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# Boosting radical innovativeness through start-up acquisitions: the role of decision autonomy and structural integration

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**Since start-ups often own cutting-edge technology and knowledge, acquiring a start-up can provide buyers with a unique opportunity to boost their radical innovativeness. As a result, start-up acquisitions have increasingly gained importance. Acquirers, however, face difficult decisions on target autonomy and integration, which often constitute a dilemma. We analyzed survey data from 118 M&A and integration managers in charge of corporate start-up acquisitions. Our results show that a start-up's decision-making autonomy supports acquirer's radical innovativeness. The structural integration of the target reinforces the positive effect of decision autonomy. Our work with the focus on post-merger integration and the start-up context contributes to M&A literature in several ways. We uncover a hybrid integration approach, showing that a combination of high target decision autonomy and the full absorption (i.e., structural integration) of the start-up by the acquiring organization is most beneficial for acquirer's radical innovativeness.**

## 1. Introduction

Mergers and acquisitions (M&As) play an important role in enabling established companies to modify their resources to grow and foster innovation (Karim and Capron, 2016). Literature shows that acquiring start-ups<sup>1</sup> can promote buyers' innovative capabilities (Andersson and Xiao, 2016). According to research, acquisitions are a dominant and preferred exit route for start-ups (Strese et al., 2018).

A crucial question for the literature on knowledge acquisition and M&As is whether the acquisition of start-ups boosts acquirers' radical innovativeness (Zhou and Li, 2012; Cefis and Marsili, 2015; Xie et al., 2018; Dao and Strobl, 2019). Start-ups often possess cutting-edge knowledge and technologies, providing acquirers with opportunities to increase their radical innovativeness (Benson and Ziedonis, 2009; Hussinger, 2012). To tap the purchased start-up's resources, the acquirer has to

orchestrate a post-merger integration (PMI) process that adds the start-up with its functional activities to the organization, recombines it, or dissolves it (Graebner et al., 2017). The acquirer has to carefully consider the extent to which the start-up should be structurally integrated and how much autonomy it should retain (Puranam et al., 2006).

Many start-up acquisitions ultimately fail due to significant PMI challenges (Korshunova et al., 2021). M&A literature explores how to determine the right balance between decision autonomy and integration to prevent unsuccessful mergers (Graebner et al., 2017; Colman and Rouzies, 2019). Some scholars have perceived integration as the opposite of autonomy (Puranam et al., 2006; Phene et al., 2012), but others have argued that integration and autonomy can sometimes be pursued together (Zaheer et al., 2013). However, there is a significant gap in the literature regarding our understanding of the interplay between decision autonomy and integration in PMI (Puranam et al., 2006; Angwin and Meadows, 2015). Start-up integrations are a unique context to study post-merger management practices, which is further explained in the following.

First, compared to large and publicly traded companies, start-ups usually create radical product or service innovation (Weiblen and Chesbrough, 2015). They are often agile, fast, and high-performing, which enables them to quickly adapt to market changes and customer needs (Puranam and Srikanth, 2007; Andersson and Xiao, 2016). Start-ups possess unique capabilities that acquirers can leverage to enhance their own radical innovativeness and competitive advantage (Andersson and Xiao, 2016). Second, start-up acquisitions entail significant PMI challenges (Korshunova et al., 2021). When targeting a start-up, acquirers face information asymmetries that are higher than when pursuing large, publicly traded firms (Shen and Reuer, 2005). Start-ups typically display substantial ownership stakes, agility, risk-taking propensities, and visionary growth targets (Schweizer, 2005; Weiblen and Chesbrough, 2015), meaning they pursue high levels of decision autonomy. Autonomy is a core element of a start-up's innovativeness (Rindova et al., 2009). Acquirers intend to benefit from their target's innovativeness, so they have to determine how much decision autonomy their target should retain. In addition, acquirers need to take into consideration whether they should fully absorb the target company (i.e., structural integration) or preserve it as a detached, affiliated organizational unit (i.e., separation) (Haspeslagh and Jemison, 1991).

Motivated by M&A literature on reconfiguration and decision rights in the context of PMI, the present

research on start-up acquisitions has two objectives. First, we investigate how the acquirer's radical innovativeness is affected by the degree of decision autonomy in the PMI of start-ups. Decision autonomy is the extent to which the acquirer allocates decision-making rights to the target's functional activities (e.g., strategy formulation, marketing, R&D). Taking the perspective of the acquirer, we look at an important outcome, radical innovativeness, defined as "the capability to generate innovations that significantly transform existing products and services" (Subramaniam and Youndt, 2005, p. 452). Second, we explore the influence of the formal post-merger design choice (i.e., the structural integration of start-up into acquirer) on the relationship between decision autonomy and radical innovativeness. The post-merger design choice differentiates between structural integration and structural separation (Puranam et al., 2006, 2009). This differentiation highlights this decision's temporal and strategic precedence over any other implementation mechanism (Puranam and Srikanth, 2007) and this binary perspective makes it possible to focus the respondents' attention on the question of whether the start-up was mainly integrated or left separate. As a result, we develop a conceptual model that captures how a start-up's decision autonomy relates to an acquirer's radical innovativeness. To understand the consequences of the post-merger design choice, we analyze the moderating effects of structural integration on the relationship between decision autonomy and the acquirer's radical innovativeness. We explore our research model with survey data from 118 M&A and integration managers in charge of corporate start-up acquisitions.

With our focus on PMI in the start-up context, we advance previous M&A literature in meaningful ways. First, we contribute to the reconfiguration and decision rights literature in the context of PMI management practices (Karim and Mitchell, 2000; Karim, 2006; Castañer and Karim, 2013). Our conceptual model uncovers a hybrid integration approach by engaging with the topics of (i) a start-up's decision autonomy and (ii) a start-up's structural integration into the acquirer. Our study supports initial discussions of the presence of PMI hybrid settings to decision autonomy and structural integration in PMI (Schweizer, 2005; Angwin and Meadows, 2015; Safavi, 2021). We offer a nuanced picture of reconfiguration mechanisms regarding decision rights and organizational design choice of start-up PMI. Precisely, we find that a combination of high target decision autonomy and the full absorption (i.e., structural integration) of the start-up by the acquiring organization is most beneficial

for acquirer's innovativeness. So-called *symbiotic acquisitions* (i.e., strategic interdependence combined with target autonomy) is particularly challenging to implement (Haspeslagh and Jemison, 1991; Rosenzweig, 1993). Second, we show how decisions rights and PMI organizational design choices develop reconfiguration mechanisms (Karim and Capron, 2016; Graebner et al., 2017). While M&A literature reveals that corporate innovation is needed to achieve competitive advantage and economies of scale (Weiblen and Chesbrough, 2015) and considers start-up M&A as a relevant part of economic growth (Trąpczyński et al., 2018; Arora et al., 2021; Brueller and Capron, 2021), our study adds a nuanced picture into how corporate acquirers can achieve resource reconfiguration with start-up acquisitions that unfold acquirers' radical innovativeness during PMI.

## 2. Theory and hypothesis development

### 2.1. Boosting radical innovativeness: post-merger integration of start-ups

Research on decision rights and on the reconfiguration of a firm's resources resulting from its acquisitions generally focuses on explaining PMI mechanisms from a strategic perspective (Meyer-Doyle et al., 2019). This literature considers how acquirers can build and use reconfiguration mechanisms in acquisitions to enable sustained performance and growth (Meyer-Doyle et al., 2019). The terminology *reconfiguration* "refers to the activities in which firms engage when adding, redeploying, recombining, or divesting resources or business units." (Karim and Capron, 2016, p. 54). In the context of PMI, reconfiguring means enhancing acquirers' capabilities to renew or expand their resource base, that is, acquisition reconfiguration capability (Mitchell et al., 2007). Reconfiguration through PMI enables the acquirer to identify opportunities and new ways of resource usage – for example, through product cross-selling (Karim, 2006).

Acquisitions enable firms to increase their radical innovativeness and create sustainable competitive advantage (Cohen and Levinthal, 1990). To succeed, they need to (re)combine and leverage both their own and their target's technologies and market knowledge (Karim and Capron, 2016). Competitors or companies active in other industries often possess knowledge that may enhance a firm's existing expertise and capabilities (Yli-Renko et al., 2001; Phene et al., 2012). Acquiring other firms may thus be critical to gain immediate access to different knowledge or technologies. Buyers can overcome

path dependencies or resource scarcity and circumvent lengthy, risky internal research and development (Ahuja and Katila, 2001; Dunlap et al., 2016). Acquisitions facilitate close inter-firm communication and interaction, which promotes the transfer of tacit and socially complex resources (Ranft and Lord, 2002). Start-ups often possess cutting-edge technology and knowledge, which makes them attractive acquisition targets for established corporations (Hess and Siegwart, 2013; Weiblen and Chesbrough, 2015). They also possess unique individual and organizational capabilities that can help potential acquirers to drastically transform their own products or services, and they may, hence, drive their acquirer's radical innovativeness (Puranam and Srikanth, 2007; Andersson and Xiao, 2016). A start-up's specific value potential is its savvy, which can disrupt or destroy existing technology and competencies (Baumol, 2002). Acquiring a start-up may enable large firms to leverage this potential using their complementary resources such as proprietary technologies and experience (Baumol, 2002; Andersson and Xiao, 2016).

To promote their own radical innovativeness, acquirers need to take into account the unique characteristics of the start-up they have acquired during PMI (Cannella and Hambrick, 1993; Bilgili et al., 2017). Established companies and start-ups differ substantially regarding their organizational setup (Weber and Weber, 2007), corporate culture (Schweizer, 2005), and innovation processes (Maula et al., 2013). This likely increases the challenge of successful PMI. Start-up acquisitions are marked by higher levels of information asymmetry between acquirer and target than are acquisitions of large and public firms (Shen and Reuer, 2005). Start-ups possess much less codified knowledge than established firms do (Shepherd et al., 2000), so establishing effective relationships and interaction mechanisms to identify, access, and transfer critical knowledge is especially important (Graebner et al., 2017). For these reasons and more, much of what is known about acquisitions may not apply in the start-up context and may need to be extended or replaced (Weitzel and McCarthy, 2011).

Our research model draws on Zaheer et al. (2013), who underline the role of a start-up's decision autonomy and integration for PMI processes. Acquired start-ups with a high level of decision autonomy have a broad range of activities under their own authority and can implement operational and strategic decisions (Zaheer et al., 2013). The question of how much decision autonomy the acquirer should grant to the start-up closely relates to the PMI approach taken, that is, the decision on whether the start-up should be absorbed into the

acquirer's structure or preserved within the organization (Haspeslagh and Jemison, 1991; Puranam et al., 2006).

## *2.2. Start-up decision autonomy and its relation to post-merger radical innovativeness*

Although preserving a start-up's decision autonomy during PMI presents challenges, we argue that the acquirer's radical innovativeness is boosted if high decision autonomy levels are granted to the start-up's functions. Preserving a start-up's decision autonomy during PMI unfolds two mechanisms that positively influence the acquirer's resource reconfiguration and enable spill-over effects of radical, innovative capabilities from the start-up to the acquirer; a high degree of autonomy (1) enables start-ups to preserve their innovation capacity, which is then accessible and transferable to the acquirer (innovation spill-over effect) and (2) fosters the willingness to share and transfer tacit knowledge that allows strategic renewal of the acquirer.

First, the preservation of start-up's decision autonomy over functional activities during PMI enables the start-up's leaders to make effective decisions based on their tacit knowledge (Dobrajska et al., 2015). Due to their freedom to determine their function's activities, they can, for example, stimulate research and marketing activities in line with market or product needs (i.e., iterative experimenting). Their independence in decision-making is key to tackling problems or overcoming barriers to the market, which in turn is essential for embarking on ground-breaking changes (Karim and Mitchell, 2000; Subramaniam and Youndt, 2005; Puranam et al., 2006). Thereby, the acquirer can transform existing solutions and technologies by using the benefits of the start-up's effective decisions or experimental results, thus enabling the transfer of radical, innovative capabilities from the start-up to the acquirer (Colman, 2020). Potential spill-over effects of radical, innovative capabilities from the start-up to the acquirer are based on the start-up's possession of specialized and unique knowledge (Andersson and Xiao, 2016). Zaheer et al. (2013) find that reasonable decision autonomy levels are especially important for acquisition success if the target possesses specialized and unique knowledge. Granting the target start-up high levels of decision autonomy may allow the acquirer to incorporate new knowledge and resources into the process of reconfiguration technologies and market knowledge. From a start-up perspective,

high decision autonomy is part of its emancipation. For example, entrepreneurs are highly motivated to provide social or public value with their disruptive solutions (Rindova et al., 2009). Furthermore, entrepreneurs value their start-up's autonomy as individual freedom, since it enables new ways of thinking and acting (Steyaert, 2007). In contrast, constraining a start-up's decision autonomy may lead to negative attitudes among the founders and reduce their drive to engage in "emancipatory projects to create change" (Rindova et al., 2009, p. 483). High levels of decision autonomy support a start-up's disruptive capacities, which will be needed to develop the acquirer's reconfiguration mechanisms. Also, the start-up might refuse to cooperate closely with the acquirer, although cooperative behavior is expected during PMI (Datta and Grant, 1990). Furthermore, the acquirer's functions need to evaluate potential radical, innovative capabilities and establish cooperative behavior with the start-up's functions (Weber et al., 1996; Graebner et al., 2017). Preserving a start-up's decision autonomy requires managerial actions from the acquirer, for instance, to ensure freedom from the bureaucracy of the acquirer's corporate rules (Weiblen and Chesbrough, 2015; Colman, 2020).

Second, according to Andersson and Xiao (2016), start-ups possess unique knowledge about their market segment. With this knowledge, they complement the acquirer's expertise, and the combined knowledge bases result in new approaches to resource usage and market-oriented solutions. However, both parties must be willing to collaborate and start-ups need to have a willingness to share their knowledge with the acquirer. Wei and Clegg (2020) show that the willingness to collaborate must be supported and implemented at the operational levels of both the start-up and the acquirer to fulfill the acquirer's value creation expectations. To boost the acquirer's radical innovativeness means that the acquirer must be willing to grant the start-up its autonomy and the start-up must be willing to disclose its knowledge. Although high levels of autonomy may be challenging to achieve, such levels might in turn strengthen the formal and informal knowledge exchange between the start-up and the acquirer. Especially informal interactions are necessary for accessing start-ups' non-codified knowledge, which offers the potential to tap into radically new market opportunities. Access to the other's tacit knowledge and prior innovation activities has the potential to positively influence transformations of the acquirer's existing products, services, or technologies (Puranam et al., 2006). Also, according to

research on self-managing teams, autonomy positively affects strategic effectiveness (Haas, 2010). Like self-managing teams, start-ups that retain autonomy in strategy formulation could provide the acquirer with insights into new strategic options. Such insights increase the likelihood of reshaping the acquirer's existing strategies or exercising new strategic options. Maintaining a certain level of start-up decision autonomy is hence crucial for the acquirer's resource reconfiguration.

Despite the challenges for the acquirer to preserve a start-up's decision autonomy, high levels of decision autonomy during PMI sustain entrepreneurial ambitions and maintain the entrepreneurial process that is necessary to promote the acquirer's radical, innovative capacities. Research on M&A argues that a substantial level of decision autonomy enhances the cooperation, the productivity, and the knowledge sharing of key start-up employees during PMI (Datta and Grant, 1990; Kapoor and Lim, 2007; Zaheer et al., 2013). However, it needs to be acknowledged that granting the target start-up high levels of decision autonomy is quite challenging for the acquirer. Hence, we expect that a higher level of start-up decision autonomy enables the acquirer's access to tacit knowledge, increases the creation of new opportunities, and enhances the spill-over of innovative capabilities, boosting the acquirer's radical innovativeness. We thus hypothesize:

**Hypothesis 1** Start-up decision autonomy positively relates to acquirers' radical innovativeness during the post-merger integration.

### 2.3. *Structural start-up integration and its interaction with decision autonomy*

Following Karim and Mitchell (2004), reconfiguring acquired and existing resources could help realize radical innovation opportunities. We consider reconfiguring at the level of decision rights and structural design choice. Grant (1996, p. 380) highlights that the "critical source of competitive advantage is knowledge integration rather than the knowledge itself" and calls for an analysis of the mechanisms that enable the successful integration and application of acquired resources. In alignment with Puranam et al. (2009) and Puranam et al. (2006), structural integration is the complete absorption of the start-up by the acquiring organization, which eliminates any structural differences. In the opposite case, structural separation, the start-up remains a distinct organizational unit within the acquirer. We argue that structural integration positively moderates the relationship between the degree of decision autonomy granted to

the start-up and the acquirer's radical innovativeness. The moderating effect considers four potential combinations of low and high decision autonomy levels and structural integration vs. separation, as summarized in Table 1.

Before detailing the mechanisms of the interplay between structural integration and start-up's decision autonomy, we first look at the case of structural separation. Structural separation and high levels of decision autonomy may lower the likelihood of the acquirer's radical innovativeness for the following reasons. While an autonomous start-up may enjoy independence from bureaucracy and organizational inertia, it forfeits structural integration benefits such as access to different corporate capabilities and various financial and non-financial resources – assets that start-ups typically lack (Govindarajan and Trimble, 2005; Weiblen and Chesbrough, 2015). On the one hand, due to its high level of decision autonomy, the start-up retains its radical, innovative capabilities and disruptive potential. It can decide for itself how to tackle problems and overcome barriers to the market (Karim and Mitchell, 2000; Subramaniam and Youndt, 2005; Puranam et al., 2006). On the other hand, the structurally separate start-up's radical innovation efforts remain distinct from those of the acquirer. Structural barriers are higher due to the start-up's ongoing independence; in this condition, coordination is more difficult between the start-up and the acquirer (Puranam et al., 2009), reducing the likelihood of spill-over effects in the area of innovative capabilities. Therefore, structural separation negatively affects the positive effects of a start-up's decision autonomy on the acquirer's radical innovativeness. When a start-up is structurally separated and has low levels of decision autonomy, we expect the acquirer's radical innovativeness to be limited. While the reduction of a start-up's decision-making rights entails a loss of inventiveness, reduced cooperation efforts, and dissolving of scarce and tacit knowledge (Subramaniam and Youndt, 2005; Zaheer et al., 2013), structural separation presents a barrier to the transfer of radical, innovative capabilities from the start-up to the acquirer (Puranam et al., 2006).

Under structural integration, and when a start-up's decision autonomy levels are relatively low, we expect the levels of the acquirer's radical innovativeness to be lower. Although the acquirer provides the start-up with corporate capabilities and resources both financial and non-financial (Puranam et al., 2009), the start-up in this condition has lost its independence and cannot determine its innovation activities (Zaheer et al., 2013). The loss

**Table 1.** Moderating mechanisms of start-up’s decision autonomy levels and structural integration versus structural separation on acquirer’s radical innovativeness

<b>Start-up’s structural separation</b>	Sustained independence of innovation activities	
	Coordination efforts between innovation activities	
<b>Start-up’s structural integration</b>	Loss of inventiveness and cooperation efforts	Preserved innovative capabilities and disruptive capacities
	Dissolving of scarce and unique knowledge	Activities and innovation efforts of acquirer and start-up remain distinct
	Structural barrier to the transfer of innovative capabilities	Existence of structural barriers
	Separation of knowledge and resources	Spill-over effects of innovative capabilities rather unlikely
<b>Start-up’s structural integration</b>	Providing corporate capabilities & (non-)financial resources	
	Requires knowledge exchange and integration across functions	
<b>Start-up’s structural integration</b>	Disruption of existing innovation activities	Mutual adaption of innovation activities
	Decrease of knowledge development & innovative capabilities	Access to scarce and unique knowledge
	Reduction of disruptive capacities	Transfer of innovative capabilities
	Loss of entrepreneurial acting and thinking	New combination of knowledge and resources
		Reshaping and/or exercising of (new) strategic options
	Decision-making rights not granted	Independence to determine innovation activities
	<b>Low</b>	<b>High</b>
	<b>Start-up’s decision autonomy levels</b>	

The figure displays the combinations of start-up’s decision autonomy levels (i.e., allocation of decision-making rights to functional activities) and structural integration versus structural separation (Hypothesis 3). Boxes in bold briefly describe the formal aspects; dotted boxes show the mechanisms on and consequences for acquirer’s radical innovativeness.

of autonomy decreases knowledge development and reduces innovative capabilities (Karim and Mitchell, 2000; Subramaniam and Youndt, 2005; Puranam et al., 2006). Disruptive capacities based on entrepreneurial acting and thinking slow down due to the constraints on the start-up’s freedom (Rindova et al., 2009). Structural integration requires the mutual adaption of both parties’ processes toward the acquirer’s corporate procedures and goals (Puranam et al., 2009). Despite the support of the acquirer’s resources during structural integration, structural integration is likely to reinforce the negative aspects of low decision autonomy levels, reducing the likelihood of spill-over effects and the reconfiguration of the acquirer’s resources.

Under structural integration, a high level of decision autonomy is likely to promote the cooperation of the start-up’s employees (Datta and Grant, 1990). Structural integration means that innovation activities between the start-up and the acquirer can be mutually aligned (Puranam et al., 2009), providing the acquirer with access to the start-up’s scarce and

unique knowledge. Maintaining the start-up’s decision autonomy with respect to which product or service ideas to focus on helps to preserve the start-up’s radical innovativeness and leverage it for the acquirer. Therefore, structural integration amplifies the positive effect of decision autonomy on transferring radical, innovative capabilities from the start-up to the acquirer. The start-up’s research and marketing activities (e.g., iterative experimenting) align with the acquirer’s innovation activities. Also, the start-up maintains the independence to proceed further with its entrepreneurial activities (e.g., to adjust experiments and try new research and marketing trials). Under structural integration, the acquirer provides the start-up with resources and corporate capabilities (Puranam et al., 2009). Such support mechanisms foster the start-up’s (radical) innovation efforts. Thus, this setting reinforces the potential for the acquirer to gain access to new knowledge and combine it with its own resources to realize novel resource combinations. We propose that the configuration of structural integration and high autonomy increases the acquirer’s radical innovativeness. Therefore, we hypothesize:

**Table 2.** Sample composition ( $N = 118$ )

A: Industry-type acquirer		E: Number of employees' new venture	
Producing	48%	<10	24%
Services	52%	10–20	25%
B: International focus of acquisition		21–50	22%
Domestic acquisition	64%	51–100	12%
Cross-border acquisition	36%	>100	17%
C: Technological intensity acquirer		F: Age of new venture	
Hi-Tech	69%	<3 years	22%
Low-Tech	31%	3–5 years	25%
D: Number of employees' acquirer		6–9 years	25%
<500	20%	>9 years	29%
500–1,000	12%	G: Integration mode post-merger	
1,001–5,000	29%	Separate entities	63%
5,001–10,000	14%	One integrated entity	37%
>10,000	25%		

**Hypothesis 2** Structural start-up integration positively moderates the relationship between a start-up's decision autonomy and its acquirer's radical innovativeness during post-merger integration.

### 3. Methodology

#### 3.1. Sample

In line with prior acquisition research, we surveyed key informants (Capron, 1999; Ellis et al., 2009). We targeted M&A and integration managers of established companies who had accompanied at least one start-up acquisition. We focused on acquisitions between 2010 and 2014. By choosing this period, we excluded acquisitions where integration was still ongoing and thus has not yet significantly affected outcomes. We focused on German-speaking countries (Germany, Austria, Switzerland) and covered different industries to ensure the generalizability of our findings. The sample was derived with a random search on the social networks LinkedIn and Xing; we identified 1,888 suitable managers from M&A, innovation, corporate venturing, and strategy departments. We collected our data between November 2016 and March 2017. Before sending out the survey, we called all potential respondents to ensure that they were willing to participate, were knowledgeable, and could provide accurate answers. We promised strict confidentiality and anonymity, thus reducing desirability bias and the potential of common method bias (Podsakoff et al., 2003; Gordon, 2016). After two e-mail reminders to all 578 qualified respondents and one follow-up call each, we received 158

responses. Deleting submissions with no variance or significant missing data (more than 3%) resulted in a final set of 118, a response rate of 20.4%. This rate is in line with other research in this field (Homburg and Bucerius, 2006; Jansen et al., 2006; Zaheer et al., 2013). We applied unconditional mean imputation to impute the few missing values in our data (<0.15%) to improve overall accuracy (Little and Rubin, 1987; Lynch and Jarvis, 2008). Most respondents belonged to the management (51%) or senior management level (25%). The final sample contains high- and low-tech companies from various industries (see Table 2 for details).

We tested for nonresponse bias by splitting the sample into three groups (i.e., quantiles) and comparing early with late respondents (Armstrong and Overton, 1977). The *t*-test revealed no significant differences for any of the variables. We applied Harman's single-factor test (Podsakoff and Organ, 1986). The single factor explains only 21.9% of the total variance, indicating no issues of single-source bias. To ensure that common method bias did not unduly affect our results, following Podsakoff et al. (2003), we introduced a common latent factor into our structural model within our confirmatory factor analysis (CFA). The results did not change in statistical significance or factor loadings. We therefore conclude that common method bias is unlikely in our analysis.

#### 3.2. Variables

All our constructs are well established in the literature (Churchill, 1979). We pretested the questionnaire with four academics and five practitioners to

increase validity and reliability and to assure clarity and parsimony (Podsakoff et al., 2003).

### 3.2.1. Dependent variable

We measured radical innovativeness with a three-item scale using the construct of Subramaniam and Youndt (2005). Within our survey, we decided that the respondent (M&A manager) should rate the capability of the acquirer's business unit that was intended to profit most from the acquisition to generate radical innovations in the products and/or services it had introduced since the acquisition.

### 3.2.2. Explanatory variables

For the target's decision autonomy, we used Zaheer et al.'s (2013) measures. *Decision autonomy* is the extent to which the acquiring company has preserved the start-up's decision rights in those four functional domains. During the pretest of our survey, the domain capturing *marketing* caused some confusion, and participants requested a differentiation between market research-related activities and promotion- and sales-related activities. Following the recommendations on scale adaption and validity by Heggstad et al. (2019), we incorporated this differentiation. To capture the formal post-merger design choice, we used a binary variable, differentiating between *structural integration* and *structural separation* (Puranam et al., 2006, 2009).

### 3.2.3. Control variables

We included different firm-level controls. We controlled for the target's management *team size* and *age* before the acquisition since both variables have been shown to affect the post-merger process (Hambrick and Cannella, 1993; Sears, 2018). Different aspects of similarity and relatedness between the acquirer and the target are known to impact post-acquisition integration (Capron, 1999; Homburg and Bucerius, 2006), so we controlled for corporate differences by considering *technological relatedness*, *internal and external relatedness*, and *management style similarity*. As revenues can be misleading in assessing the size of new ventures (Damodaran, 2010), we used the number of start-up *employees* (Zaheer et al., 2013). We added the target's *founder industrial experience* to control whether human capital relates to the acquisitions and subsequent performance (Kiessling et al., 2012). We also controlled for the *start-up's ownership prior to acquisition*, that is, whether any company holds significant shares (cf. Kiessling et al., 2012). Similarly, using the pre-acquisition *start-up product innovation* portfolio, we considered the start-up's original innovation level (Song et al., 2008). At the acquirer level, we include the acquirer's industry (*business*

*type*), since the knowledge-based view asserts that knowledge integration is critical in competitive and uncertain environments and industries (Luca and Atuahene-Gima, 2007). We accounted for national cultural differences by assessing whether the transaction was domestic or cross-border (*country focus*) (Brock, 2005; Feys and Manigart, 2011). We also implemented the *deal year* using dummy variables for 2008 to 2017 to eliminate potential time effects (Hayward, 2002). The year 2008 served as the reference category. The dummy variables are included in the regression analysis but not displayed in the results table to conserve space. Initially, the acquisition and decision on the target's autonomy and integration are based on different motives (Wei and Clegg, 2020). To observe potential effects, we differentiated between technology-motivated and non-technology-motivated acquisitions, that is, *acquisition motive* (Cassiman et al., 2005). Lastly, at the market level, we included *environmental uncertainty*. Table 3 shows the descriptive data and correlations.

### 3.3. Model specification

Before testing our hypotheses, we scrutinized the robustness and validity of our model in several ways. First, we analyzed our latent measurement constructs with exploratory factor analysis (EFA), employing maximum likelihood factor analysis with promax rotation. Items we removed based on insufficient factor loadings (>1.0) are marked in the Appendix A. Second, we conducted confirmatory factor analysis (CFA) to check how the measured items represented the latent constructs. We used CFA to examine each of our latent constructs' factor structure to ensure the constructs' unidimensionality, validity, and reliability. Third, to further ensure our constructs' unidimensionality, following Hair (2010), we checked that each indicator for a latent construct had no significant loading on another factor. We further excluded covariances between constructs for the latent variables used within CFA (Hair, 2010). The average variance extracted (AVE) is above 0.5 for all constructs, and the square root of AVE is larger than the interconstruct correlations, confirming convergent, and discriminant validity (Fornell and Larcker, 1981; Hair, 2010). Fourth, we tested reliability and found that the threshold values of 0.7 for Cronbach's alpha and 0.7 for composite reliability (CR) were exceeded in all but one case (Hair, 2010). Cronbach's alpha for *internal and external relatedness* provides acceptable reliability, with a value of 0.67 (Hair, 2010). The CR is greater than the AVE for all measures. In sum, all constructs met the widely accepted statistical criteria, attesting to the presence of a good fit between

**Table 3.** Descriptive data and correlations

Variable	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) Radical innovativeness	4.28	1.05	1.000																
(2) Team size	4.24	2.85	0.103	1.000															
(3) Technological relatedness	2.39	0.80	0.157	0.038	1.000														
(4) Internal and external relatedness	3.41	1.35	0.018	-0.004	0.483	1.000													
(5) Industrial experience start-up founder	24.92	21.48	0.174	0.077	0.337	0.157	1.000												
(6) Start-up age	7.47	6.31	-0.057	0.138	0.052	0.150	0.143	1.000											
(7) Start-up employees	61.32	90.55	-0.053	0.163	0.075	0.055	0.074	0.266	1.000										
(8) Management style similarity	4.68	1.01	0.045	0.013	-0.011	0.047	0.057	0.092	-0.117	1.000									
(9) Start-up ownership prior acquisition	1.12	0.32	0.152	-0.003	-0.048	0.102	-0.048	0.108	0.182	-0.012	1.000								
(10) Start-up product innovation	4.21	1.51	0.350	0.095	0.106	-0.041	0.093	0.077	0.140	0.009	0.028	1.000							
(11) Business type	1.52	0.50	-0.047	-0.098	-0.167	0.027	-0.177	-0.230	-0.044	0.133	0.040	0.009	1.000						
(12) Country focus	1.36	0.48	-0.081	0.067	0.139	-0.040	0.274	-0.004	0.040	-0.082	-0.114	0.054	-0.114	1.000					
(13) Deal year <sup>1</sup>	2014	2.06	0.186	0.131	0.092	0.089	-0.081	-0.086	-0.089	0.189	0.093	0.017	0.124	-0.165	1.000				
(14) Acquisition motive	0.38	0.49	-0.213	-0.176	-0.078	0.038	-0.051	0.004	0.149	-0.038	0.144	-0.141	0.235	-0.051	-0.138	1.000			
(15) Environmental uncertainty	3.93	1.34	0.126	0.031	-0.057	0.022	-0.213	-0.140	-0.222	0.021	0.142	0.254	0.236	-0.041	0.174	-0.029	1.000		

(Continues)

Table 3. (Continued)

Variable	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	
(16) Decision autonomy	4.32	1.56	0.141 (0.128)	0.038 (0.680)	0.029 (0.751)	-0.129 (0.163)	-0.051 (0.583)	-0.110 (0.237)	-0.102 (0.270)	-0.036 (0.701)	-0.048 (0.605)	0.085 (0.360)	0.020 (0.829)	0.063 (0.496)	0.023 (0.801)	0.072 (0.438)	-0.049 (0.598)	1.000		
(17) Structural integration	0.37	0.49	0.021 (0.823)	-0.009 (0.924)	0.174 (0.060)	0.181 (0.049)	0.164 (0.077)	0.202 (0.028)	-0.077 (0.408)	0.029 (0.756)	-0.012 (0.898)	-0.098 (0.293)	-0.026 (0.779)	0.217 (0.018)	-0.147 (0.111)	-0.136 (0.141)	-0.034 (0.717)	-0.374 (0.000)	1.000	

N = 118; p-values in parentheses; Table displays the pairwise correlation coefficients; descriptive analyses use unstandardized values.

<sup>1</sup>The deal year is inserted without using dummy variables.

data and measurement model. Finally, we tested the structural model in our CFA by including all latent variables. The analysis showed acceptable goodness-of-fit statistics with  $\chi^2/df=1.4040$ , CFI=0.964 SRMR=0.067, and RMSEA=0.059 (Rothaermel and Deeds, 2004). Furthermore, all variance inflation factors (VIF) are smaller than 1.4, indicating that multicollinearity is not an issue in our data (Neter et al., 1990).

### 4. Results

We applied hierarchical robust regression to avoid biased confidence intervals for our hypothesis testing and to avoid observation deletion (Aiken et al., 1991; Cohen et al., 2003; Rousseeuw and Leroy, 2003). The regression results are shown in Table 4. Supporting H1, the acquired start-up’s decision autonomy positively relates to the acquirer’s post-merger radical innovativeness with a p-value under the 0.10 level (Model 2:  $\beta=0.117$ ,  $p=.066$ ). Analyzing the margins shows that an increase in decision autonomy (+1 SD above the mean) is associated with a 4.4% increase in radical innovativeness, when all other variables are held constant (Williams, 2012). Including the direct effect of decision autonomy increased the  $R^2$  by 11.3% ( $R^2=0.355$ ). The change in  $R^2$  is statistically significant at the 0.10 level ( $p=.066$ ).

We also confirm H2, namely that post-merger structural start-up integration positively moderates the relationship between decision autonomy and acquirers’ radical innovativeness. Model 3 in Table 4 shows a positive interaction between structural integration and decision autonomy ( $\beta=0.391$ ,  $p=.002$ ). Adding the interaction effect to the model leads to a significant rise ( $p=.002$ ) in  $R^2$  of 23.4% ( $R^2=0.438$ ). To interpret the effect size of the interaction, we used margin predictions (Williams, 2012). The estimation for high decision autonomy levels and structural integration shows a 12.4% increase in radical innovativeness (+1 SD above the mean). As the interaction Figure 1 shows, the relationship between decision autonomy and radical innovativeness is stronger with the target’s structural integration. In particular, the difference between structural integration and separation increases significantly with high decision autonomy values (those above 3.7). Using slope difference shows that the slope for structural separation is not statistically different from zero ( $z=-0.48$ ,  $p=.633$ ), whereas the slope for integration is significantly different from zero ( $z=3.72$ ,  $p=.000$ ). A joint test for slope difference reveals that the slopes for structural separation and integration are significantly different ( $F=10.02$ ,

**Table 4.** Hierarchical regression analysis – radical innovativeness

Dependent variable: radical innovativeness	Model 1	Model 2	Model 3
Firm-level controls (start-up)			
Team size <sup>5</sup>	0.004 (0.913)	0.001 (0.978)	0.005 (0.867)
Technological relatedness <sup>6</sup>	0.102 (0.454)	0.062 (0.651)	0.067 (0.604)
Internal and external relatedness <sup>6</sup>	0.037 (0.627)	0.048 (0.535)	0.024 (0.744)
Industrial experience start-up founder <sup>5</sup>	0.008 (0.088)	0.009 (0.041)	0.012 (0.007)
Start-up age <sup>5</sup>	-0.026 (0.103)	-0.025 (0.120)	-0.028 (0.063)
Start-up employees <sup>5</sup>	-0.001 (0.270)	-0.001 (0.487)	-0.001 (0.428)
Management style similarity <sup>6</sup>	-0.026 (0.775)	-0.039 (0.666)	-0.035 (0.684)
Start-up ownership prior acquisition (dummy) <sup>1,6</sup>	0.525 (0.071)	0.482 (0.097)	0.479 (0.080)
Start-up product innovation <sup>6</sup>	0.193 (0.003)	0.214 (0.001)	0.182 (0.004)
Firm-level controls (acquirer)			
Business type (dummy) <sup>2,5</sup>	-0.033 (0.870)	-0.040 (0.841)	-0.129 (0.497)
Country focus (dummy) <sup>3,5</sup>	-0.164 (0.407)	-0.252 (0.211)	-0.377 (0.050)
Acquisition motive (dummy) <sup>4,6</sup>	-0.139 (0.485)	-0.214 (0.284)	-0.233 (0.214)
Market-level controls			
Environmental uncertainty <sup>5</sup>	0.052 (0.492)	0.056 (0.461)	0.033 (0.651)
Variables of interest			
Structural integration (dummy) <sup>7,8</sup>	-0.040 (0.843)	0.157 (0.471)	-1.377 (0.011)
Decision autonomy <sup>7</sup> (H1)		0.117 (0.066)	-0.037 (0.635)
Structural integration <sup>7</sup> × decision autonomy <sup>7</sup> (H2)			0.391 (0.002)
Constant	2.493	1.819	3.009
F-value	1.914	2.136	2.865
Prob (F-statistic)	0.016	0.005	0.000
Observations	118	118	118
R <sup>2</sup>	0.319	0.355	0.438

N=118; p-values in parentheses. The *deal year dummies* are included in the estimation but not shown in the table to conserve space.

<sup>1</sup>Independent prior acquisition served as reference group.

<sup>2</sup>Product business type served as reference group.

<sup>3</sup>Domestic deals served as reference group.

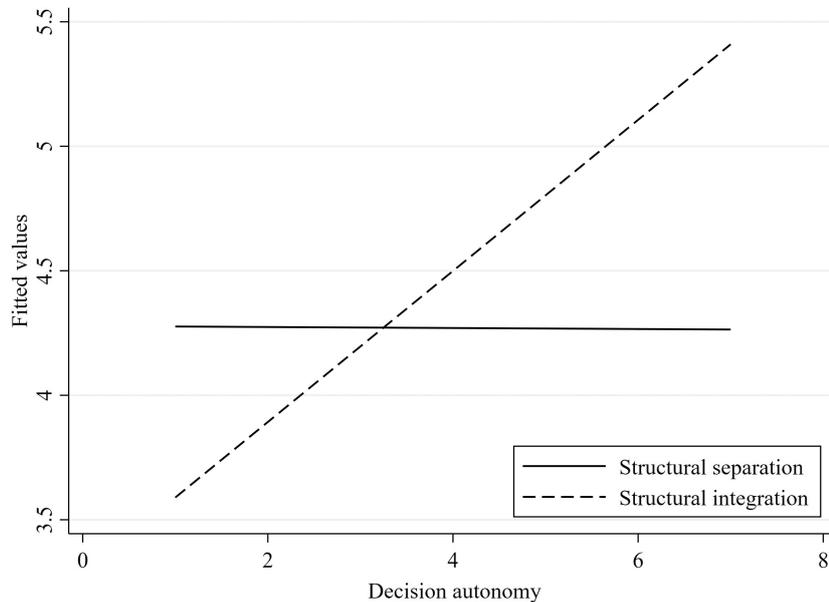
<sup>4</sup>Technology-motivated acquisition served as reference group.

<sup>5</sup>Variable refers to peri-acquisition.

<sup>6</sup>Variable refers to pre-acquisition.

<sup>7</sup>Variable refers to post-acquisition.

<sup>8</sup>Structural separation post-merger served as reference groups.



**Figure 1.** Moderating effects of start-up’s decision autonomy levels and structural integration versus structural separation on acquirer’s radical innovativeness.

$p = .002$ ). Estimating the average marginal effect suggests that the probability of radical innovativeness increases by 35.4 percentage points with structural integration ( $p = .000$ ).

### 5. Additional analyses and robustness tests

We conducted additional analyses and robustness tests for several reasons. First, acquisitions are complex, with various influencing factors. Our relatively small sample size raises concerns about whether overfitting or outliers might have affected our findings (Harrell, 2015). We reran our estimated models excluding observations for which the score on our dependent variable equaled seven (the maximum on the seven-point Likert scale). The results allow the same interpretations for all our hypotheses as the full model does. Furthermore, we applied bootstrapping analysis to validate the robustness of our findings. We used 1,000 bootstrap replications and the bias-corrected method with 95% confidence intervals (Hair, 2010). The bootstrap analysis confirms the direction and significance of our results.

Second, our regression results lead to the interpretation that the relationship between decision autonomy and radical innovativeness is stronger with the target’s structural integration. This interpretation might be caused due to omitted variables such as general management ability or other variables

difficult to observe. Therefore, feeling the need to address potential issues of endogeneity in this study, we employed the instrumental variable (IV) method (Bascle, 2008; Ebbes et al., 2019). Following Chenhall and Moers (2007) and Semadeni and Cannella (2011) two conditions needs to be fulfilled for a variable to be a valid instrument. First, the variable conceptually relates to the explanatory variable (i.e., instrument relevance) and second, the variable is not correlated with the error term (i.e., exclusion restriction). We identified the industry average of the target’s decision autonomy and the acquirer’s R&D intensity as instrument variables. The identification is based on two reasons. First, both variables likely correlate with those of the focal venture. Second, it is rather unlikely that the industry averages of autonomy and R&D intensity directly affect the focal firm’s radical innovativeness.

For examining potential-omitted variable bias, we used the STATA’s “ivreg2” command. Due to our small sample size, we used the robust option and the LIML estimator (Bascle, 2008; Ullah et al., 2020). The first-stage regression confirmed the instrument relevance with  $F = 13.23$  ( $p = .000$ ) and the Cragg-Donald  $F$ -value displays instrument strength with a value of 10.39. Both values are above the threshold of 8.68 applying 10% maximal LIML size (Stock and Yogo, 2002). The Hansen  $J$  statistic displays an insignificant  $p$ -value of  $p = .269$  confirming the validity of instruments (Hansen, 1982). Therefore, it can be assumed that endogeneity does not unduly bias our results (Baum, 2006; Larcker and Rusticus, 2010).

Third, we followed previous research on acquisitions (Capron, 1999; Zaheer et al., 2013) and estimated a mediation model that determines if the relationship of decision autonomy with radical innovativeness might be driven by internal and external relatedness (similarity). Following Hayes's (2009) approach, the results obtained from this validation demonstrate an insignificant indirect mediation effect. This result leads us to conclude that we are not overestimating our main analyses.

Fourth, we used the three-item scale by Subramaniam and Youndt (2005) to estimate whether decision autonomy, and the moderation between decision autonomy and structural integration relate to the acquirer's incremental innovativeness. Previous knowledge acquisition and M&A literature found that the two different types of innovativeness – incremental and radical – unfold different mechanisms, for example, in the context of crowdfunding (Chan and Parhankangas, 2017), inter-organizational knowledge acquisition (Xie et al., 2018), market knowledge resources (Kyriakopoulos et al., 2016), and corporate venture capital (Rice et al., 2000). Thus, start-up PMI may also unfold mechanisms that enable incremental innovativeness. The results reveal that decision autonomy does not associate with the acquirer's incremental innovativeness ( $\beta=0.086$ ,  $p=.220$ ). Furthermore, the interaction term between decision autonomy and structural integration is also insignificant ( $\beta=0.232$ ,  $p=.176$ ).

Sixth, we used the acquirer's innovativeness before the acquisition (Covin and Slevin, 1989) and the acquirer's and the start-up's technological complementarity (vs. similarity) (Cassiman et al., 2005; Puranam and Srikanth, 2007) as further variables to estimate potential effects on our dependent variable. Including these variables does not change the direction and significance of our results.

## 6. Discussion

### 6.1. Theoretical implications

Our results have implications for the M&A literature in several ways. First, our study builds on reconfiguration and decision rights literature in the context of PMI management practices (Karim and Mitchell, 2000; Karim, 2006; Castañer and Karim, 2013). Following Zaheer et al. (2013), we confirm that decision autonomy contributes to the acquirer's radical innovativeness. A start-up's decision autonomy has the potential to ensure an acquirer's opportunity recognition and creation. Various peculiarities characterize start-up

acquisitions (Weber and Weber, 2007). Thus, the benefits of decision autonomy are not independent of other PMI management practices, such as the start-up integration mode selected for PMI (Zaheer et al., 2013). Considering the initial discussion on the presence of hybrid settings of PMI by Angwin and Meadows (2015) and Safavi (2021), our study shows how M&A managers challenge the integration-autonomy dilemma and leverage corporate radical innovativeness as an acquisition outcome. We show that a combination of high target autonomy and the full absorption (i.e., structural integration) of the start-up by the acquiring organization is most beneficial for acquirer's innovativeness. Our findings thus also bridge over to the hybrid postacquisition integration approach developed by Schweizer (2005). As the author notes, choosing "the right integration approach is important [...] and depends on granting the necessary degree of autonomy" (Schweizer, 2005, p. 1068). In this context, our results emphasize a hybrid organizational arrangement of structural integration combined with high start-up autonomy. This type of hybrid arrangements is also called *symbiotic acquisitions* in the literature (Haspeslagh and Jemison, 1991). In this case, strategic interdependence is combined with preserving organizational autonomy. This form is particularly challenging to implement (Rosenzweig, 1993).

Unraveling the relationships of our research model allows us not only to answer the recent call of post-merger scholars "to identify when and how target autonomy is beneficial" (Graebner et al., 2017, p. 5) but also to show when and how decision autonomy is even more fruitful to the acquisition outcome we studied, the acquirers' radical innovativeness. Furthermore, our additional analysis on incremental innovativeness reveals that start-up PMI does not affect the acquirer's incremental innovativeness. By taking a closer look at and distinguishing between different types of innovation, our study contributes to the research field of innovation management. Whereas decision autonomy and the combination of high target autonomy and the full absorption (i.e., structural integration) of the start-up by the acquiring organization benefits acquirers' post-merger radical innovativeness, these PMI management practices do not enable incremental innovativeness which is "the cumulative improvement of existing knowledge, capabilities, or technologies," (Chan and Parhankangas, 2017, p. 238). For M&A literature on the management practices of PMI, our research provides evidence that the two different types of innovativeness – incremental and radical – should

be managed differently. One might speculate that this is due to firms pursuing start-up acquisitions for an exploratory growth strategy rather than exploitative activities (Freytag, 2019). In sum, our study leads to a more nuanced understanding of the mechanisms through which decision autonomy and structural integration boost the acquirer's radical innovativeness. Puranam and Srikanth (2007) find that structural integration diminishes the acquirer's capacity to use the target's knowledge for further innovation efforts. Interestingly, we show that structural integration moderates the effect of decision autonomy on the acquirer's radical innovativeness. Structural integration can be seen to imply a loss of autonomy (Puranam et al., 2006). But we show that the configuration of structural integration and high decision autonomy increases the acquirer's radical innovativeness. Thus, companies can boost their radical innovativeness with start-up acquisitions in which M&A managers grant decision rights across the target's functional activities and simultaneously integrate them structurally. Our results confirm the presence of hybrid settings of decision autonomy and structural integration in the context of start-up PMI and an acquirer's radical innovativeness (Angwin and Meadows, 2015; Safavi, 2021).

Second, our study shows that decision rights and PMI organizational design choices develop reconfiguration mechanisms (Karim and Capron, 2016; Graebner et al., 2017). Firms reconfigure their resources to innovate (Karim and Capron, 2016). We provide evidence that corporate acquirers can achieve resource reconfiguration with start-up acquisitions aimed at enhancing their radical innovativeness. Thereby, we include findings from entrepreneurship research. According to Baumol (2002), a start-up's specific value is knowledge that can disrupt and destroy existing technology or knowledge. Entrepreneurship studies exploring M&As from a start-up perspective indicate that start-up acquisitions foster the development of innovative capabilities that enable ground-breaking and radical novelties (Hess and Siegart, 2013; Andersson and Xiao, 2016). Start-ups with decision autonomy promote the transformation of the acquirer's existing solutions and technologies. Entrepreneurship research finds that start-up autonomy preserves emancipation and freedom, resulting in opportunity creation (Rindova et al., 2009). A start-up's capacity to initiate drastic changes goes hand in hand with a transformation of the acquirer's existing knowledge, an upheaval needed to achieve radical innovativeness (Subramaniam and Youndt, 2005). We extend M&A literature in the field of start-up

acquisitions (Andersson and Xiao, 2016) by explicitly analyzing start-ups' PMI and addressing start-up acquisition challenges (Benson and Ziedonis, 2009; Hussinger, 2012). We explain that start-up M&A enables corporate innovation that is needed to achieve competitive advantage and economies of scale (Weiblen and Chesbrough, 2015). These insights add to M&A literature considering start-up M&A as a relevant part of economic growth (Trąpczyński et al., 2018; Arora et al., 2021; Brueller and Capron, 2021).

## *6.2. Managerial implications*

Established companies can indeed boost their innovative capabilities with start-up acquisitions. These may help develop radical innovations. To support this process, M&A managers need to orchestrate decision autonomy and structural integration, especially for departments driving innovation. Although counter-intuitive, concurrent decision autonomy and structural integration promise the highest post-merger outcome for radical innovativeness. Managers may realize this by structurally integrating the start-up into their corporate R&D units while granting it the decision autonomy to adhere to its own established ways of working, culture, incentive systems, and priorities. The start-up may thus operate as a separate, high-performing innovation center within corporate structures.

## *6.3. Limitations and further research*

We targeted firms younger than 12 years at the time of the acquisition, which might create certain limitations. Although the average start-up age in our study is in line with previous studies on start-up acquisitions (Benson and Ziedonis, 2009; Puranam et al., 2009), future research could examine acquisitions in earlier start-up stages. Analyzing acquisitions of early-stage ventures could help develop an understanding of potential differences in PMI management practices regarding acquisition outcomes, for instance, organizational agility (Teece et al., 2016).

Based on M&A research, our empirical analysis and additional analyses consider the influence of internal and external relatedness and technological relatedness between the start-up and the acquirer before the acquisition (Capron, 1999; Zaheer et al., 2013). By focusing on reconfiguration mechanisms during a start-up's PMI, we mainly theorize how these mechanisms affect the acquirer's radical innovativeness. However, different aspects of relatedness could counteract reconfiguration mechanisms during the PMI of a start-up's M&A. For example,

technological or geographical overlaps (Sears and Hoetker, 2014; Yan et al., 2020). Research could further study potential overlaps and how they affect a start-up's M&A and, particularly, the acquirer's resource base.

Our study is motivated by literature on reconfiguration and decision rights in the context of PMI, which limits our study's findings concerning the conceptualization of decision autonomy and structural integration. The design of our research model and our research methodology do not examine the underlying mechanisms of our observed relationships. Future research can, for instance, thus build on our research and consider in more detail how spillover effects from a start-up to the acquirer actually work. For example, one potential explanation is that the start-up with autonomy keeps developing new products and technologies, which could be source of radical innovation from the parent perspective. Furthermore, future research could explore in more detail different types of integration. For instance, structural integration might entail functional integration or structural integration might be in a sense fulfilled through different levels of functional integration. Future research thus has great potential to build on our results and look at the types of integration and also their temporal sequencing. Our study enables us to consider PMI from a multidimensional perspective but not as a symbiotic, multistage process, as proposed by Haspeslagh and Jemison (1991). Thus, further research might consider symbiotic integration by gathering information on the gradual progression of PMI (Graebner et al., 2017).

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## Data availability statement

Data available on request due to privacy/ethical restrictions.

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## Note

<sup>1</sup> Following Benson and Ziedonis (2009), we define start-ups as companies which are younger than 12 years with fewer than 500 employees. Throughout this paper, the terms “start-up” and “new venture” are used synonymously.

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APPENDIX A

Construct (based on) and items <sup>1</sup>	Cronbach alpha	AVE	CR
Radical innovativeness (Subramaniam and Youndt, 2005) <i>How would you rate the capability of the business unit, which was intended to profit most from the acquisition to generate the following types of innovations in the products/services it has introduced since the acquisition?</i>	0.86	0.67	0.86
<ul style="list-style-type: none"> <li>• Innovations that make your prevailing product/service lines obsolete</li> <li>• Innovations that fundamentally change your prevailing products/services</li> <li>• Innovations that make your existing expertise in prevailing products/services obsolete</li> </ul>			
Decision autonomy (Zaheer et al., 2013) <i>To what extent did your firm grant decision-making autonomy to the target in the following dimensions?</i>	0.83	0.55	0.84
<ul style="list-style-type: none"> <li>• Strategy formulation</li> <li>• Marketing (focus on market research-related activities)<sup>2</sup></li> <li>• Marketing (focus on promotion- and sales-related activities)</li> <li>• R&amp;D</li> <li>• Operations</li> </ul>			
Structural integration (Puranam et al., 2006, 2009) Please indicate if the acquired new venture continues to operate mainly independently OR if the majority of the acquired new venture has been integrated into your company	–	–	–
Internal and external relatedness <sup>4</sup> (Capron, 1999) <i>Please indicate the degree to which you agree with the following statements concerning the internal/external relatedness of the acquired new venture just before the acquisition:</i>	0.67	–	–
<ul style="list-style-type: none"> <li>• The products/services of both companies were similar</li> <li>• The products/services of both companies were mainly based on the same technology</li> <li>• The geographical markets of both companies were mainly identical</li> <li>• The customers of both companies were mainly identical</li> <li>• The two companies were direct competitors</li> </ul>			
Management style similarity <sup>3,4</sup> (Homburg and Bucerius, 2006) Decentralized (1) versus centralized (7) Short-term oriented (1) versus long-term oriented (7) Delegative (1) versus hierarchical (7) Flexible (1) versus inflexible (7) Output-oriented (1) versus process-oriented (7) Proactive (1) versus reactive (7) Unbureaucratic (1) versus bureaucratic (7)	0.76	–	–
Environmental uncertainty (Luca and Atuahene-Gima, 2007) <i>Please indicate your agreement with each of the following statements with regard to the respective business unit's environment:</i>	0.89	0.64	0.86
<ul style="list-style-type: none"> <li>• Customer needs and product preferences change quite rapidly</li> <li>• Customer product demands and preferences are highly uncertain</li> <li>• It is difficult to predict changes in customer needs and preferences</li> <li>• Market competitive conditions are highly unpredictable</li> </ul>			

Construct (based on) and items <sup>1</sup>	Cronbach alpha	AVE	CR
Product innovation (Li and Atuahene-Gima, 2001)	0.87	0.59	0.84
<i>Rate the acquired new venture relative to its competitors for the period before the acquisition on the extent to which it had:</i>			
<ul style="list-style-type: none"> <li>• Developed a large variety of new product/service lines</li> <li>• Increased the rate of new product/service introductions to the market</li> <li>• Placed emphasis on developing new products/services (e.g., through allocation of substantial financial or personnel resources)</li> <li>• Increased its overall commitment to develop and market new products/services</li> </ul>			

<sup>1</sup>All items were assessed on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree), otherwise being indicated; for large and diversified companies, respondents were asked to answer all questions with regard to the business unit that benefitted most from the acquisition.

<sup>2</sup>Measure was dropped from the scale during item purification phase in the exploratory and confirmatory factor analyses.

<sup>3</sup>The degree of management style similarity is calculated by the sum of differences between the new venture and corporate along all dimensions.

<sup>4</sup>Manifest variable.