case study approach is the most appropriate research method in the study of relationships between firms as phenomena that are difficult to separate from their context (Halinen and Törnroos 2005). Particularly, the qualitative case study method implies the following advantages in contrast to other research methods: new topic areas can be approached, theory can be developed, and multiple levels of analysis within one setting can be explored (Eisenhardt 1989; Yin 2014). Our study considers the two energy firms as units of analysis (case entities) that execute various projects with start-ups related to innovation to achieve strategic resilience. Thereby, those projects include multiple levels of analysis involving different internal and external parties.

We identified our case entities based on their ability to extend existing theory through providing typical examples (Eisenhardt 1989; Yin 2014). The German energy sector is confronted with far-reaching transformation processes (e.g., the nuclear and coal phase-out, and further legal regulations in the context of climate policy goals). Firms in this industry have to deal with a lot of change and innovation needs (e.g., Hake et al. 2015; Nordensvärd and Urban 2015; Witt 2013). More precisely, they have to adapt their core business, complement their core business with energies from renewable sources, and digitize products and processes. At the same time, various structural and cultural adjustments are needed (e.g., reduction of hierarchies, restructuring of personnel, opening to the external market, customer orientation). We purposely selected two cases that serve as examples of transformative and innovative large firms for the following reasons (see Table 1): First, both cases are established large corporations that face a political incision in their core businesses, leading to the slow dismantling of their key activities. To adapt to those incisions, they started to complement their core businesses with different new and innovative business areas, strategy fields, and firms. Based on different secondary data, we found that CO-1 formed three new business areas and expanded one business area. These business areas consist of different strategy fields, which cover topics appropriate to the business area's objectives. In total, CO-1 has complemented half of their eight business areas with 13 new and innovative topics since 2018. Since 2015, CO-2 has added one new business area to its portfolio and has constantly extended another business area. In total, CO-2 has complemented half of its four business areas by strategically focusing on six new and innovative topics. Second, both firms constantly seek to collaborate with various innovation initiatives in their region (e.g., universities, other research institutions, accelerators, business associations, start-up funds). Based on various reports, we identified six major innovative research and development projects in each firm involving diverse partners (i.e., universities, research institutes, and other industrial firms). Third, the two cases are among the first firms in their region and sector that actively try to develop new

Table 1 Cases overview

Acronym cases	Year of foundation	Number of employees	Corporation structure	Cooperation with innovation initiatives	Innovative research projects	Cooperation activity with start-ups
CO-1	1990	More than 7000 (Status in 2021)	*Business areas:* In total 8: 3 newly formed, 1 area extended *New strategy fields:* 13 innovative topics included in the business areas since 2018 (Status in 2020)	Universities; Other research institutions; Accelerators; Business associations; Start-up funds	6 projects (Status in 2019)	Start in 2018
CO-2	1990	More than 1000 (Status in 2021)	*Business areas:* In total 4: 1 newly formed, 1 area extended *New strategy fields:* 6 innovative topics included in the business areas since 2015 (Status in 2020)	Universities; Other research institutions; Accelerators; Start-up funds	6 projects (Status in 2020)	Start in 2016

The findings in this table are based on status reports, press and media releases, firm presentations, annual accounts, and interviews

and innovative topics through cooperation projects with start-ups. CO-1 began its start-up cooperation activities in 2018, and CO-2 in 2016.

The previous points show that the two cases have similar challenges, strategies, and structures. Thus, by selecting these cases, we fulfill the requirements of a replication logic (Eisenhardt 1989).

3.2 Data Collection and Analysis

For the selection of the cases, we first collected publicly available secondary data about the firms (e.g., websites, press and media reports, firm presentations, annual accounts). These data provided the basis for a preliminary analysis of the cases, their firm data and facts, and their transformation processes.

The preliminary analysis of the secondary data provided the preparatory work to begin primary data collection by conducting 22 in-depth interviews. In the first phase of primary data collection, we interviewed 14 employees within the two established firms to discuss their general cooperation activities with start-ups. A multi-level perspective was gained by collecting data from both management and project levels (for more details see Table 2). As the strategy of cooperation with start-ups represents a multi-layer phenomenon, we also saw the need to include the perspectives of involved external parties. For this purpose, in the second phase, we conducted six

Table 2 Overview primary data

Affiliation case	Number of referencing interviews*	Acronym Interviews	Position of interviewees
Internal focus CO-1	6	CO-1-I1 to CO-1-I6	Innovation manager (1); Head of corporate development (1); Head of a new strategy field (3); Innovation project employee and coordinator (1)
External focus CO-1	5	SI-1-I1; SI-1-I2; SU-1-I1; SU-2-I1; SU-3-I1	Start-up accelerator SI-1: Coach (1); Coach and event manager (1) Start-up SU-1: CEO and project employee (1) Start-up SU-2: CEO and project employee (1) Start-up SU-3: CEO and project employee (1)
Internal focus CO-2	8	CO-2-I1 to CO-2-I8	Head of corporate development (1); Head of strategy and implementation (1); Innovation manager externally (2); Innovation manager internally (2); Head of business development of a new strategy field (1); Innovation project employee and coordinator (1)
External focus CO-2	6	SI-1-I1; SI-1-I2; SU-3-I1; SU-4-I1; SU-5-I1; SU-6-I1	Start-up accelerator SI-1: Coach (1); Coach and event manager (1) Start-up SU-3: CEO and project employee (1) Start-up SU-4: CEO and salesperson (1) Start-up SU-5: Salesperson and business development (1) Start-up SU-6: CEO and salesperson (1)

SI-1: founded in 2014, 15 employees; SU-1: founded in 2013, 12 employees; SU-2: founded in 2020, 3 employees; SU-3: founded in 2015, 30 employees; SU-4: founded in 2016, 8 employees; SU-5: founded in 2013, 30 employees; SU-6: founded in 2018, 11 employees
* 3 interviews provide insights into each of the 2 firms' perspectives, which explains why the sum differs from the number of interviews

interviews with start-ups and two interviews with a start-up intermediary involved in cooperation projects with the established firms related to innovation (see Table 2). The start-ups and the start-up intermediary selected were founded between 2013 and 2020 and employed between three and 30 people. For this paper, the firms' and interviewees' names have been changed to protect anonymity.

We applied the snowball sampling method to identify appropriate interviewees within the established firms, start-ups, and the start-up intermediary. This sample recruitment strategy is particularly significant in multi-source studies in organizational research (Marcus et al. 2017). We recruited 12 people and 10 people were referred by those already interviewed (Marcus et al. 2017). The data was collected by an open and narrative approach, with flexibility to choose the appropriate focus of the interview depending on the interviewee's position and experience (Hollway and Jefferson 2008). Based on a literature review and the secondary data analysis, an interview guide with semi-open questions was developed and applied during the interviews. All relevant topics were covered in two parts: optional and mandatory. The optional part included questions about general firm information (i.e., structure, organization, processes, culture) and current challenges and transformation processes to complete the secondary data. The mandatory part addressed the topics of external cooperation strategies with start-ups (i.e., status quo of the cooperation activities, objectives in the cooperation), as well as their resilience effects (i.e., exchange processes, mutual

influence, challenges and success factors, external influencing factors). The mandatory part was adjusted accordingly for interviews with start-ups and the intermediary. During data collection, we asked all the interviewees to describe the process of the cooperation projects in retrospect. This narrative approach is suitable to consider temporal dimensions (past, present, future) as well as social dimensions (internal and external, personal and structural) (Clandinin et al. 2009) and thus allows us to reconstruct the process and its outcomes from the interviews.

We conducted three interviews at the firms' offices and 19 interviews via video call or telephone, as the global COVID-19 pandemic made face-to-face visits more difficult. Both variants were comparable in scope and content. In the case of personal visits at the two established firms, we took the opportunity to gain additional information on the corporate culture and structure during informal conversations and added them as supporting material to the data. The 22 in-depth interviews lasted between 35 and 80 min (average 60 min), were digitally recorded and transcribed word-by-word according to the rules of content-semantic transcription and extended content-semantic transcription (Dresing and Pehl 2017).

Data analysis of the primary data was conducted according to qualitative content analysis (Miles and Huberman 1994) using MAXQDA software. In our case, the analysis did not follow a linear process, but can be divided into five main steps. In the first step, we inductively reviewed the 14 interviews with the established firms to find recurring patterns, thus making use of the elements of grounded theory (Corbin and Strauss 1990). During this process, we identified the main topics of challenges and transformation processes, resilience strategies, and internal and external measures to implement innovation strategies. From this, it became clear that the two cases implemented their external innovation strategies using cooperation projects with start-ups. In the second step, we looked more deeply into the projects with start-ups related to innovation, breaking down the complexity of the data and establishing main categories. In doing so, we identified the main categories of cooperation process and resilience effects. In the third step, we analyzed the 14 interviews case-by-case in detail, added relevant text segments to the main categories, and broke the main categories down into subcategories (codings). In this step, we created separate text summaries of the findings from the categories for each case. From this step, we identified relationship quality as a linking pin between cooperation process and resilience effects, adding this aspect as third main category, establishing sub-categories and creating text summaries. Then, the coding and summary of each category were discussed and combined in a cross-case comparison using qualitative pattern matching (Yin 2014) (see Appendix for our coding structure and examples of cross-case pattern matching of data material). In particular, we evaluated the findings from the individual analyses in the author team under the aspects of similarities and differences. This revealed that the cases had very similar approaches and therefore we decided to focus this study on the similar aspects. Consequently, the cases are not presented case-by-case, but the interviewees' opinions are summarized across cases in the findings part of this paper. In the fourth step, the eight interviews with start-ups and the intermediary were used to concretize and complement the categories. Finally, in the fifth step, a framework was developed, with particular attention paid

to the connection between the project process and resilience benefits as well as the role of relationship quality in this connection.

4 Findings and Discussion

The data analyses of both cases showed that the relationship between cooperation projects with start-ups related to innovation and strategic resilience can be outlined in a three-part framework (see Fig. 1). This framework provides a holistic view on the cooperation process, the resulting resilience benefits for established firms, and the conditions required to realize these benefits from the process. In the next sections, we present and discuss our findings along the three parts of the framework.
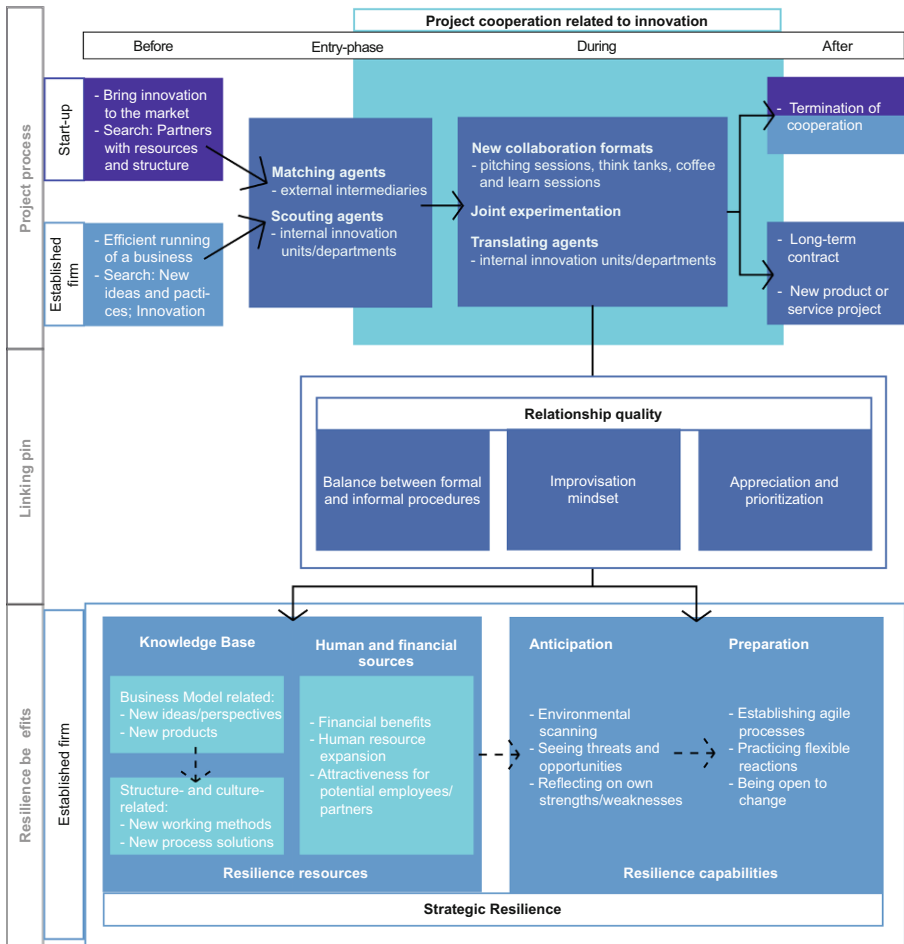

Fig. 1 Relationship quality as a linking pin between cooperation process and resilience benefits

4.1 The Process of Cooperation Projects with Start-ups Related to Innovation

The upper part of our framework shows the process of cooperation projects with start-ups related to innovation and its four different phases (i.e., before cooperation, entry-phase into cooperation, during cooperation, and after cooperation). From the data, we were able to identify specific aspects of this kind of cooperation process compared to other cooperations (i.e., between two established firms or between suppliers and buyers). In the following, we will highlight and discuss these aspects for each of the four phases. In so doing, we also refer to previous research supporting our empirical insights.

4.1.1 Before Project Cooperation

As shown in the upper part of Fig. 1, the established firms and start-ups act independently from one another before the project cooperation begins. During this phase, the start-ups proactively identify future needs and trends as a basis for developing their business model and search for a market fit for the innovation component of their product or service (Kohler 2016). As they focus on future and radically new trends, they often may act as disruptors (e.g., Kumaraswamy et al. 2018). In particular, to achieve a successful market fit, start-ups look for early adopters who offer financial resources and business routines (Islam et al. 2017; Minshall et al. 2010; Weiblen and Chesbrough 2015). As our cases showed, they seem to search partners helping them learn to run a business model efficiently, and provide budget, network and equipment to place the business model in the market (Islam et al. 2017; Weiblen and Chesbrough 2015). Established firms can function as such early adopters or partners as they are able to provide those resources and routines. In turn, they seek to increase innovation performance (Islam et al. 2017), as they need to constantly adapt to dynamic environments to survive in the markets – for example, in our case, the rapid changes due to nuclear and coal phase-out, climate policy goals, or demand shifts of energy resources due to the Russia-Ukraine War. Thus, they try to identify new solutions to further develop or realign their business model. However, most established firms are very efficient and have functioning structures, which often makes it difficult for them to deviate from the known and identify future trends (e.g., Christensen et al. 2018).

To make first steps towards increasing their innovativeness and thus their strategic resilience, our case study firms initiated a strategic innovation planning process by defining a business-, structure-, and process-related innovation roadmap. In so doing, they realized that they need to seek external players who fit with the objectives of their innovation roadmap and who are able to develop solutions that match future trends (Kohler 2016). Thus, established firms search for start-ups that show a strategic fit, i.e., reveal overlapping interests (e.g., Niederkofler 1991), which in our case implies suitable new and innovative solutions in the fields of digital infrastructure as well as energy production, storage, and distribution. This also includes a shared vision of the solutions' outcome in the markets and the impact on the partners' business (Douma et al. 2000).

4.1.2 Entry-phase into Project Cooperation

Our cases revealed that for established firms, it is especially difficult to identify suitable start-ups as they operate in a different world.

> "Start-ups are in a completely different bubble and deal with other topics and this feedback is extremely helpful […] . And that's [why they can be seen as] a radar, extended radar, extended eye, binoculars." (CO-2-I3:40)

On the one hand, there are many start-ups entering and leaving the market, making it difficult for established firms to keep up with this pace (Weiblen and Chesbrough 2015). On the other hand, the representatives of the established firms are often significantly older than those of the start-ups – an age difference that can lead to misunderstandings since they speak different languages. To solve those problems, our data indicate that especially start-up intermediaries and start-up funds function as matching agents. These external and independent institutions play a key role in establishing an initial contact between the two actors (see also Blanka and Traunmüller 2020) by offering among others networking events (i.e., pitching sessions, speed dating). Thus, established firms enter contractual memberships with those matching agents and consequently get insights into future topics and innovative solutions at an early stage (Giglio et al. 2023). Furthermore, those matching agents provide support in negotiation issues so that start-ups and established firms can find common ground and enhance their knowledge base on prerequisites of a cooperation between start-ups and established firms (Garcia Martin et al. 2023). In so doing, these matching agents also help with their expertise to overcome cultural differences. They act as a translator between the start-up culture with characteristics such as short decision-making processes due to lean organizational structure and the established firms' culture of planning security (Islam et al. 2017).

> "[…] the advantage of the accelerator is that we have the opportunity to address a much larger group of start-ups, or a much larger group of start-ups apply there, which then also gives us additional, stronger or broader access to start-ups." (CO-1-I2:48)

Besides external matching agents, institutionally established units (e.g., corporate development, innovation unit/department) act as scouting agents from within the established firms (e.g., Weiblen and Chesbrough 2015). Our cases showed that these scouting agents also facilitate the entry into projects between established firms and start-ups. In so doing, scouting includes, on the one hand, that the employees of those units manage the contractual memberships with the external matching agents.

> "So, we are the one who provides the input channel, who makes the contact, but we can't do the business related work at the end." (CO-1-I2:66)

On the other hand, they actively participate in events and search for start-ups with a strategic fit and afterwards establish the initial contact between the start-up and thematically appropriate strategy fields within the established firm. Mostly, those networking activities lead to informal information exchange about further start-ups

and possible scouting options. To sum it up, the matching and scouting agents pursue the overall objective to help find partners with a strategic fit.

4.1.3 During Project Cooperation

After identifying a partner with a strategic fit, project cooperation is initiated, and collaborative terms are clarified and established. We found from our cases that there can be a wide range of characteristics, objectives, and topics of projects between established firms and start-ups related to innovation in the energy sector (see Table 3). However, in the following, we focus on approaches that are generally important for projects between established firms and start-ups related to innovation and that can help bring them to success.

Particularly during the phase of clarification of project steps and goals, initiating events can be useful to find a common language. Our data showed that, as with other projects, kick-off events between strategic and operational staff helped define the formal means such as a roadmap and management rules for projects (Dille and Söderlund 2011). Nevertheless, specific formats (i.e., pitching sessions, think tanks, coffee and learn sessions) may be essential in a previous step to understand new topics, joint intersections, working approaches and thus help to build a common basis. To exemplify with our data, one of our cases showed that a start-up was invited to hold a coffee and learn session (including the world café method) on the topic of artificial intelligence to generate new ideas together with the firm's

Table 3 Detailed information on the projects

Cooperating partner(s)	Project type	Objectives of the project
CO-1 and SU-1	Product development project; pilot project	Support of a new strategy field; focus: mechanical engineering Further plant construction project; research project
CO-1, SI-1 and SU-2	Product implementation project; pilot project	Support of a new strategy field; focus: renewable energy and environment Further long-term product implementation and service partnership project
CO-1, SI-1 and SU-3	Product development project	Support of a new strategy field; focus: IT and services Further projects for the development of new business models; marketing cooperation
CO-2, SI-1 and SU-3	Product development project	Support of a new strategy field; focus: IT and services Still in the planning phase
CO-2, SI-1 and SU-4	Product implementation project	Image building; focus: art and media One time project with a further step in digitization
CO-2 and SU-5	Product implementation project	Support of a new strategy field; focus: renewable energy and environment Further step in digitization; further product implementation project; long-term service partnership for the implemented product; research project
CO-2, SI-1 and SU-6	Product development project; pilot project	Change of the processes and tools; focus: software and artificial intelligence One time project with a further step in automation and digitization

employees – ranging from the managing board to operational employees. Through joint experimenting, 15 ideas were generated, and three projects established.

> "The topic of artificial intelligence was trendy and we selected the start-up SU-AI for the start-up class and then said that in order to gain acceptance for the start-up and so that the start-up could see what the CO-2 has to offer, we invited them to a coffee and learn event where they told us what they do and where employees were supposed to throw in ideas about what they could do on the topic of artificial intelligence at CO-2." (CO-2-I4: 36)

Furthermore, the specific approach of joint experimentation is also practiced during product and service development in our specific kind of cooperation projects. According to the interviews, this involves experimenting with the start-up's prototypes and pilots once or even several times and learn from failures. As a result, a continuous and iterative development of the start-ups' solution takes place, and the established firms get the chance to customize them according to their problems and requirements.

> "And we saw added value in this prototype for the firm and then said, 'Okay, we're going to do a pilot project with you. We will test or you will test this model that you have under real conditions, in the field [...].' This gives you the added value of getting a 'proof of concepts', so to speak, for your MVP (Minimum Viable Product)." (CO-1-I1:26)

In particular, successful experimenting is supported by the innovation unit/department as it acts as translating agent for innovative topics, which does not occur in this way in other project cooperation (i.e., between two established firms or between suppliers and buyers) (Weiblen and Chesbrough 2015). On the one hand, the employees in this unit/department pick up problems and issues internally in various subject-specific units/strategy fields and match them with external innovative solutions. On the other hand, they help to establish new reporting structures internally by setting up the initial contact between projects or newly emerging strategy fields and a member of the management board.

> "At the same time, in 2018, we identified the first new business units with a project, CO-1 PLUS, which operate in an independent organizational unit and have a member of the management board as their sponsor, and report directly to the management board. And they do not carry out their activities within the organization but are already separated to ensure the degree of freedom and the possibilities for developing these new business areas." (CO-1-I2: 22)

Thus, similar to corporate accelerator programs, our data shows that top management support is also an important factor in project cooperation with start-ups (Kanbach and Stubner 2016). Our data especially revealed that this support helps to establish a direct reporting, reduce hierarchy levels, and achieve faster decision-making processes.

"In my opinion, the best thing you can do is to give employees the feeling that they can always talk to their boss if something is not going well. [...] And you should keep this spirit, because this is how innovations are created." (CO-1-I3: 30)

The specific events, the experimenting and translation measures can be seen as intentional interventions (van Marrewijk and van den Ende 2022) that can influence both established firms and start-ups positively in combining their competencies, aligning their working methods and implementing measures together in a spirit of collegial collaboration. In so doing, both parties are seen as equal partners that may lead to the formation of understanding, which influences the positive development of trust and thus building a relationship capital between the project members (e.g., Carmeli and Gittell 2009; Faems et al. 2008; Pasian et al. 2012; von Danwitz 2018). This positive relationship is also known as operational fit – the ability to make the resources involved in the collaboration, on the personal and structural level, compatible (Niederkofler 1991).

4.1.4 After Project Cooperation

In our cases, the shift to the phase after project cooperation involves either the completion of the prototype or pilot, the approval of the final product, or the successful launch of a service. As indicated in the interviews, three scenarios can then occur: The first two scenarios imply a positive future by continuing the cooperation to longer-term, more comprehensive partnerships (Minshall et al. 2010), being more likely if a strategic fit still exists and an operational fit has been developed (Niederkofler 1991). In those cases, the cooperation can be stabilized on the one hand by a long-term contract, or on the other hand by a development project for new products, services, or research.

"And now [...] we have finally entered a typical framework contract, [...] where we can regularly request this service." (CO-1-I6:24)

In the third case, the cooperation is dissolved when for example the operational fit has not been developed and/or a strategic fit no longer exists. Mainly, the termination of the cooperation seems to happen when negative experiences were made on a personal and/or structural level during project cooperation. For example, our data showed that one start-up had already started to implement first development steps as discussed between the parties, but in the end never received a budget for the measures taken. In this case, non-transparent communication negatively influenced the personal level of the project staff. Thus, especially learning about the partner, knowing the partners' structures and processes, and the industries where they operate in is necessary to exchange their complementary resources successfully (Knight and Pye 2005).

To realize direct and indirect resilience benefits from the project process, a high relationship quality between the established firm and the start-up seems to be an important condition. In the next section, we will elaborate on this important aspect.

4.2 Relationship Quality as a Linking Pin Between the Project Cooperation Process and Resilience Benefits

During our data analysis process, we found some characteristics that seem to be essential to realize resilience benefits out of the described cooperation process. These characteristics are 1) a balance between formal and informal procedures within the project work, 2) an improvisation mindset of involved people, and 3) appreciation of the cooperation partners and prioritization of their concerns (see middle part Fig. 1). The three elements are closely linked, and all refer to the relationship between the cooperation partners. We thus formed the overarching category of relationship quality as a linking pin between the project cooperation process and resilience benefits. Depending on its characteristics, this condition can foster or hinder the realization of resilience. Similar to our findings, the quality of relationships is also described as essential to foster learning in cooperation (Gulati 1998) as well as to learn from failures in organizations (Carmeli and Gittell 2009; Dutton 2003). Our findings go beyond these insights in the sense that we can show that the three mentioned characteristics of the relationship quality help generate direct and indirect resilience benefits for the established firms (i.e., direct effects on strategic resilience capabilities and indirect effects via resilience resources such as the knowledge base as well as human and financial resources). In the following, we describe the three included characteristics in more detail as well as their potential influence.

4.2.1 Balance Between Formal and Informal Procedures

One important challenge for the partners is to find the right balance between formal and informal working procedures. From the literature, we already know that both procedures are important for fast reactions (Faraj and Xiao 2006; Ring and van de Ven 1994), but based on our data, we can say that differences must be made depending on the maturity level of projects. Our analysis shows that formal means such as roadmaps or resource planning can facilitate the achievement of the project cooperation objective. However, our interviewees emphasize that such means should take a flexible form in projects with start-ups related to innovation. Furthermore, the project process can be supported by regular formal meetings with all project members. However, informal communication by phone and email is also important to be able to react to urgent and serious challenges quickly and flexibly in the projects. Based on our case analysis, it can be said that the more radical and newer the output in the project, the more informal and unstructured the procedures should be. Along this line, the effectiveness of established formal project management methods in the context of new, uncertain and risky projects is questioned (Loch and Kavadias 2011). Thus, it can make sense to only fix the tasks in a roadmap and leave the processing path open.

> "The 'trackers' [...] really [are] a practice of agreeing on specific tasks and checking progress regularly. That's rather agile [...] in terms of the approach and is characterized mainly by many sprints in between." (SU-1-I1:16)

This kind of procedure broadens the knowledge base of established firms by questioning their own structures and learning from the rather agile processes of the start-ups. Thus, it also fosters the development of resilience capabilities in the sense that a balance between formal and informal procedures allows for flexible and quick reactions to any kind of changes (Ring and van de Ven 1994). In particular, we conclude that this element of the relationship quality can prepare established firms well for unexpected situations and strengthen their capability to deal effectively with such situations. We thus assume that it can lead to resilience benefits at the organizational level.

4.2.2 Improvisation Mindset

To achieve a balance between formal and informal procedures, it can be helpful to involve people with an improvisation mindset. Especially when working with start-ups, things do not always work as planned and involved people must leave their normal ways of doing something. Then the project benefits from people who are able and willing to improvise (Gama et al. 2017). Those people are aware and ready to change procedures when needed. They accept the situation, use what is available and make the best of it. Furthermore, they show a general open-mindedness towards innovations and novelties. They are not restricted to intra-organizational activities but act within the wider innovation ecosystem and see the need for external knowledge to be absorbed. For example, they look for new ideas and partners via events and networking in the ecosystem.

> "Then, of course, I take the people who really want it, who have the drive, who have the will to change something and who, when in doubt, don't shy away from reconsidering a process." (CO-2-I2:24)

In this context, Weick (1993) refers to bricolage—the capability to improvise and creatively solve problems. A bricoleur is a person who uses available resources to find new solutions to existing problems. Different studies confirm that this kind of improvisation is needed to achieve resilience (Rerup 2001; Weick 1993; Weick et al. 1999). Our study particularly underlines the important role of an improvisation mindset in developing resilience capabilities. An improvisation mindset at the individual level (Rerup 2001) allows for the quick acquisition of new ideas, knowledge, and products. Consequently, the knowledge base of established firms can be broadened and, in some cases, structural and cultural adjustments can take place (when new working methods and process solutions are transferred into the established firms' organization). Furthermore, the improvisation mindset is particularly important to anticipate changes effectively and thus prepares established firms well for unexpected events. It thus can strengthen strategic resilience at the organizational level.

4.2.3 Appreciation and Prioritization

An important condition for a resilience-enhancing cooperation process seems to be that the project partners value each other (von Danwitz 2018) and give priority to

the joint project. Our interviewees state that the project members need to match on a personal level. This means trusting each other, treating partners as equals, and developing an understanding for the other to master the cooperation process and challenges together (Pasian et al. 2012).

> "It's almost as if we were colleagues who support each other simultaneously, and this is reflected in many aspects." (SU-2-I1:16)
> "And if I'm a young start-up entrepreneur, [...] it's also important that I find someone who treats me fairly, with whom I can get along well. And vice versa, it's just the same, [...] that you don't just have to get along well on a technical, professional level, but also on a human level [...]." (CO-1-I5:16)

Open and transparent communication plays an important role in this context (von Danwitz 2018; Yang et al. 2022). In our cases, this means delays or errors are communicated clearly and immediately by both sides in case of problems. Besides that, the status quo and each step in the problem-solving process are made transparent. This type of communication is equally important during the normal project process to estimate project risk, discuss follow-up projects, or obtain feedback.

> "That's why it's actually the only requirement [...], that you have such a contact at eye level to a certain extent. And mutual trust, so that we can somehow exchange ideas about such things." (CO-1-I1: 96)

In addition, the interviewees point to the important role of a supporting context (in terms of organizational level embeddedness) (e.g., Bakker 2010; Sydow et al. 2004). In our case that includes three elements: 1) scouting/translating, 2) making resources available, and 3) reducing complexity and bureaucratic steps.

Scouting/translating   As already mentioned in Sect. 4.1, the initiation of cooperation with a start-up can be supported by an internal innovation or corporate development unit/department. In particular, the employees of this unit/department take the role of innovation scouts externally and form an innovation gateway to the operational business units internally (Weiblen and Chesbrough 2015). Problems and topics are picked up in the various subject-specific units/strategy fields and suitable external start-ups with their new ideas, perspectives and products are provided. As our data shows, when initiating cooperation, the employees of the innovation or corporate development unit/department fulfill a moderating role internally by acting as translators between start-ups and the operational units (e.g., regarding financial issues). Project cooperation can also be supported by alliances with start-up funds and intermediaries who act as matching agents (e.g., Blanka and Traunmüller 2020; Giglio et al. 2023; Martiskainen and Kivimaa 2018). They provide support in structural or negotiation issues so that start-ups and established firms can find common ground.

> "And that's basically the exciting part for me, because I'm the mediator between the start-up and the industry partner since they usually speak different languages in terms of requirements management, timelines, and content." (SI-1-I1:6)

Making Resources Available   Furthermore, project cooperation with start-ups is positively influenced if sufficient human and financial resources are available. The resources need to be clarified and flexibly managed so that employees involved in project cooperation with start-ups ideally have more time available than in normal cooperation. According to the interviews, an obstacle can arise if the project team members are too strongly involved in other operational tasks in addition to the project cooperation.

> "And I just think what's important is whoever wants innovation must also know that it has a price." (SU-6-I1:28)

Reducing Complexity and Bureaucratic Steps   Relationship quality also means that partners, especially large corporations, are willing and able to reduce their complexity and bureaucratic steps (e.g., Hora et al. 2018; Weiblen and Chesbrough 2015). The two cases in our study have a very traditional structure: many hierarchical levels, structured processes, and detailed regulations. Reducing their complexity is an important measure to accommodate the hands-on mentality and shorter life cycles of start-ups. In our cases, the cooperation with start-ups gave the impetus for structural and cultural adjustments, for example simplifying and speeding up decision-making processes by removing bureaucratic steps. An example mentioned several times in the interviews are contract negotiations, which are often out of proportion to the service or product paid for.

> "In other words, we are actually very dependent on being very lean, very narrow, and very, very fast on the road. With as little unnecessary or slowing down bureaucracy as possible." (CO-1-I6:10)

To summarize, valuing the cooperation partner and providing a supportive context build trust and openness, which in turn lead to close interaction, feedback, and joint experimentation. New working methods and process solutions are increasingly used, and resources are shared among the parties involved. This not only allows for more effective problem solving, but also helps to reflect on existing processes, learn from each other, and adapt, as necessary (see also Gulati 1998). Thus, the firm broadens its knowledge base, which is particularly important to resilience at the organizational level, and it develops resilience capabilities. Especially, established firms learn to reflect on own strengths and weaknesses and thus can enhance their anticipation capabilities.

4.3 Resilience Benefits of the Established Firm

Based on our interviews and including previous findings from the resilience literature, we can say that cooperation projects with start-ups contribute to the development of strategic resilience in established firms. In our case, the main condition for the successful translation of these projects into resilience benefits is a high relationship quality between established firms and start-ups (see Fig. 1). Based on that, various sources of resilience arise for the established firms: 1) an enhancement of the firm's knowledge base, 2) an expansion of human and financial resources,

and 3) the development of strategic resilience capabilities (i.e., anticipation and preparation) (see bottom part of Fig. 1).

4.3.1 Enhancement of the Firm's Knowledge Base

From the literature, we already know that a firm's knowledge base is an important antecedent of resilience (Duchek 2020). Our two cases provide insights into how cooperation projects with start-ups can enhance the knowledge base of established firms and how this contributes to their resilience. On the one hand, we found that these specific projects provide the opportunity for established firms to expand their business model related knowledge. During the cooperation project, start-ups provide the firms with new perspectives, ideas, and products which can complement the firm's business model. This broadens the firm's knowledge base and thus its spectrum of perception and action (Cohen and Levinthal 1990; Duchek 2015). On the other hand, these projects can lead to structure- and culture-related expansions of the knowledge base. For example, start-ups provide established firms with new working methods and process solutions.

> "It's also an opportunity to cooperate with start-ups and drive the change management process at our firm forward to some extent." (CO-1-I2:52)

However, these two kinds of knowledge base expansion are not clearly separated. Rather, business model related improvements often entail structure- and culture-related improvements. For example, interviewees report that cooperation projects to introduce digital solutions also create structural benefits in terms of internal process advancements. Our study shows that high levels of relationship quality support that the start-ups' impulses for improvement can actually be used and that changes at the structural and cultural level of the firms can be initiated (Hora et al. 2018).

4.3.2 Expansion of Human and Financial Resources

Through cooperation projects with start-ups, established firms can also expand their resource base. Different studies already confirm that a broad set of resources is essential to build resilience (e.g., Hamel and Välikangas 2003; Vogus and Sutcliffe 2007). We show that cooperation projects could make (human and financial) resources accessible (Gittell et al. 2006) and that those together with an enhancement of the knowledge base are prerequisites for the development of resilience capabilities (i.e., anticipation and preparation).

First, our cases show that the established firms can gain a better cost/benefit ratio from cooperation projects with start-ups than with other firms. Our data revealed that in first time projects start-ups succeed with their specialist knowledge against the development of these competencies within the firm itself, as it would be far too expensive to train the expertise in-house (Hora et al. 2018). Consequently, in cooperation projects with start-ups, it is possible to reduce costs. At the same time, the established firms can use employees from the start-ups to work on a specific topic and thus expand their human resource base.

"What I hope to get from a start-up is bundled expertise in a precisely defined small field." (CO-1-I3:26)

Second, we concluded from the interviews that cooperation projects with start-ups can improve the established firms' public perception and marketing position in the sense that customers and other stakeholders recognize the firms as innovative and open to cooperation. This, in turn, can enhance the firms' attractiveness for customers, potential workers, and cooperation partners.

"And vice versa, the large firm [...] of course takes the label from us: we make innovations, we want to digitize, we want to make ourselves fit for the future and continue to exist in the market." (SU-3-I1:70)

To realize the maximum benefit of the cooperation project, the above-described relationship quality plays an important role. High levels of relationship quality help to get access to the partner's resources and use these resources for innovation purposes.

4.3.3 The Development of Strategic Resilience Capabilities

Finally, our data show that cooperation projects with start-ups help to accelerate the resilience capability development of established firms (Lengnick-Hall et al. 2011). In particular, we show that based on an expanded knowledge as well as resource base, the firms develop anticipation and preparation capabilities (see also Casprini et al. 2022; Somers 2009) which then help to respond effectively to future crises.

First, established firms enhance their environmental scanning capabilities (Duchek 2020). Based on their newly gained expertise, they broaden their search scope and become able to see relevant developments in the wider corporate environment. This means that they are able to see more potential threats as well as opportunities. Furthermore, cooperation projects lead to reflection and learning processes in the established firms. The interviews showed that reflection on challenges in cooperation projects is used to identify optimization potential for internal processes (see also Morais-Storz and Nguyen 2017). For example, cooperation projects acted as a trigger for flattened hierarchies and faster and shorter decision-making processes.

"And then we had to implement a completely different accounting process. At that time, the accounting system really was as follows: invoice came, invoice was scanned, a sheet was added on top, invoice was released for circulation, and we said, 'We can't do it that way. We have quite a lot of small invoices, if we do all that, we can't get the payment terms of 14 days.' We introduced an electronic workflow for these incoming invoices." (CO-2-I4:12)

Second, these reflection and learning processes allow for a better preparation for future crises. For example, agile processes that are established in cooperation projects with start-ups can be used to develop solutions in future crisis situations. Furthermore, established firms learn to react flexibly when conditions change and adapt their processes if needed, which is also useful in crisis situations.

"The topic of hierarchies, the topic of implementing ideas, the topic of agility, [...] it all comes from the start-up. As a large firm, I can try to take something from that." (CO-1-I3:64)

One important part of this flexibility is a trial-and-error culture, which is often practiced in cooperation projects with start-ups. For example, the interviewees state that the joint product is repeatedly questioned and adapted if necessary during joint experimentation. Consequently, an error culture is adopted step-by-step through open and transparent communication. Especially, flexibility and agility are two abilities that help to deal with daily challenges and can be seen as sources of resilience (Raetze et al. 2021b).

Overall, we assume that many learning processes take place during cooperation projects involving start-ups, which provide diverse transformation impulses for established firms. Even if these initially only have an effect in a small area or among individual people, over time scaling effects can occur, so that entire business units or even the entire organization adopt an innovation. High levels of relationship quality promote these reflection and learning processes, and thus help make the most out of the cooperation.

4.4 Overall Summary and Discussion

Our study on strategic resilience, cooperation with start-ups as an underlying external innovation strategy, and its implementation through projects results in a three-part framework. This framework provides a holistic view to understand the interdependencies of the project process, the resulting resilience benefits for established firms, and the conditions required to realize these benefits from the process. In so doing, we link the concepts of resilience, project management and inter-organizational cooperation. Especially, we complement resilience research, as so far, its focus has mainly been on cooperation projects in the context of supply chain resilience and risk reduction (e.g., Naderpajouh et al. 2015; Thomé et al. 2016).

From our data, we could illustrate the specifics of the project cooperation with start-ups related to innovation along their course (i.e., before cooperation, entry-phase into cooperation, during cooperation, and after cooperation) and identify some specific approaches during these steps that we assume can help lead to success. Especially, we recognize the importance of contextual embeddedness of those specific cooperation projects (Bakker 2010; Engwall 2003). We indicate that, although the objective of the cooperation projects is to develop or introduce innovation that organizations need to renew, those have to pay more attention to work relationship building processes as well as supporting structural and institutional elaborated measures. So far, scholars have provided a theoretical view of work relationships and their influence on the individuals' engagement and activism (Carmeli et al. 2015). With our study, we provide empirical insights into individual and structural characteristics arising from work relationships that can help organizations to establish resilience (Brueller et al. 2019). First, we identified the involvement of external matching agents and institutionally established internal scouting und translating agents that help to form a strategic but also operational fit. So far, those agents have already

been recognized in research on cooperation with start-ups (e.g., Blanka and Traunmüller 2020; Giglio et al. 2023; Islam et al. 2017; Weiblen and Chesbrough 2015). However, we show that those are especially important in project cooperation (see also Martiskainen and Kivimaa 2018) and we are the first to link them to resilience research. Thereby, our data indicated that the matching agents of start-up funds and intermediaries provide support in structural or negotiation issues so that start-ups and established firms can find (strategic and operational) common ground (Eskerod 1998; Niederkofler 1991). Apart from that, the scouting and translating agents of the corporate development or innovation unit/department help facilitate the entry into projects by establishing the initial contact between the start-up and thematically appropriate new strategy fields. Furthermore, we show that they help to establish new reporting structures. Especially, we confirm previous research saying that in this context the support of the top management is important for a successful project management outcome and the enhancement of resilience (Granig and Hilgarter 2020). Second, we indicate that experimenting during the project cooperation process can influence both established firms and start-ups positively through understanding and combining their competencies, aligning their working methods, and implementing measures together in a spirit of collegial collaboration. In so doing, we show that organizations have to experiment with new measures to establish sources of resilience and thus achieve their strategic goal of innovation, renewal and growth (see also Brueller et al. 2019; Hamel and Välikangas 2003; Iborra et al. 2020).

From the project cooperation process, we found that a key condition for cooperation projects with start-ups related to innovation emerges. We call this condition relationship quality, which includes a balance between formal and informal procedures, an improvisation mindset of the involved people, and an appreciation of project partners as well as the prioritization of their concerns. In so doing, we complement former research on prior ties and governance of stakeholders as characteristics of the relationship level (Yang et al. 2022). In our case, we conclude that these characteristics allow for flexible and quick reactions to unexpected changes and help established firms to reflect on their knowledge and behavior, learn from the cooperation partners, and adapt when needed. Especially, the relationship level is underpinned with value and allows for building trust and task integration (e.g., Carmeli and Gittell 2009; Faems et al. 2008). Thereby, we show that trust facilitates the communication between actors (Faems et al. 2008) and task integration eases the building of shared goals, shared knowledge and mutual respect (Carmeli and Gittell 2009). Similar to our findings, high-quality relationships are also described as essential to learn from failures in organizations (Carmeli and Gittell 2009; Dutton 2003) or to coordinate cooperation projects (van Marrewijk and van den Ende 2022). However, we illustrate with our empirical data that different characteristics of the relationship quality help generate direct and indirect resilience benefits. In our case that means resilience resources (i.e., knowledge base, human and financial sources) and resilience capabilities (i.e., anticipation and preparation) which are the main elements of strategic resilience (Duchek 2020; Hillmann and Guenther 2021; Lengnick-Hall and Beck 2005). In this context, we already know that a firm's knowledge base is an antecedent of strategic resilience (Duchek 2020), but with our study we provide in-depth insights into how external knowledge acquisition from start-ups

function and how this could lead to internal structural and cultural improvements of the established firms. Furthermore, different studies confirm that a broad set of resources is essential to build resilience (e.g., Hamel and Välikangas 2003; Vogus and Sutcliffe 2007). We show that cooperation projects related to resilience could make (human and financial) resources accessible and that those together with an enhancement of the knowledge base are prerequisites for the translation into resilience capabilities (i.e., anticipation and preparation) (Richtnér and Löfsten 2014).

Overall, we reveal how project, relationship, and organizational levels can be linked and thus follow the call for more multi-level investigations in resilience research (e.g., Williams et al. 2017). We extend previous resilience research that usually focuses on only one level of analysis (e.g., Herbane 2019). More precisely, we show the effect of the meso level of the project on the macro level of the established firms' strategic resilience. In so doing, we further enhance research on (resilience) projects (Geraldi and Söderlund 2018; Naderpajouh et al. 2020), and we address the call to intensify research on the proactive aspects of resilience at the organizational level (Raetze et al. 2021b).

5 Conclusion, Limitations, and Implications

With this study, we make an important contribution to resilience research by focusing on cooperation projects with start-ups related to innovation as a specific vehicle to enhance a firm's strategic resilience. Using the cases of two German energy firms, we were able to give insights into the realization of those projects. We developed a three-part framework detailing specific actions during the cooperation project process, resilience benefits for established firms and, as a linking pin, relationship quality.

It is in the nature of exploratory case studies that no statistically validated correlations can be shown. However, our framework can serve as a useful basis for future research. Besides the need for quantitative empirical studies that confirm and expand our findings, we see great potential in the further specification of cooperation projects with start-ups. Our study included diverse types of cooperation projects related to innovation. Project partners differed in their project management maturity depending on the firm age, and the projects had very different characteristics (i.e., development projects, implementation projects, testing projects). This means that future research could engage in clustering different types of projects and analyzing their effects on organizational-level resilience. Furthermore, we have only examined the effects of cooperation projects on the resilience of established firms. Future research could also focus on the effects of those projects on the start-ups' resilience.

In our study, we used a narrative approach to retrospectively reconstruct the project cooperation process of one-time projects and its outcomes. Future studies might use ethnography as a useful research method to accompany such processes in real time, to study their long-term development with further follow-up projects, and thus gain further insights. On the one hand, such studies could provide deeper insights into the dynamics at the relational level, for example how relationship quality influences cooperation processes, but also how this relationship quality emerges from the cooperation process. On the other hand, more insights could be gained on

whether follow-up project cooperation releases even more and varied (resilience) resources.

In addition, we consciously selected two similar cases as typical examples of transformative and innovative large firms. Precisely, we studied German energy firms that are comparable in terms of their structure, challenges, and approaches to overcome these challenges. Nevertheless, the findings of this paper are not limited to firms in the energy sector and can be transferred to large established firms in general. Such firms can benefit from opening up to start-ups and starting cooperation projects when they are able to create a high degree of relationship quality, which includes a balance between formal and informal procedures, an improvisation mindset, and appreciation and prioritization. Beyond this, and based on our interviews, we even think that medium-sized firms can also benefit from this kind of cooperation. However, future research is needed to support this assumption and clarify differences between these types of firms and the effects of cooperation projects with start-ups.

6 Appendix

Table 4 Coding structure and examples of cross-case pattern matching of data material (Translated from German)

Project cooperation process	Example from data related to CO-1	Example from data related to CO-2
Before project cooperation	That is, start-ups are interesting to me precisely when an advantage for the firm can be derived from them. (CO-1-I5:14)	To get a radar for ideas, fresh wind and fresh life into the organization, to meet this start-up world and to earn money with it ideally. (CO-2-I3:12)
Entry-phase into project cooperation Different worlds	And we have also had the experience that, especially in the areas where older colleagues were, the response was: "Leave me alone with your modern fancy stuff". (CO-1-I2:64)	Start-ups are in a completely different bubble and deal with other topics and this feedback is extremely helpful [...]. And that's [why they can be seen as] a radar, extended eye, binoculars. (CO-2-I3:40)
Matching agents	[...] the advantage of the accelerator is that we have the opportunity to address a much larger group of start-ups, or a much larger group of start-ups apply there, which then also gives us additional, stronger or broader access to start-ups. (CO-1-I2:48)	The accelerator is intended to provide support for specific strategies. If we now do a lot with biogas, then they should support biogas. If we want to focus on hydrogen as our topic of the future, then they should look for hydrogen topics. This gives us a better pipeline of start-ups and enables us to promote ideas in a more targeted manner. And this will also lead to cooperation. (CO-2-I5:6)
Scouting agents	So, we are the one who provides the input channel, who makes the contact, but we can't do the business-related work at the end. (CO-1-I2:66) Corporate development cannot evaluate the business and technical-related issues, but structural issues. In other words, the structural issues associated with cooperation can be dealt with by the corporate development. But in the end, the corporate development still serves to initiate and support the process. Implementing the process is then no longer a matter for the corporate development. (CO-1-I5:38)	How can the innovation managers help with their know-how, their network and the start-ups they know? (CO-2-I6:22) What we pay attention to is that there is always an internal coordinator present. We often have the case that the start-ups are located in the accelerator and [the employees think] that it must be free of charge if the start-up does something for us. There are frequent discussions, even internally, about why I have to pay them if they do a project with me. Well, if they were to do it with another large firm, then they would also have to pay for it. (CO-2-I3:14)

Table 4 (Continued)

Project cooperation process	Example from data related to CO-1	Example from data related to CO-2
During project cooperation Kick-off	It always depends on the initial steps, some kind of kick-off, agreeing on a roadmap, which goal should be achieved by when. (SU-3-I1:30) The first thing was to establish a regular communication. As close as possible, every 14 days since our sprints [...] are also 14 days. Accordingly, there is a reporting beforehand in the team. And then protocoling and documenting the respective meeting. (SU-3-I1: 30)	There was basically a kick-off. I then slowly bowed out of the process. (SU-5-I1:16) And perhaps in addition to accompany this modification, the colleagues also have a jour fix meeting every two weeks with CO-2 [...] to basically always be able to exchange current information: Attention, there have been problems here! (SU-5-I1:16)
Project types	And we saw added value in this prototype for the firm and then said, 'Okay, we're going to do a pilot project with you. We will test or you will test this model that you have under real conditions, in the field [...].' This gives you the added value of getting a 'proof of concepts', so to speak, for your MVP (Minimum Viable Product). (CO-1-I1:26)	Or alternatively, when it comes to product development, there are various start-ups that are now working on intelligent household applications, such as Alexa for pets, and they are looking at whether they can set up a joint product line. (CO-2-I7:12)
New collaboration formats	The young firm had first introduced itself to us here in the firm. Through the contact from our corporate development department. They had seen it first at the accelerator and then introduced themselves to us again separately. That's when I got to know the start-up or the product. And then I saw them again at the accelerator during a presentation or a pitch. (CO-1-I6:28)	So let us perhaps take it like this, we had the start-up SU-AI with whom we held a coffee and learn event at the beginning of last year. [...] The topic of artificial intelligence was trendy and we selected the start-up SU-AI for the start-up class and then said that in order to gain acceptance for the start-up and so that the start-up could see what the CO-2 has to offer, we invited them to a coffee and learn event where they told us what they do and where employees were supposed to throw in ideas about what they could do on the topic of artificial intelligence at CO-2. So, they presented it really well and [...] I think there were 15 ideas from employees that they dropped at this coffee and learn event. (CO-2-14: 36)
Joint Experimenting	And we saw added value in this prototype for the firm and then said, 'Okay, we're going to do a pilot project with you. We will test or you will test this model that you have under real conditions, in the field [...].' This gives you the added value of getting a 'proof of concepts', so to speak, for your MVP (Minimum Viable Product). (CO-1-I1:26)	So, it always depends, if I buy something off the shelf, then I just buy something off the shelf and if I maybe take a smaller start-up into account, then I can possibly go a step further, possibly I have a bit more flexibility. (CO-2-I7:20)

Table 4 (Continued)

Project cooperation process	Example from data related to CO-1	Example from data related to CO-2
Translating agents	In other words, CO-1 is undergoing a transformation process and the world outside is still moving forward. And to bridge the gap between a firm that has a business model in the process of being dissolved and the world around it, which continues to move. [...] That is my vision here at the firm, and in this context, I'm looking for ideas and innovation potential both inside and outside the firm to build up new business areas for CO-1. (CO-1-I1:6) Also with separate reporting, separate responsibilities, so that you can simply act a bit more quickly in this area. (CO-1-I6:12)	That is why the goal of our colleagues of the innovation unit, in particular, is to establish this pull principle at this corporation. That, in turn, means, asking about needs and seeing, among the firm, what moves the people. (CO-2-I6:22) We have the corporate development, and there was also the area of 'new topics', but this is now being transferred from the corporate development unit to one member of the management board. (CO-2-I7:64)
After project cooperation	But then that was more of a one-time action in which we obtained data, in which the start-up obtained data in order to simply expand their database, and for us it was a good opportunity to once again perform a quality check of the modules supplied. (CO-1-I2:40) And now [...] we have finally entered a typical framework contract, [...] where we can regularly request this service. (CO-1-I6:24)	QI: Does that mean that the license for the product was purchased for one year, that's what I heard. That is, it could also be that this will not be continued after the year, and it will then simply expire [...]. CO-2-I8: Yes, exactly. That's how I would summarize it as well. (CO-2-I8:22) So, then this framework agreement basically applies to the entire portfolio and of course also the new plants, which is of course also nice for us, because we then also have this growth perspective. (SU-5-I1:24)
Relationship quality	*Example from data related to CO-1*	*Example from data related to CO-2*
Balance between formal and informal procedures	The "trackers" [...] really [are] a practice of agreeing on specific tasks and checking progress regularly. That's rather agile [...] in terms of the approach and is characterized mainly by many sprints in between. (SU-1-I1:16)	That's why we also purposely said that we develop in short sprints with feedback and have also permanently provided the access points so that it could be tested at some point. (SU-3-I1:38)
Improvisation mindset	Otherwise, it has to be said that the start-ups with which we are now cooperating primarily involve people on our side who are, I would say, younger and more open-minded about such issues. (CO-1-I2:62)	Then, of course, I take the people who really want it, who have the drive, who have the will to change something and who, when in doubt, don't shy away from reconsidering a process. (CO-2-I2:24)

Table 4 (Continued)

Project cooperation process	Example from data related to CO-1	Example from data related to CO-2
Appreciation and prioritization Value each other and priority of the joint project	And if I'm a young start-up entrepreneur, [...] it's also important that I find someone who treats me fairly, with whom I can get along well. And vice versa, it's just the same, [...] that you don't just have to get along well on a technical, professional level, but also on a human level [...]. (CO-1-I5:16)	The topic of AI was trendy and [...] then said that in order to gain acceptance for the start-up SU-6 [...], we invited them to a coffee and learn event where they told us what they do and where employees were supposed to throw in ideas about what they could do on the topic of AI at CO-2. (CO-2-I4:20)
Open and transparent communication	It was a very open and transparent communication on the part of the start-up, which reported to me that the corresponding error had occurred. We then considered together how we could fix the error as quickly as possible. That was then carried out accordingly and actually communicated with each other throughout the entire process, both with the customer and with the two companies. (CO-1-I6:70)	You don't want to say to the start-up, everything takes a little longer with us, but somehow, I really find an openness and a transparency when you really cooperate, so that you say, 'Look, we're trying our best, but what do we do when it goes like this?' (CO-2-I6:38)
Supporting context	And that's basically the exciting part for me, because I'm the mediator between the start-up and the industry partner since they usually speak different languages in terms of requirements management, timelines, and content. (SI-1-I1:6)	We always make sure that a translator is present. We often have the case that [...] [the start-ups] are sitting in SI-1 and that [then our employees think] this must be free of charge if the start-up does something for us. (CO-2-I5:14)
Resilience benefits	*Example from data related to CO-1*	*Example from data related to CO-2*
Knowledge base	It's also an opportunity to cooperate with start-ups and drive the change management process at our firm forward to some extent. (CO-1-I2:52)	What I was trying to say earlier is that our employees should learn from the culture of the start-ups. That we should bring the culture into our firm. (CO-2-I5:26)
Human and financial resources	So, it is also significantly cheaper than existing products in terms of overall costs. (CO-1-I6:32)	They have created a price-performance bundle that a big player can no longer offer or is simply too rigid. (CO-2-I5:12)

Table 4 (Continued)

Project cooperation process	Example from data related to CO-1	Example from data related to CO-2
Strategic resilience Anticipation	Networking is, simply, being part of certain fixed networks. But also, personal contacts. That you know someone somewhere who has heard something from someone who in turn knows someone. The motto is: You can get to such topics via three corners. Or someone sits somewhere in a fund as an advisor and has picked up something that somehow fits well. Then he connects and says: 'Hey, here'. And it's mainly through these channels. It has also happened that someone approaches us directly, but that is the exception rather than the rule. (CO-2-I7:32)	we also have a public responsibility. So, we have to say that we have to make sure that we support the region and that a start-up culture settles here, because that helps us in the long term, also in terms of personnel. After all, good people come to [firm location], founders, and at some point, it may no longer work out with the start-up, and they then look for work here and then we also have staff like that. The better the city of [firm location] is doing overall, whether with new ideas or the like, the more this city grows and the more we as a firm can profit from it. (CO-2-15:26)
Preparation	The topic of hierarchies, the topic of implementing ideas, the topic of agility, [...] it all comes from the start-up. As a large firm, I can try to take something from that. (CO-1-I3:64)	So, you change processes by working with start-ups. And that's a goal that's likely always treated as secondary. But I think it's a goal that shouldn't be neglected because it can always rejuvenate a company. We are also dependent on that right now. (CO-2-I2:22)

Declarations

Conflict of interest A.-K. Dieterle and S. Duchek declare that they have no competing interests.

Ethical standards For this article no studies with human participants or animals were performed by any of the authors. All studies mentioned were in accordance with the ethical standards indicated in each case. Consent to the publication of the data in anonymized form was obtained from all participating persons and institutions for the data collected.

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