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Alliances of service firms and manufacturers: Relations and configurations of entrepreneurial orientation and hybrid innovation

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ABSTRACT

Alliances between service firms and manufacturers in pursuit of joint hybrid innovations face both advantages and challenges. This study analyzes the ambivalence in service firm-manufacturer alliances via complementarities versus divergences. The mixed method approach consists of a multiple case study of 12 firms, regression analysis, and a fuzzy-set qualitative comparative analysis (fsQCA) of a sample of 190 firms. The three methods deliver consistent and robust results that complement each other. Findings are that a service firm's entrepreneurial orientation enhances joint hybrid innovation and alliances with manufacturers. Divergences between firms have ambivalent influences on joint hybrid innovation, depending on the service firm's entrepreneurial orientation and the equity arrangement of the alliance.

1. Introduction

Researchers have turned their attention towards hybrid innovation between service firms and manufacturers (Kindström, Kowalkowski, & Sandberg, 2013). Hybrid innovations can make use of the strengths of service firms in handling information, communication technology, intangible assets, service-related knowledge, and external resources (Tether & Tajar, 2008). Generally, innovation increases by a firm's entrepreneurial orientation, which explains a firm's search for innovative solutions, willingness to take risks, and proactiveness (Covin & Slevin, 1989; Lumpkin & Dess, 1996). Prior studies on manufacturers show that internal innovation increases with greater EO (Rauch, Wiklund, Lumpkin, & Frese, 2009). Only a few studies consider how entrepreneurial orientation influences innovation in alliances (Bouncken, Plüschke, Pesch, & Kraus, 2016), but neglect service firms and hybrid innovation. On the one hand, entrepreneurial orientation facilitates a proactive and risk-taking integration of services with a manufacturer's products towards joint hybrid innovation. On the other hand, service firms differ from manufacturers while divergences increase with high entrepreneurial orientation. Alliance research shows that organizational divergences reduce alliance performance (Lavie, Haunschild, & Khanna, 2012). The configuration of the divergences between service firms and manufacturers might jeopardize their inter-firm complementarities that lead to joint hybrid innovation.

Drawing upon this ambivalence, the present study aims at analyzing how a service firm's entrepreneurial orientation influences joint hybrid innovation in alliances, considering divergences between firms. The study's theoretical background is the combination of the fit approach in alliance research (Nielsen, 2010) with the dominant business logic concept (Prahalad & Bettis, 1986). Fit of dominant business logics implies how firms can easily use strategic resources to pursue opportunities (Lado, Boyd, & Hanlon, 1997). The model assumes that higher entrepreneurial orientation will help to unknot the complementarities between service firms and manufacturers (Meyer & Heppard, 2000). Yet, divergences reducing fit will cause misunderstanding and discoordination and can reduce hybrid innovation (Argote, McEvily, & Reagans, 2003). It is thus important to understand core divergences and their configurations.

To achieve robust findings (Woodside, 2010, 2014), the present study uses a mixed-method approach. The study comprises a multiple case study of 12 firms, regression analysis, and a fuzzy-set fsQCA of a sample of 190 firms. The multiple case study unravels divergences between service firms and manufacturers. The regression analysis supports the merits of a service firm's entrepreneurial orientation on joint hybrid innovation and shows the ambivalent influence of diverging practices and business logics. The fsQCA clarifies influences by its configuration of divergences, entrepreneurial orientation, and hybrid innovation.

This article begins with the theoretical background, explaining service-manufacturer alliances, entrepreneurial orientation, and the fit

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concept. The three-step study then untangles key divergences, tests per a regression analysis, and clarifies configurations by fsQCA. The discussion shows how the findings advance theory.

2. Theoretical background

Service firms' solutions hold rich, intangible assets and information, incorporating flexible and interactive development processes with customers (Vargo & Lusch, 2004). Manufacturers mainly produce tangible output using sequential and standardized processes (Boyt & Harvey, 1997). Service firms can access external resources and capabilities more easily than manufacturers (Mina, Bascavusoglu-Moreau, & Hughes, 2014). In an alliance with a manufacturers service firms contribute intangible assets and service-related knowledge to joint hybrid innovation (Tether & Tajar, 2008; Ulaga & Reinartz, 2011). The flexible, intangible, and customer-oriented solutions of service firms complement manufacturers' static and sequential business logic and practices (Benavides-Espiriosa & Ribeiro-Soriano, 2014). Entrepreneurial orientation can foster the search for innovative solutions, willingness to take risks, and proactiveness (Covin & Slevin, 1989) while creating new (hybrid) offerings. Greater entrepreneurial orientation transforms tacit and process-related service innovations into hybrid solutions. Hence, service firms with a high entrepreneurial orientation will increase complementarities for hybrid solutions in alliances (Lim, Ribeiro, & Lee, 2008).

Proposition 1. Service firms with greater EO will support joint hybrid innovation in alliances between service firms and manufacturers.

Although alliances between service and manufacturing firms have a high potential for complementarities, which can increase by a service firm's entrepreneurial orientation they also face divergences. Divergences might reduce the fit between firms. Fit can measure the coherence of a firm with its environment or with the firm's internal strategy, structure, and processes (Nielsen & Gudergan, 2012). In a narrow definition, the strategic fit between allying firms describes the match between the allies' strategic approaches (Nielsen, 2010). A broader definition relates strategic fit to similarities in technology, products, and markets, separating it from organizational fit with organizational processes and logics (Geringer & Hebert, 1991; Nielsen & Gudergan, 2012). Greater fit of organizational processes and dominant business logics implies that firms can more easily leverage resources to joint value-creation opportunities (Lado et al., 1997). Prior studies focus on cultural divergences between firms to explain alliance failure (Pérez-Nordtvedt, Kedia, Datta, & Rasheed, 2008; Pesch & Bouncken, 2017b). Only Lavie et al. (2012) study operational divergence, finding that organizational divergences can induce alliance failure and that relational alliance mechanisms can cope with divergences and thus maintain alliance performance. Alliances between service firms and manufacturers will face divergences, for instance, from different standardization abilities. The typical case of low standardization of service firms and high standardization of manufacturers hinders their congruent business practices in the alliance (Boyt & Harvey, 1997). In contrast to service firms, manufacturers can split the production and the consumption of their offerings into two separate operations (Vargo & Lusch, 2004). Focusing on the management level, the dominant logic concept(s) can help to explicate why firms fit and how this causes misunderstanding and coordination problems that hinder joint innovation (Argote et al., 2003). Firms with greater dominant business logic fit (Prahalad & Bettis, 1986) can more easily utilize strategic resources in value-creation opportunities (Achrol, 1996), for instance those initiated by an entrepreneurial orientation (Meyer & Heppard, 2000). Diverging business logics negatively influence the application of service firms' entrepreneurial orientation and the ability to leverage hybrid innovation. Firms can benefit from sharing similar approaches to entrepreneurial orientation, seizing opportunities for hybrid solutions (Obloj, Obloj, & Pratt, 2010). Thus, the effect entrepreneurial orientation has on hybrid innovation depends on divergences between firms.

Proposition 2. Organizational divergences between service firms and manufacturers will influence the effect EO has on joint hybrid innovation in the alliance.

However, what are the major organizational divergences between service firms and manufacturers and how do these divergences interact with entrepreneurial orientation on joint hybrid innovation? Can different configurations specify these divergences? A multiple case study, regression analysis, and fsQCA analysis will provide answers.

3. Empirical investigation

3.1. Multiple case study

The study uses a purposeful sampling approach (Eisenhardt, 1989; Suri, 2011), employing the following selection criteria: (a) All firms operate in a service firm-manufacturer innovation alliance, (b) are incumbents, aged between 5 and 15 years to control for age-based differences in entrepreneurial behavior, and (c) are located within a range of 100 km of one another to avoid influence of cultural differences. Table 1 characterize the sample firms

Initial face-to-face open interviews between two researchers and an informant at the firm included general questions about the innovation alliance with the alliance firm. Interviews lasted about 1.5 h. Interview partners were CEOs, alliance managers, or innovation managers. The researchers contacted interviewees a second time to review and discuss the case write-ups thereby ensuring data accuracy. Data collection took place between April 2014 and September 2015. The Gioia methodology guided the coding (Gioia, Corley, & Hamilton, 2013; Table 2).

Table 2 shows three initial findings. Interviewees confirm that manufacturers and service firms diverge. Core dimensions relate to entrepreneurial orientation and business logics and practices. Service offerings require specific relationship-based practices (Oliva & Kallenberg, 2003). Manufacturing practices are more transaction based than the stronger interaction- and relationship-oriented service practices are (Grönroos & Ojasalo, 2004). In the pursuit of hybrid solutions service firms and manufacturers need to align their divergent practices of value creation (Brady, Davies, & Gann, 2005). Hence, diverging business practices of service firms and manufacturers might reduce the positive influence entrepreneurial orientation has on joint innovation.

3.2. Methodology

3.2.1. Sample and data collection

The survey uses key informants from among top and middle management of service firms in alliances with manufacturers. Slightly over half of the firms deliver service components in the medical equipment industry (55%). The rest of the firms deliver services in the general engineering and manufacturing sector (45%). Respondents belong to different corporate departments, including management (32%), marketing (24%), R&D (11%), sales (42%), and other non-specified departments (11%). The average firm size by number of employees is 4197. The average sales volume is 811 million euros. The average firm age is 31 years. The alliance had lasted on average for 10 years. Of the firms, 37% have their headquarters in Germany, 25% in other EU countries, 9% in Asia, 9% in North America, and 2% in South America.

3.2.2. Measurement model

According to Eggers, Kraus, Hughes, Laraway, and Snycerski (2013), entrepreneurial orientation (EO) is a higher-order construct of three first-order constructs: innovativeness, proactiveness, and risk-taking, connected to three manifest indicators (Table 3). Joint hybrid innovation uses the scale by Bouncken et al. (2016). Diverging business logics (DBL) measured with a single item whether the logics and

Table 1
Characterize the sample firms.

Case firm	Firm type	Industry (SIC code)	Firm size (no. of employees)	Founding year	Short business description
1	Service	871 engineering, architectural, and surveying	11–50	2005	Automation engineering; special focus on the development of software solutions and accompanying consulting services; direct interaction with manufacturing partner
2	Service	872 accounting, auditing, and bookkeeping services	11–50	2005	Tax accounting; services especially for manufacturers
3	Service	874 management and public relations services	11–50	2006	IT and management consulting; specialized for manufacturing business
4	Service	738 miscellaneous business services	51–250	2006	Facility management; direct linkages to manufacturing partners
5	Service	737 computer Programming, data processing, and other computer-related services	11–50	2000	Industrial software solutions; strong focus on innovative, highly customized solutions
6	Service	738 miscellaneous business services	11–50	2004	Consulting and project management related to cargo handling; manufacturing partners
7	Manufacturing	349 miscellaneous fabricated metal products	51–250	2000	Production of engines and metal production equipment; direct interaction with service partner
8	Manufacturing	356 general industrial machinery and equipment	51–250	2002	Project-based development and sale of highly customized, highly complex machinery; maintenance done by service partner
9	Manufacturing	344 fabricated structural metal products	11–50	2004	Solution-based portfolio of offerings; inseparability of product and service offerings; highly complex offerings; mainly project-based business
10	Manufacturing	369 miscellaneous electrical machinery, equipment, and supplies	11–50	2006	Production technical equipment used in the realm of quality management; direct linkage to service partner
11	Manufacturing	354 metal working machinery and equipment	11–50	2003	Sale of standardized machinery; enhancement of solutions portfolio by service partner offerings
12	Manufacturing	351 engines and turbines	51–250	2006	Project-based sale of machinery; after sales service in direct interaction with service partner

mentalities of the firm diverges from that of their respective alliance partner. Meanwhile, diverging business practices (DBP) measured with a single item whether the "business practices" of the alliance partner.

Confirmatory factor analysis (CFA), carried out using tests the measurement model for joint hybrid innovation and entrepreneurial orientation (Table 3). All criteria support adequate measurement fit: $\chi^2/df = 1.43$, CFI = 0.93, RMSEA = 0.05, and SRMR = 0.07 (Hu & Bentler, 1999). The non-orthogonal first-order solution (model 2) and the higher-order factor (model 3) show excellent model fit. The χ^2-difference test of model 2 versus model 1 rejects the orthogonal first-order solution of entrepreneurial orientation ($\Delta\chi^2 = 48.38$, $\Delta df = 3$, $p < 0.01$). The target coefficients ($TC_1 = TC_2 = 1.00$) indicate that the covariance of the non-orthogonal first-order solution is completely covered by the higher-order factor solution of EO.

Table 4 show the correlations, for instance, entrepreneurial orientation shows a negative association with equity participation and a strong positive relation to joint hybrid innovation.

3.3. Regression model

Regression analysis follows the assumption that variations of the dependent variable (joint hybrid innovation) are accompanied by systematic changes of the independent variable (entrepreneurial orientation). The study controls for firm size because small firms are normally more flexible than large firms (Haveman, 1993) and work within entrepreneurial regimes (Agarwal, 1998). Firms' age is an important control because older firms have greater inertia (Hannan & Freeman, 1984).

To examine the interaction of entrepreneurial orientation with organizational divergences between service firms and manufacturers the analysis includes the computation of the interaction terms by multiplying the mean centered factor scores of entrepreneurial orientation and DBL (and similarly, entrepreneurial orientation and DBP).

3.4. Fuzzy-set qualitative comparative analysis (fsQCA)

Configuration analysis with fsQCA 2.5 uses set-theoretic methods (Ragin, 1987). In fsQCA terminology, conditions or configurations are either sufficient or necessary for an outcome. Studying cases as configurations allows for causal asymmetry, which means that the explanation of the outcome does not imply that this explanation also accounts for the absence of the outcome. Wagemann and Schneider (2010) argue that negation of configurational conditions does not necessarily result in the negation of outcomes. Further advances in comparison to the traditional inferential test theory enable equifinality, neutral permutations, limited diversity of empirical representations, and definition of meaningful variable thresholds according to theoretical considerations (Fiss, 2011).

The logic of sufficient or necessary conditions or configurations requires the transformation of metric variables into fuzzy sets. Three substantively meaningful anchors reflect full non-membership (i.e., membership score = 0), a cross-over point of maximum ambiguity (i.e., 0.5), and full membership (i.e., 1) for each case and each variable. The analysis uses the following calibration thresholds: firm size, with ≤ 10 employees (full-out at 10%), 50 employees (cross-over at 49%), and ≥ 500 employees (full-in at 85%); firm's age with, ≤ 5 years (full-out at 12%), 20 years (cross-over at 49%), and ≥ 50 years (full-in at 87%); equity participation only allows full-out (73%) and full-in. For the factor scores of latent variables (entrepreneurial orientation and joint hybrid innovation), the study uses -1, 0, and $+1$ as anchors. This results in entrepreneurial orientation thresholds of 11% (full-out), 47% (cross-over), and 91% (full-in), and for joint hybrid innovation in 14% (full-out), 46% (cross-over), and 92% (full-in). For DBP and DBL (Likert scale) the study uses the anchors 1.2, 2, and 4.8. This results in DBP thresholds of 24% (full-out), 50% (cross-over), and 92% (full-in), and DBL thresholds of 28% (full-out), 50% (cross-over), and 95% (full-in).

The lowest acceptable consistency for solutions is set to 0.85, which

Table 2
Coding results.

First order concepts	Second order themes	Aggregate dimension
• Innovation only takes place as result of external pressure • Change as disruptive process • New business opportunities are actively created by searching for new solutions for satisfying customer needs • Change as regular process	Evaluation of the necessity of innovative solutions	Perspective on entrepreneurial activities
• Risk-taking as basic business principle • Openness towards sharing information • Collaboration experience • Importance of data protection • Degree of dependence on basic technologies	Attitude towards risk	
• Embeddedness in firm traditions; inertia • Economic situation of the firm • Individual managerial power • Organizational structure; number of hierarchy levels within the firm	Degree of actively seeking for business opportunities	
• Main revenues created based on products • Firm advertising focused on products • Number of patents in the firm • CEO background in engineering	Product as center of business processes	Basic understanding of how to do business
• Main revenues created based on service • Service as central differentiation criterion • Core capabilities are service capabilities • CEO background in management	Service as center of business processes	
• Strong competitive pressure • High degree of standardization of value creation processes • Utilization of digital technologies with the focus of cost reduction • Price-based competition	Cost focused perspective	Operational business practices
• Opportunity for network partner to directly intervene in value creation processes • Utilization of digital technologies with the focus of strengthen network partner ties • Availability and quality as main elements of competition	Relation-focused perspective	

is above the minimum threshold of 0.75 (Fiss, 2011). Also, the minimum acceptable solution frequency is set to three.

4. Results

Table 5 shows the results of the regression models. Control variables do not significantly explain joint hybrid innovation (model 1). Model 2 shows how entrepreneurial orientation, DBP and DBL influences joint hybrid innovation. The results of their interactions are shown in model 3. The mutual effect of entrepreneurial orientation with DBP is associated with higher joint hybrid innovation, whereas the mutual effect of entrepreneurial orientation with DBL leads to decreasing joint hybrid innovation. Taken together, the results of regression analysis support Propositions 1 and 2.

Analysis via QCA not only investigates whether the condition (high entrepreneurial orientation) leads to the outcome but also whether the absence of the condition leads to the absence of the outcome. If the presence of high entrepreneurial orientation (condition) is associated with the presence of high JHI (outcome), then high EO is a *sufficient* condition for high innovation (left side of Fig. 1), which means that high entrepreneurial orientation is a sub-set of high innovation (Wagemann & Schneider, 2010). With a consistency of 0.825 and a coverage of 0.804, high EO is a sufficient condition for high innovation. Consistency and coverage are in the generally accepted range but also show that high innovation cannot be fully explained by high entrepreneurial orientation. The same applies to the inverse solution, where the absence of entrepreneurial orientation is associated with the absence of innovation (left side of Fig. 2). The consistency of this

Table 3
First-order-measurement-model of latent variables ($N = 190$). Model-fit-indices are: chi^2 (df) = 126.049 (88), $p = 0.004$, MLR-scaling correction factor = 1.110; $chi^2/df = 1.432$; RMSEA = 0.048; CFI = 0.929; SRMR = 0.065. Columns show standardized factor loadings (Std. FL), composite reliability (CR), average variance extracted (AVE), and Fornell-Larcker-ratio (FLR).

Construct	Indicators	Std. FL > 0.60[1]	CR > 0.70[2]	AVE > 0.50[3]	FLR < 1.0[3]
Joint hybrid innovation	In the vertical alliance our innovations/new products incorporate technology that is new to customers.	0.870	0.821	0.609	0.484
	In the vertical alliance our innovations/new products offer benefits that are new to the customers.	0.824			
	In the vertical alliance our innovations/new products introduce many completely new features to the market.	0.625			
Innovativeness	We highly value innovations/new product lines.	0.716	0.759	0.512	0.669
	We consider ourselves as an innovative company.	0.723			
	Competitors in this market recognize us as leaders in innovation.	0.707			
Proactiveness	We work to find new businesses or markets to target.	0.719	0.792	0.560	0.611
	We consistently look for new business opportunities.	0.791			
	Our marketing efforts try to lead customers, rather than respond to them.	0.734			
Risk-taking	We value new strategies/plans even if we are not certain that they will always work.	0.704	0.763	0.518	0.381
	To make effective changes to our offering, we are willing to accept at least a moderate level of risk of significant losses	0.723			
	We encourage people in our company to take risks with new ideas.	0.731			

[1] Bagozzi and Yi (1988).
[2] Bacon, Sauer, and Young (1995).
[3] Fornell and Larcker (1981).

Table 4
Correlations ($N = 190$).

		1		2		3		4		5	6		7
1	Log (employees)	1											
2	Firm's age	0.370	***	1									
3	Equity participation	0.186	*	−0.037		1							
4	Diverging business practices	−0.028		0.122	†	−0.032		1					
5	Diverging business logic	0.006		0.038		0.069		0.685	***	1			
6	Entrepreneurial orientation	0.106		−0.119		−0.138	†	−0.071		−0.054	1		
7	Joint hybrid innovation	0.060		−0.092		−0.063		−0.067		−0.018	0.656	***	1

Coefficients are significant at: $^{\dagger}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, and $^{***}p < 0.001$.

solution is 0.806 and the coverage is 0.827.

An advantage of QCA analysis is the possibility of showing configurations of equifinal conditions that lead to the presence or absence of the outcome (see Table 6). The conditions that form the parsimonious and intermediate solution are core conditions (Fiss, 2011).

Entrepreneurial orientation is a core condition for joint hybrid innovation, whereas the absence of divergent logics or the presence of divergent practices is peripheral conditions. The absence of entrepreneurial orientation and the presence of DBP and DBL points to non-membership in the set of joint hybrid innovation. A further consideration of firm size, firm age, and equity participation could provide insights into more conditions and about robustness. However, the results do not change. With inclusion of equity participation, the parsimonious solution suggests four configurations of membership in the set for joint hybrid innovation and two configurations in the set for non-membership Table 6 shows these results. The six solutions of the fuzzy-set analysis have acceptable consistency (> 0.80), indicating the presence of core and peripheral conditions. The results suggest that the presence of entrepreneurial orientation is a core condition of joint hybrid innovation. The presence of entrepreneurial orientation consistently relates to joint hybrid innovation. The absence of entrepreneurial orientation (~EO) relates to non-membership in the set of joint hybrid innovation (depicted as ~joint innovation). Thus, entrepreneurial orientation is a cause of joint hybrid innovation.

Configurations 1a and 1d deviate in the peripheral conditions DBP • ~Equity versus ~DBP • Equity, where the tilde indicates absence. Equally, solutions 1b and 1c deviate in their conditions: DBL • ~ Equity versus ~DBL • Equity. Peripheral conditions for joint innovation are diverging business practices when firms use no equity participation in the alliance (configuration 1a) or when they do not have diverging business practices under the use of equity participation (configuration 1d). Equally, the presence of diverging business logics when equity participation is absent (configuration 1b) or the absence of diverging business logic when equity participation is present (configuration 1c) are peripheral conditions of entrepreneurial orientation and joint innovation. In the absence of entrepreneurial orientation, diverging business practices (configuration 2a) or equity participation (configuration 2b) build peripheral conditions for the absence of joint innovation.

Fig. 1 right shows the plot of the fuzzy OR logic and the aggregated path solutions 1a–1d. Points in the lower right and the upper left corners of the plot represent errors in conventional quantitative analysis. In fuzzy-set analysis, the cause of cases in the upper left corner is a superset of the outcome. The latter supports the contention that x is sufficient for y. Rather, results indicate cases with high membership in the outcome due to other causes. Cases in the lower right region support the contention that the cause is necessary for the outcome.

Fig. 2 shows the plot of absent entrepreneurial orientation and absent joint innovation (left). The two configurations come from the presence of diverging business practices (2a) or the presence of equity participation (2b). The right side of Fig. 2 shows the aggregated path solutions.

5. Discussion

This study analyzes how the entrepreneurial orientation of a service firm in an alliance with a manufacturer influences hybrid innovation. All three empirical methods support the contention that the service firms' entrepreneurial orientation is a fundamental condition for hybrid innovation. A service firms' entrepreneurial orientation brings the ability to proactively combine divergent capabilities and resources and is a core driver of joint hybrid innovation. Entrepreneurial orientation can encourage manufacturing firms to contemplate and experiment with innovative solutions for their products and to transcend some traditional, inert behaviors. The merits from alliances between service firms and manufacturers support the complementarity argument in the alliance literature (Das & Teng, 2003). The consistent, positive findings of entrepreneurial orientation are supported by prior studies on the advantages of entrepreneurial orientation within (Covin & Lumpkin, 2011) and among firms (Bouncken et al., 2016). Nonetheless, divergences among firms might damage the fit between firms.

The multiple case study reveals two important forms of divergence between service firms and manufacturers: business practices and of business logics. These divergences stress the importance of fit between

Table 5
Estimated standardized model coefficients (Est.) and standard errors (S.E.) for $N = 190$. Coefficients are significant at: $^{\dagger}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, and $^{***}p < 0.001$. The fit-indices for model 3 are $chi^2(df) = 22.49$ (15), $p = 0.10$; RMSEA = 0.05; CFI = 0.93; SRMR = 0.04.

	Model 1			Model 2			Model 3		
	Est.	(S.E.)	p	Est.	(S.E.)	p	Est.	(S.E.)	p
Log (employees)	0.127	(0.083)		−0.021	(0.063)		−0.025	(0.062)	
Firm's age	−0.143	(0.079)	†	−0.001	(0.061)		−0.005	(0.060)	
Equity participation	−0.103	(0.086)		0.031	(0.068)		0.028	(0.066)	
Entrepreneurship orientation (EO)				0.658	(0.042)	***	0.645	(0.043)	***
Diverging business practices (DBP)				−0.056	(0.076)		−0.086	(0.076)	
Diverging business logic (DBL)				0.054	(0.076)		0.090	(0.076)	
EO × DBP							0.167	(0.087)	†
EO × DBL							−0.201	(0.087)	*
Variance explained (R^2)	*0.027*	(*0.026*)		*0.436*	(*0.055*)	***	*0.453*	(*0.055*)	***

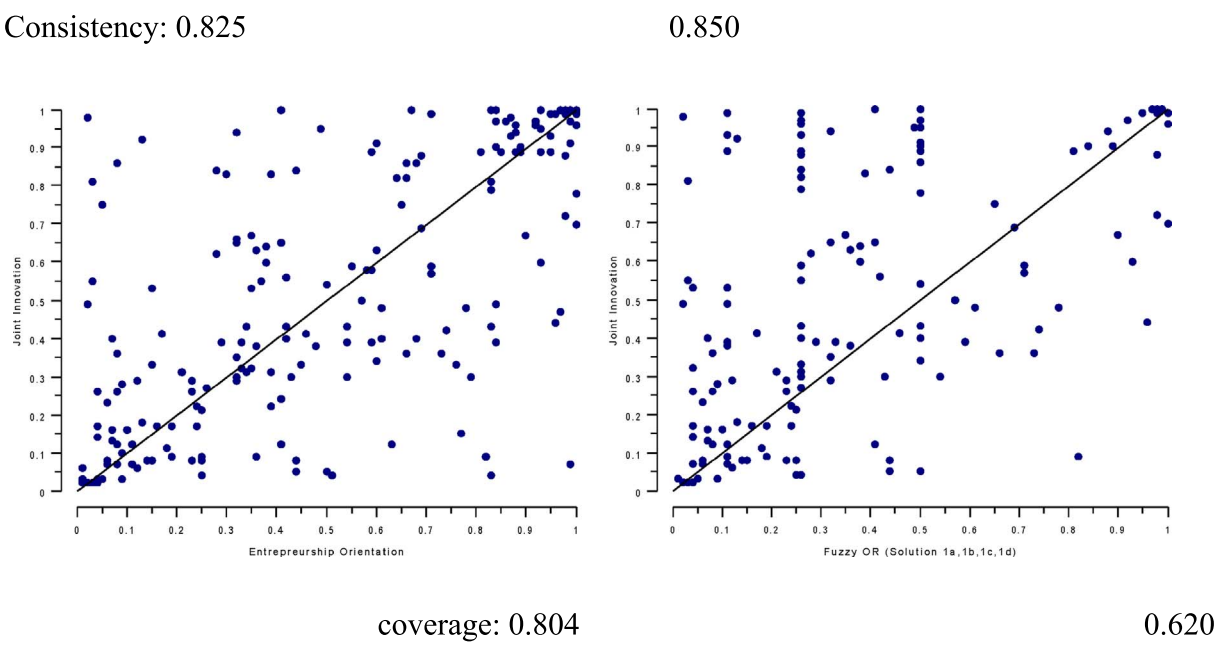

Fig. 1. XY plots of EO and joint hybrid innovation (left), and the fuzzy "OR" logic aggregated path solutions 1a–1d.

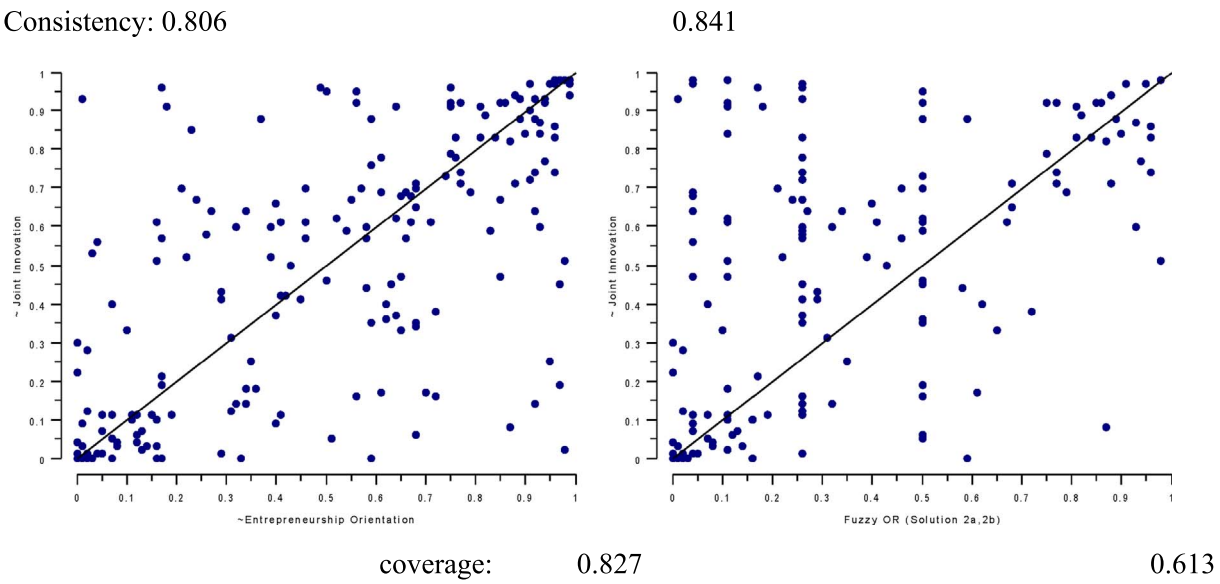

Fig. 2. XY plots of absent EO and absent joint innovation (left), and the fuzzy 'OR' logic aggregated path solutions 2a–2b.

Table 6
Configurations of joint innovation (1a–1d), and the absence of joint innovation (2a–ab).

Configurations for…	Joint hybrid innovation			~Joint hybrid innovation		
	1a	1b	1c	1d	2a	2b
Entrepreneurship orientation	●	●	●	●	⊗	⊗
Diverging business practices	●			⊗	●	
Diverging business logic		●	⊗			
Equity participation	⊗	⊗	●	●		●
Consistency	0.86	0.90	0.88	0.88	0.86	0.81
Raw coverage	0.33	0.35	0.17	0.17	0.54	0.20
Unique coverage	0.03	0.05	0.01	0.01	0.41	0.07
Overall solution consistency	0.87				0.84	
Overall solution coverage	0.56				0.61	

Notes: Black circles indicate the presence of a condition, and circles with a cross-out indicate its absence. Large circles indicate core conditions; small ones, peripheral conditions. Blank spaces indicate no importance.

firms in alliances (Nielsen, 2010). The regression analysis finds opposing effects of divergences. Divergent business logics in interaction with the service firms' entrepreneurial orientation reduce joint hybrid innovation. However, divergent business practices and service firms' entrepreneurial orientation increase joint hybrid innovation. Diverging business logics refers to the basic principles of cognition and strategies in the firms. In this case, diverging logics specifically infer firms' agreement on a coherent design for the hybrid innovation and its positioning in the market. Even so, diverging business logics can raise dysfunctional task conflicts concerning value creation and value appropriation from the hybrid innovation of service and product components. This finding on logics elaborates upon other service research that considers matching business logics as crucial for the success of collaborations (Gebauer, Edvardsson, Gustafsson, & Witell, 2010). Prior studies highlight the misfit of diverging logics that results from mentality differences, causing misunderstandings (Lavie et al., 2012) which can lead into conflicts and competition (Bouncken & Kraus, 2013). Regression results show that diverging practices between firms breeds novel amalgams of services and products. Diverging business practices might correspond to differences in standardization between service firms and manufacturers, as standardization is low for service firms and high for manufacturers. Diverging practices can allow the combination of flexible service processes with products. Even standardized products can achieve customization and become innovative when combined with services. The divergent perspectives concerning practices might stimulate conflicts of functional tasks, but discourse about divergent procedures and practices can enhance complementarities (Pesch & Bouncken, 2017a). Thus, the contrasting findings contribute to the discussion of ambivalent effects of task conflicts in the literature (De Dreu, 2006).

The two high EO configurations of fsQCA indicate diverging business practices or business logics as positive conditions for joint hybrid innovation. Yet, the positive association only exists in non-equity alliances. Consistent with previous alliance research, findings here indicate that equity alliances differ from non-equity alliances (Dhanaraj & Beamish, 2004). The less institutional framework of non-equity seems to stimulate complementarities of diverse viewpoints from diverse business logics. Firms can contemplate and experiment with novel solutions without automatically considering the consequences on the joint institution of an equity alliance. High autonomy of the firms and low institutional interlockings in non-equity alliances allow innovative designs from using entrepreneurial orientation and divergent logics. The loose institutional frame does not require adaptations of formal alliance structures. It uses the full potential of proactive ideas. Similarly, diverging business practices benefit when entrepreneurial orientation complements high autonomy and loose couplings in non-equity alliances that allow extensive experimenting and implementing of service-product combinations. The loose frame brings less frictions with subsequent lower dangers of escalating conflicts. Service firms might lack product knowledge logics and might find it difficult to properly calculate risks related to product issues. Also, manufacturers are not familiar with service-related risks and logics. Thus, the knowledge and competences differ and allow greater complementarities. The non-equity framework excludes the need for extensive discussions, which slow down decision-making processes, and intensive risk calculations (Bouncken & Fredrich, 2016). Extensive discourse and adaptations would otherwise reduce the merits of risk-taking and proactiveness of the service firm's entrepreneurial orientation. In essence, non-equity alliances, with lower coupling of components, personal interaction, and co-location between firms, render differences less visible and less influential.

The fsQCA results emphasize that entrepreneurial orientation is a necessary condition for firms with diverging business practice for joint hybrid innovation. Manufacturers need the impetus of the service firms' entrepreneurial orientation to complement their products with services. Misunderstandings, incompatibilities, and conflicts have momentum when entrepreneurial orientation is low. In addition, differences in practices among service firms and manufacturers will complicate novel joint and compatible structures when entrepreneurial orientation is low. In such a case, firms might not take risks. Firms might not be sufficiently proactive in their interactions to solve task conflicts. Low entrepreneurial orientation would prevent joint hybrid innovation. Consequently, when entrepreneurial orientation is low, firms may not even discuss adapting their practices or may fail to merge their practices in order to achieve hybrid innovations.

Naturally, the present study is not free from limitations. One limitation is the use of key informants. Yet, this study uses multiple informants for the survey and for the case studies. Additionally, the multiple case study uses information from both sides of the dyad. Future research could contrast the present findings with analyses of manufacturer-manufacturer alliances or service firm-service firm alliances. Future research should also dig deeper into the relational embeddedness between the allying firms and the openness to novel alliance partners. Further studies might consider whether intense interaction, trust, and positive relationship experiences form negative conditions in equity alliances or, on the contrary, whether those factors might decrease the negative effects stemming from divergence.

In conclusion, the present findings advance prior alliance research in both content and methodological rigor. In one sentence, service firm-manufacturer alliances can improve hybrid innovation when the service firm has a high entrepreneurial orientation and when using complementarities from diverging practices. Previous research ignored service firms and their entrepreneurial orientation in terms of influencing divergences in alliances and between equity and non-equity alliances. The present study is the first to explicitly analyze service firm-manufacturer innovation alliances and the conditions necessary for successful joint hybrid innovation. The present study is the first to combine case-study insights with regression analysis and fsQCA to achieve a deeper understanding of alliances among service and manufacturing firms.

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