

Configurations of innovation performance in foreign owned subsidiaries: focusing on organizational agility and digitalization

Agility and
digitalization
for innovation

Sven Dahms

*College of Business Administration, Abu Dhabi University,
Abu Dhabi, United Arab Emirates*

Sladjana Cabrilo

*Department of International Business Administration, I-Shou University,
Kaohsiung, Taiwan, and*

Suthikorn Kingkaew

Independent Consultant and Researcher, Bangkok, Thailand

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Abstract

Purpose – The authors investigate conditions that drive innovation performance in foreign-owned subsidiaries. The authors study five variables affecting innovation performance: organizational agility and digital capabilities as the main drivers and competencies and embeddedness in internal and external networks as complementary antecedents of innovation.

Design/methodology/approach – The authors draw on the neo-configurational perspective and apply fuzzy set qualitative comparative analysis (fsQCA) to empirically test survey data from subsidiaries located in the emerging economies of Thailand and Vietnam.

Findings – While the authors find no single condition on its own determining innovation performance, the authors do find that in concert they form four configurations of high innovation performance. The results indicate that all configurations contain competencies, as well as that subsidiaries should prioritize between internal and external networks to complement agility, digital capabilities, to achieve high innovation performance. The authors also reveal intriguing contextual differences in the innovation performance configurations between the two host countries.

Originality/value – By incorporating causal complexity as well as substitutability and complementarity of innovation drivers, the authors extend the current understanding of subsidiary innovation performance outcomes.

Keywords Organizational agility, Digital capability, Innovation performance, Subsidiaries, Emerging economies, fsQCA

Paper type Research paper

Introduction

The advancement of digital technologies has forced companies around the world to rapidly transform their business and management practices (Venkatraman, 2017) and has put forward organizational agility as one of crucial capabilities through which companies can successfully deal with the grand challenges (Del Giudice *et al.*, 2014; de Diego and Almodóvar, 2022). As subsidiaries are continuously enhancing their strategic influence within Multinational Enterprises (MNEs) (Georgijevski *et al.*, 2022), this study focuses on the antecedents of innovation performance in the context of foreign-owned subsidiaries, derived from the international business literature, with special focus on how the interplay between organizational agility and digital capabilities drives innovation performance. Organizational agility allows subsidiaries to keep core organizational efficiencies while simultaneously



maintaining their ability to quickly adapt new technologies in the host country (Shams *et al.*, 2020) and to exploit unpredicted changes as opportunities to innovate and prosper (van Oosterhout *et al.*, 2006; Franco *et al.*, 2022). For being agile, subsidiaries have to timely process a large volume and variety of dispersed information that can be enhanced by digital technologies (Cepeda and Arias-Pérez, 2019; Lu and Ramamurthy, 2011; Shams *et al.*, 2020).

However, the focus of studies on agility and digital capabilities in international business research (Cepeda and Arias-Pérez, 2019; Fourné *et al.*, 2014; Shams *et al.*, 2020; Tallon and Pinsonneault, 2011) is dispersed among several disjoint domains, resulting in many inconsistencies in the findings (Bai *et al.*, 2018). For instance, digital capabilities have been found to be a double-edged sword by being on the one hand crucial for driving organizational agility (Cepeda and Arias-Pérez, 2019; Lee *et al.*, 2015; Lu and Ramamurthy, 2011; Mavengere, 2013) and innovation (Dahms *et al.*, 2020; Koch and Windsperger, 2017) and on the other a hindrance leading to so called “rigidity traps”. Sometimes established technology driven routines become entrenched and forestall needed agility (Shams *et al.*, 2020) and potential to innovate (Dahms *et al.*, 2020).

In addition to the intriguing and complex interplay between agility, digital transformation and innovation performance within subsidiaries (Bai *et al.*, 2018), literature suggests that subsidiary competencies (Dahms *et al.*, 2020; Pereira *et al.*, 2019; Teece *et al.*, 2016) and its access to internal and external networks (Cepeda and Arias-Pérez, 2019; Delgado-Márquez *et al.*, 2018), also drive innovation performance (Chen *et al.*, 2021; Shams *et al.*, 2020). Finally, although we have witnessed a gradual shift of global innovation locus to developing countries (Zhao *et al.*, 2021), where Asia became the most attractive region for research and development spending (PriceWaterhouseCoopers, 2015) and an ideal context for investigating foreign subsidiaries’ activities and performance (Bai *et al.*, 2018), we remain less informed about the untapped innovation opportunities for MNEs within the developing parts of Asia (Zhao *et al.*, 2021).

In order to narrow the identified knowledge gaps, we develop a theoretical framework based on the neo-configurational perspective (Fiss, 2011; Misangyi *et al.*, 2017) that focuses on agility and digital capabilities, as our main drivers of innovation performance, but also includes other relevant drivers derived from the literature, such as competencies and networks. This allows the simultaneous consideration of multiple interdependent antecedents (Chen *et al.*, 2021), including their complementary and substitutability, which lead to high innovation performance outcomes under causal complexity. We study empirically configurations of high innovation performance, where a configuration stands for a number of antecedents that must be in place simultaneously for high innovation performance to occur or not. Therefore, our results differ sharply from previous literature that used a prevailing symmetric view on antecedents of innovation in MNEs and investigated the key concepts of our study mostly in isolation of each other (Dahms *et al.*, 2020; Soundararajan *et al.*, 2021; Pereira *et al.*, 2019; Delgado-Márquez *et al.*, 2018; Fourné *et al.*, 2014).

Our study offers a holistic understanding of the interconnectedness between antecedents of innovation performance in subsidiaries located in emerging markets, with an explicit focus on agility and digitalization. First, drawing upon the neo-configurational perspective, we reveal multiple pathways to enhance innovation performance, suggesting to engage in tradeoffs where strength in some assets substitute for weakness in others (Pezeshkan *et al.*, 2022; Kumar *et al.*, 2022). This is our main contribution as configurational analysis preserves the complex causal conditions and develops configurations of interconnected explanatory antecedents that jointly explain innovation performance in subsidiaries. It goes beyond associations between single and isolated innovation drivers and a limited set of interaction terms explored in most of the earlier theoretical frameworks.

Second, having in mind the emerging role that Asia plays in global networks as a location for innovation and creativity (Bai *et al.*, 2018; Zhao *et al.*, 2021), this research explores innovation in foreign-owned subsidiaries located in Thailand and Vietnam. While the two countries rapidly

develop a reputation as hubs in manufacturing and services throughout the region and the world, they are also at very different stages of their economic development (Hoskisson *et al.*, 2013; Pezeshkan *et al.*, 2022; Zhao *et al.*, 2021) and with different levels of information digitalization and local institutional agility (Sohag *et al.*, 2021). Moreover, knowing that greater protection of property rights favor international R&D spillovers and innovation activity (Barbosa and Faria, 2011), it is important to mention here that while Thailand has been relatively leading in the field of intellectual property protection in Southeast Asia, intellectual property infringement in Vietnam has been serious despite Vietnam's relatively complete intellectual property legal system (Macdonald and Turpin, 2008; OECD, 2013).

Literature background and framework development

Organizational agility

Organizational agility has generally been referred to a firm-wide capability to detect and deal with changes that arise unexpectedly in the business environment in a timely and cost-effective manner (Lu and Ramamurthy, 2011; Franco *et al.*, 2022) and to renew itself and quickly respond (Zhang and Li, 2022). It merges market (Atkinson *et al.*, 2022) and operational excellence (Carvalho *et al.*, 2019), thereby enabling an organization to seize market opportunities via rapid and innovative responses (Margherita *et al.*, 2020; Atkinson *et al.*, 2022). Organizational agility implies ability to detect, interpret and quickly exploit changes as opportunities to prosper (van Oosterhout *et al.*, 2006) and ability to rapidly adjust its internal business processes in the face of market or demand changes (Dove, 2001). These two types of organizational agility have been noted as market capitalizing agility and operational adjustment agility (Lu and Ramamurthy, 2011; Cheng *et al.*, 2020). Agility highlights the speed and success of doing things and reacting to the changes in an increasingly competitive marketplace.

With increasing global uncertainty, subsidiaries will be required to balance flexibility and efficiency simultaneously (Fourné *et al.*, 2014; Doz and Kosonen, 2010). This enables them to quickly respond to diverse market demands while being efficient from the perspective of the headquarters (Verbeke, 2020). It also allows to derive innovations from local networks that provide a fit with firm specific advantages residing elsewhere in the MNE network (Kumar *et al.*, 2019). Strong market capitalizing agility can help subsidiaries to perceive a volatile host environment as a fertile opportunity for innovations (Cheng *et al.*, 2020). Operational adjustment agility emphasizes on a subsidiary's learning capability to absorb, explore and exploit knowledge and integrate own knowledge to drive innovation performance (Shams *et al.*, 2020; Chakravarty *et al.*, 2013).

However, organizational agility at the subsidiary level can also have negative implications. For instance, quick amendments might be harmful in slowly changing industries (Teece, 2014) and may lead to increased tensions with headquarters and other MNE units that might not perceive the changes as necessary to drive innovation (Ambos *et al.*, 2010; Fourné *et al.*, 2014). Another widespread problem is the difference between corporate mindsets and those of subsidiaries that become apparent when subsidiaries try to execute globally oriented and locally focused dynamic capabilities simultaneously (Shams *et al.*, 2020; Ferraris *et al.*, 2017; Fourné *et al.*, 2014).

Digital capabilities

Digitalization is herein seen as a business and digital technology integration (Cepeda and Arias-Pérez, 2019; Chen *et al.*, 2014). Digital capabilities conceptualize how new digital technology changes current business processes or models and supports the installation of new technologies in the strategic planning process (Chan *et al.*, 2019; Scuotto *et al.*, 2017). Although technological competence drives innovation through effective relationships and knowledge flows (e.g. Cabrilo *et al.*, 2020; Koch and Windsperger, 2017; Katemukda *et al.*, 2018), some studies have found that digitalization can create systemic rigidity that stifles the

innovation process (Dahms *et al.*, 2020; Lee *et al.*, 2015; Shams *et al.*, 2020). The question that remains unresolved is whether and how digital capabilities combine with other conditions to support or hinder innovation performance in subsidiaries located in emerging markets.

Competencies

Competencies along value chain activities are a key driver of subsidiary innovation performance (Birkinshaw *et al.*, 1998; Kafouros *et al.*, 2020; Dahms *et al.*, 2022b) and are at the forefront of MNE innovation (Delgado-Márquez *et al.*, 2018; Ferraris *et al.*, 2020). Subsidiaries can “venture” into new competencies over time (Ambos *et al.*, 2010). Crucial local market competencies gained from inter-organizational networks in the host location (De Beule and Van Beveren, 2019) can drive a subsidiary’s innovation performance (Dahms *et al.*, 2020; Najafi-Tavani *et al.*, 2018). However, the effect of subsidiary competencies may also rely to a large extent on its technological competencies and the local network partners (e.g. Hsieh *et al.*, 2018). This indicates the complementary role competencies as well as network relationships play in determining innovation performance.

Networks

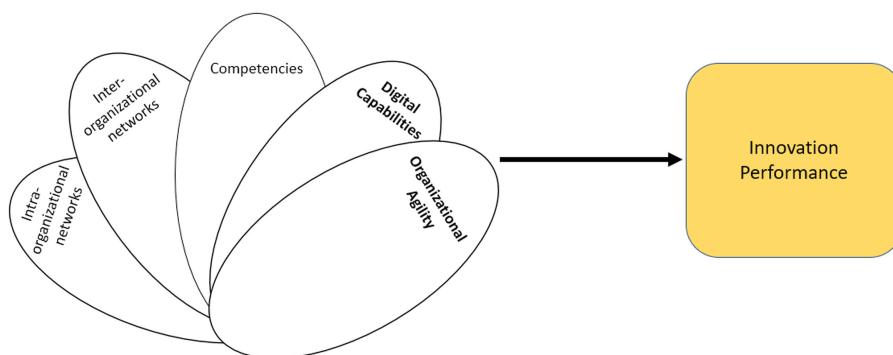
Subsidiaries are embedded in two kinds of organizational networks (Gammelgaard *et al.*, 2012). The first is intra-organizational network comprising of headquarters, other subunits, or integrated research centers, for instance. Those networks provide traditionally the main lifeline for innovation performance in subsidiaries, because this is where firm specific advantages are transferred and exploited on a global scale (Gölgeci *et al.*, 2019; Crespo *et al.*, 2020). However, intra-organizational networks can also become a stumbling block. Subsidiary innovations might be rejected by the corporate immune system due to the “not invented here” syndrome (Ambos *et al.*, 2010), especially if subsidiaries are in emerging markets that are perceived as peripheral to the core MNE network (Soundararajan *et al.*, 2021).

The second kind of networks are inter-organizational networks consisting of relationships with actors in the host country. Those are considered essential for accessing new ideas that drive innovation performance in the subsidiary (Doz *et al.*, 2001; Hsieh *et al.*, 2018; Soundararajan *et al.*, 2021). Ferraris *et al.* (2020) indicate that internal and external network relationships might be complementary in explaining innovation performance in subsidiaries, although the effects may also be contingent on subsidiary competencies (Ferraris *et al.*, 2017). In other words, the subsidiary’s technological ability in searching for a broad range of complementary knowledge in host markets to innovate is enhanced by local business networks (Chen *et al.*, 2021), while the transfer of valuable resources from subsidiaries to the MNE is amplified by internal networks (Chen *et al.*, 2022).

Innovation performance

Innovation performance is defined herein as the ability to generate innovations in products and services, production methods and processes and management and marketing practices (Cabrito *et al.*, 2020; Dahms *et al.*, 2020). Even though foreign-owned subsidiaries have become important pillars in the innovation process of MNEs (Doz *et al.*, 2001; Ferraris *et al.*, 2020; Verbeke, 2020), there is a dearth of studies that investigate the roles that organizational agility and digital capabilities play in their innovation generation. Although innovations can be supported by digital capabilities (Cepeda and Arias-Pérez, 2019), only technology is not sufficient. Instead, connections between internal and external sources of knowledge need to be maintained (Vrontis *et al.*, 2017), by establishing strong and trustful intra- and inter-organizational networks and competencies to manage knowledge inflows and outflows for innovation (Del Giudice *et al.*, 2014; Pereira *et al.*, 2019).

The following Venn diagram on Figure 1 summarizes our conceptual model and the innovation performance antecedents covered in this research.



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Note(s): Bold are key drivers

Figure 1.
Venn diagram

The neo-configurational perspective – aligning theory and research method

The neo-configurational perspective diverges from the more commonly applied symmetric approaches in four main ways (Misangyi *et al.*, 2017; Woodside, 2019). First, subsidiaries are therein cases of set theoretic configurations. They can be a part of several sets and share a similar level of innovation performance outcomes. This is a crucial aspect because innovation performance is unlikely to be determined by the same set of assets across several different subsidiaries. Second, the membership sets are based on the theory as well as the sample itself. Third, some assets might be deemed as necessary while others as sufficient to achieve high innovation performance outcomes, which are often ignored in symmetric studies. Fourth, counter-factual analysis of unobserved configurations is considered as well. These four characteristics make the neo-configurational perspective an ideal conceptual envelope to test complex outcomes, such as innovation performance in this study.

Causal complexity. Our approach in this study is different from that of extant studies of antecedents of innovation in international business. By using symmetric frameworks and selected interaction terms (e.g. Cepeda and Arias-Pérez, 2019; Ferraris *et al.*, 2020), studies search for linear relationships between causes and effects (Welch *et al.*, 2011) and cannot reveal configurations of antecedents and their joint effects (Verbeke *et al.*, 2019) that might lead to high innovation performance outcomes. Little is known about how organizational agility and digital capabilities complement or even substitute each other, as well as how other assets, such as competence and networks, complement agility and digital capabilities for high innovation performance (Ciarli *et al.*, 2021; Liu *et al.*, 2013). For instance, Cepeda and Arias-Pérez (2019) showed that digital capabilities have a positive impact on agility and possibly also on innovation capacity, but Shams *et al.* (2020) showed that digital advancement may lead to rigidity and hinder agility and innovation. Others indicated that technological capability enables wider collaboration in networks (Popa *et al.*, 2018), increases richness of available knowledge (Dahms *et al.*, 2020), contributes to overall competence of a subsidiary and its ability to manage newly created knowledge (Chen and Kamal, 2016; del Giudice and Della Peruta, 2016), respond agilely to the context changes (Lu and Ramamurthy, 2011) and accelerate innovation (Katemukda *et al.*, 2018). It may also be that only agile subsidiaries committed to exploration and experimentation may capitalize on digital capabilities and thereby create innovations (Akhtar *et al.*, 2018; Chan *et al.*, 2019).

The inconsistency of findings may stem from measurement difficulties (Verbeke *et al.*, 2019). Yet, it is important to understand under which conditions high innovation performance occurs in subsidiaries, which has been empirically underexplored. Hailing from the resource-based view of the firm, competencies and capabilities assume imperfect factor markets and

historical path dependency (Barney, 1991; Hamel and Prahalad, 1994). This creates conflicting theoretical predictions about their interrelationships with agility for instance. On the one hand, subsidiaries with greater competencies might be more agile as they have the managerial capacity and resources to adjust to changing circumstance. On the other hand, subsidiaries with higher competencies in one or several parts of the value chain might be more rigid in their ways and resistant to changes.

Host country location context. Previous studies argued for the importance of context in organizational agility and digital capabilities supporting agility (Cepeda and Arias-Pérez, 2019; Teece *et al.*, 2016). This study is focused on less explored emerging economies that vary widely in their institutional characteristics (Zhao *et al.*, 2021) and should not be treated as homogenous (Cepeda and Arias-Pérez, 2019; Fourné *et al.*, 2014). Subsidiaries operating in emerging economies face rapid but unstable growth conditions, different competitive dynamics, higher uncertainty in terms of political and regulatory landscapes (Fourné *et al.*, 2014) and scarcer availability of highly skilled labor (Liu *et al.*, 2016). Accordingly, we know little about the extent to which organizational agility and digital capabilities complement or substitute each other to drive innovation performance in emerging market contexts. This also has important theoretical implications since concepts are only useful if they can be at least conditionally generalized across different contexts (Shams *et al.*, 2020).

Research method

Data collection method and sample

The data for this research was collected via a questionnaire survey of foreign-owned subsidiaries located in Thailand and Vietnam. Both are fast-growing hubs for MNE activities and have a track record of foreign-direct investment (Hoskisson *et al.*, 2013; Pezeshkan *et al.*, 2022; Zhao *et al.*, 2021), including some subsidiaries having regional headquarter and other distinct statuses (Kingkaew and Dahms, 2019). Furthermore, most studies in the field are focussed on Mainland China or Japan in Asia, which leaves many concepts largely untested in different contexts (Christofi *et al.*, 2021; Zhao *et al.*, 2021).

This research targeted the CEO and other top-level managers in foreign-owned subsidiaries, as they are most likely to have the required information due to virtue of their positions (John and Weitz, 1988). A call center was established, and the call center agents were trained and apprised of the survey goals. The agents combined phone calls with online survey to establish a sense of trust between the research team and the managers through direct contact, which is crucial for conducting surveys in emerging markets (Najafi-Tavani *et al.*, 2018).

The sampling frame in Thailand was based on the Department of Business Development database published by the Ministry of Commerce. The database for Vietnam was based on publicly available data including the General Statistics Office, Internet searches and various chamber of commerce homepages. We received 101 useable responses from Thailand and 179 from Vietnam. This equals response rates of around 7% for Thailand and around 15% for Vietnam. The respondents' profile is provided in Appendix 1 and the sample characteristics in Table 1.

The data had been collected from August 2020 till January 2021. A wave analysis was conducted, and no significant differences were found based on the industry, size, or host region between the early and late respondents. Non-respondents and respondents have been compared based on industry and host region data available from the database. The subsequent Chi-square tests were not significant, and the data therefore indicates a degree of representativeness (Harzing, 1999).

Common method bias. As the data used for this research is largely collected from questionnaire survey, it was necessary to ensure that by using this method, no common method bias is affecting the results. Common method bias "is attributable to the measurement

Size (number of employees)			Years in foreign ownership		
Employees	Freq.	%	Years in FO	Freq.	%
<40	89	32	<4 years	97	35
40–80	90	32	4–9 years	81	29
>80	101	36	>9	102	36
<i>Total</i>	<i>280</i>	<i>100</i>	<i>Total</i>	<i>280</i>	<i>100</i>

Entry mode			Industry		
	Freq.	%		Freq.	%
Greenfield	155	55	Manufacturing	99	35
Acquisition/JV	125	45	Service	181	65
<i>Total</i>	<i>280</i>	<i>100</i>	<i>Total</i>	<i>280</i>	<i>100</i>

Table 1.
Sample characteristics

method rather than to the constructs the measures represent” (Podsakoff *et al.*, 2003, p. 879). In order to address common method bias, several steps have been taken. First, objective and secondary data has been included in the analysis (e.g. size, age, industry, host region) (Chang *et al.*, 2010). Constructs have been placed in a random manner on the questionnaire, which makes it unlikely that respondents were able to guess our framework (Christmann and Taylor, 2001). Harman’s one-factor test was conducted as post-hoc statistical test, which showed the highest loading factor at 15.2% indicating no evidence of common method bias in the data (Podsakoff and Organ, 1986). Following Hair *et al.* (2012), we also assessed common method bias via variance inflation factor (VIF) analysis based on Kock’s (2015) full collinearity approach. The average block VIF was 1.819, and the average full collinearity VIF was 1.808. Both well below the conservative threshold of 3.3 and well below the more common threshold of 5. Hence, common method bias is not seen as a severe threat to the interpretation of our results.

Survey instrument and measurement

In line with best practice in the field (Harzing *et al.*, 2009) and to increase comparability of the findings, the survey measures were adapted from previous studies. The question scales were changed from 5-point to a 7-point Likert scale to account for potential differences in the nationality of the managers (Harzing *et al.*, 2009). Forward and backward translation procedures have been followed to ensure that the final questionnaire was bilingual (Chidlow *et al.*, 2015). The survey instrument was pilot tested for the English as well as Thai/Vietnamese version and feedback was incorporated in the subsequent design.

The measure for innovation performance was adapted from Dahms *et al.* (2020) and Cabrilo and Dahms (2018) and included four dimensions: innovations in products and services, processes, management and marketing practices.

For organizational agility, the measures by Cheng *et al.* (2020) and Lu and Ramamurthy (2011) were adapted to assess the operational adjustment agility and market capitalizing agility of the subsidiary. It is worth noting that the construct by Cheng *et al.* (2020) and Lu and Ramamurthy (2011) provides also a strong international validity of the measurement.

Digital capability was adapted from Chen *et al.* (2014). The measure assesses the subsidiary’s ability to integrate digitalization within strategic management.

Further variables included competencies (Birkinshaw *et al.*, 1998), intra- and inter-organizational network relationships (Gammelgaard *et al.*, 2012), age, entry mode, industry, host region and size of the subsidiary (Dahms *et al.*, 2020).

Full details of the questionnaire can be found in Appendix 2.

Analysis

The collected data was analyzed by using fsQCA technique, which allows for a holistic exploration of antecedents that determine innovation performance. It also results in more generalizable analytical inferences, which is increasingly required in business and management research (Kumar *et al.*, 2022). We combined fsQCA with PLS-SEM to ensure not only that the measurement constructs show appropriate reliability and validity, but also to provide z-scores for the subsequent fsQCA.

Validity analysis

To ensure validity of the constructs, the measurement model was investigated. The factor loadings ranged from 0.570 to 0.855. Cronbach's alphas and composite reliabilities are above the 0.7 threshold, average variance extracted was above 0.5, all taken into consideration showing sufficient convergent validity (Fornell and Larcker, 1981). Table 2 indicates good discriminant validity indicated by a square root of the average variance extracted, which is higher than the bivariate correlations between the latent variables (Fornell and Larcker, 1981). Given that the variance inflation factors (VIFs) are well below 5 and none of the bivariate correlations above 0.8, there is also little threat of multicollinearity (Hair *et al.*, 2012).

fsQCA analysis

This research followed Jackson and Ni's (2013) two step method of calibration. As this research is using recently developed constructs, there are no theoretical thresholds available that could guide the calibration (Kumar *et al.*, 2022). Hence, the two-step method used instead allows for a more objective way to calibrate and is consistent with the characteristics of the individual data set (see Greckhamer *et al.*, 2018). This is also in line with other studies in the field (e.g. Dahms *et al.*, 2022a, b; Cabrilo *et al.*, 2020). In particular, the z-scores were used from the PLS-SEM analysis as benchmarks for cut-off points. A z-score of 1 is classified as being fully in, -1 of being fully out and 0 as 0.5 cut-off point. In other words, if a firm shows the expected value, i.e. a z-score of 0, it is considered as neither in nor out of a set. We added 0.001 to cases that fell directly on the 0.5 cut-off point to avoid dropping cases (Fiss, 2011).

We used a cutoff point of 3 as a case frequency threshold, this allowed us to retain 93% of the cases, which is well above the 80% threshold suggested in Greckhamer *et al.* (2018). It is also in line with other studies using larger samples in fsQCA (e.g. Greckhamer *et al.*, 2013; Dahms *et al.*, 2022a, b). In a next step, we use ≥ 0.80 as a benchmark for raw consistency. We also excluded configurations with proportional reduction in inconsistency (PRI) of less than 0.75.

Robustness tests. We also followed the more common method of using various percentiles to calibrate data for our robustness tests (Kumar *et al.*, 2022). The results show similar configurations as in the two-step method, hence our calibration method is robust. Furthermore, we also reduced the consistency threshold to 0.857 as suggested by Crilly (2011) as additional robustness test. The strongest configurations were in accordance with the base model, which further supports the robustness of our results as discussed next. The calibration cut-off points and the full results of sensitivity analysis can be found in Appendix 3.

Results and discussion

As a first step, we conducted a necessary condition analysis to shed light on causal complexity of innovation performance in subsidiaries. None of the conditions reached the required consistency threshold of 0.9 (Ragin, 2008). A value above that threshold would indicate that such a condition would always be required to reach a certain outcome. The highest values were reached by inter-organizational network strength (consistency = 0.777, coverage = 0.767). Hence, none of the conditions is, alone, necessary to explain high

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1 Innovation Performance	4.44	1.12	0.823										
2 Organizational Agility	4.67	1.06	0.549**	0.761									
3 Digital capabilities	4.58	1.13	0.454**	0.687**	0.801								
4 Intra-organizational Network Strength	4.47	1.10	0.593**	0.501**	0.451**	0.773							
5 Inter-organizational Network Strength	4.49	1.09	0.613**	0.476**	0.454**	0.765**	0.752						
6 Competencies	4.27	1.02	0.533**	0.435**	0.444**	0.623**	0.590**	0.720					
7 Age	11.51	12.58	0.282**	0.214**	0.169**	0.329**	0.342**	0.226**	1				
8 Entry mode	0.45	0.50	0.089	0.128*	0.09	0.097	0.141*	0.03	0.098	1			
9 Host region	0.44	0.50	-0.135*	-0.083	-0.037	-0.137*	-0.151*	-0.069	-0.250**	-0.106	1		
10 Size	220	710	-0.034	0.011	0.063	-0.015	-0.025	-0.037	0.108	-0.03	-0.036	1	
11 Industry	0.65	0.48	0.156**	0.150*	0.136*	0.149*	0.149*	0.146*	0.195**	0.108	-0.288**	-0.007	1

Note(s): Diagonals in Italic are the square roots of the average variance extracted and off-diagonal are the bivariate correlations between the constructs. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed)

Table 2.
Correlations and AVE

innovation performance. This provides indication for the complexity that underpins innovation performance outcomes.

As a second step, we conducted a sufficient condition analysis with the full sample. A condition is considered sufficient if every time the condition is present or absent, the outcome is present or absent. In other words, the condition is a subset of the outcome (Ragin, 2008).

The results are presented in Table 3. In line with the conventions in the field (e.g. Fiss, 2011; Greckhamer et al., 2018), the table contains the immediate and parsimonious solutions. A solid circle (●) indicates the condition is present and (⊗) indicates its absence, a blank space indicates that the condition has no influence on the outcome. Larger symbols mean core conditions and smaller indicate peripheral ones.

Causal conditions for high innovation performance

We found four configurations that show “equifinality” linked with high innovation performance, two (configurations 1 and 2) involving simultaneously organizational agility and digital capabilities in achieving high innovation performance outcomes for foreign-owned subsidiaries.

While we focus our analysis on configurations that include interplay between organizational agility and digital capabilities, we also clarify causally complex innovation performance and the role of other antecedents in high innovation performance configurations. First, results presented in Table 3 validate a real causal complexity of high innovation performance in foreign-owned subsidiaries, as all configurations include four out of five explored antecedents of innovation. This reveals that associations between antecedents of innovation performance and innovation outcomes, in a real-world setting are, in fact, asymmetrical, which further highlights the need to use asymmetrical technique such as fsQCA in this study (Kumar et al., 2022; Kraus et al., 2018; Woodside et al., 2020). It is also in line with the recommendation made by various scholars to revisit linear models and past results established using symmetrical techniques in business studies (Pappas and Woodside, 2021; Kumar et al., 2022). Our findings show that subsidiaries must combine a variety of innovation drivers to achieve high innovation performance. If only one of explored drivers has no influence on innovation performance (a blank space for inter-organizational network strength, intra-organizational network strength, digital capabilities and organizational agility in configurations 1, 2, 3 and 4, respectively), a subsidiary has to develop all other innovation drivers for superior innovation performance. Second, all four configurations for high innovation performance require subsidiaries’ competencies confirming that in combination with other drivers, such as agility, digital capabilities,

Table 3. Innovation performance full sample

Configuration Condition	High innovation performance				Low innovation performance			
	1	2	3	4	5	6	7	8
Organizational Agility	●	●	●			⊗	⊗	⊗
Digital capabilities	●	●		●	⊗		⊗	⊗
Intra-organizational Network Strength	●		●	●	⊗	⊗		⊗
Inter-organizational Network Strength		●	●	●	⊗	⊗	⊗	⊗
Competencies	●	●	●	●	⊗	⊗	⊗	
Raw coverage	0.47	0.48	0.49	0.49	0.46	0.48	0.44	0.47
Unique coverage	0.03	0.04	0.05	0.05	0.05	0.06	0.02	0.06
Consistency	0.92	0.92	0.93	0.91	0.91	0.90	0.91	0.90
Solution consistency		0.896				0.882		
Solution coverage		0.614				0.600		
Frequency cutoff		3				3		
Consistency cutoff		0.891				0.868		

intra-organizational and inter-organizational network strength, subsidiaries perform better in innovation if they high competencies (Kafouros *et al.*, 2020; Dahms *et al.*, 2020).

Configurations that contain the interplay between organizational agility and digital capabilities (configurations 1 and 2), require complementary competencies and intra-organizational or inter-organizational network strength clarifying why previous literature considered competencies and networks as relevant drivers of innovation performance (Dahms *et al.*, 2020; Pereira *et al.*, 2019; Cepeda and Arias-Pérez, 2019; Delgado-Márquez *et al.*, 2018) and why we included these assets as complementing innovation drivers to organizational agility and digital capabilities. Configurations 1 and 2 demonstrate that in order to fully benefit from organizational agility and digital capabilities for innovation, subsidiaries have to possess high competencies and be embedded in either the host country network or the MNE network. Digital capabilities permit the articulation of internal knowledge or collaborative work with external knowledge to rapidly respond to the demands of local context (Piening *et al.*, 2016; Schneckenberg, 2015). However, a dual focus on collecting and processing knowledge through external and internal networks to simultaneously improve internal processes and address demand changes, seems prohibitively taxing on managerial resources even if supported by technology (Lewis *et al.*, 2014). Thus, it appears that managers use digital capabilities and organizational agility tailored to one dimension at a time which could be considered a somewhat “unbalanced agility”. This is in line with Fourné *et al.* (2014) and Faroque *et al.* (2020) finding that agile MNEs struggle to balance the internal and external networks in emerging markets and that dual network focus is not as common as suggested. Our results indicate that agile subsidiary with ability to innovatively use digital technologies to take advantage of their key resources and capabilities, should prioritize and switch between an internal and external focus dynamically in emerging markets to achieve innovation performance (Bustinza *et al.*, 2020).

Otherwise, subsidiaries lacking either agility or digital capabilities (configurations 3 and 4), need to rely strongly on traditional intra- and inter-organizational network and knowledge exchange channels to leverage their competencies to high innovation performance in emerging markets (Andersson *et al.*, 2016; Dahms *et al.*, 2020). It also shows that innovation performance of MNE subunits depends on their ability to combine and recombine the knowledge and competencies that they access through their own inter-organizational networks in the host location, with those already accumulated and available in the parent company (Cantwell and Piscitello, 2014) by developing organizational agility drivers and initiatives (Margherita *et al.*, 2020) or digital capabilities (Dahms *et al.*, 2020).

Our research highlights an interconnectedness between organizational agility and digital capabilities (Cepeda and Arias-Pérez, 2019; Lu and Ramamurthy, 2011; Kane *et al.*, 2017; Mao *et al.*, 2020), but reveals that both are still difficult to manage and more conservative innovation drivers, are favored in emerging markets (e.g. Dahms *et al.*, 2020; Ferraris *et al.*, 2020; Hsieh *et al.*, 2018), especially to complement agility and digital capabilities. This goes beyond previous studies (Fourné *et al.*, 2014; Shams *et al.*, 2020; Martínez-Climent *et al.*, 2019; Mavengere, 2013) showing that the extent to which digitalization and organizational agility can be simultaneously exploited to derive innovation performance outcomes might also be context specific.

Causal conditions for low innovation performance

Configurations 5 to 8 show a variety of asset combinations that can lead to low performance outcomes, illustrating causal asymmetry. However, configurations 5, 6 and 7 (for low innovation performance) are the mirror opposite to configurations 4, 3 and 2 (for high innovation performance), respectively, showing that causal asymmetry is not a general rule. In general, configurations demonstrate that if subsidiaries lack most of the innovation antecedents, they will perform low in innovation, as only one condition, such as organizational agility (configuration 5), digital capabilities (configuration 6), strong intra-organizational network

(configuration 7) and competencies (configuration 8) cannot by itself dramatically enhance their innovation performance. Interestingly, the lack of inter-organizational network strength in all configurations for low innovation performance demonstrates that without strong and trustful relationships with actors in the host country, subsidiaries are not able to leverage their digital capabilities and competencies, to manage knowledge inflows and outflows (Del Giudice *et al.*, 2014; Chen and Kamal, 2016), absorb and understand local market needs (Yang and Liu, 2012), identify emerging business opportunities and quickly respond to anticipated context changes (Cepeda and Arias-Pérez, 2019), effectively reconfigure the knowledge already available in the parent company (Cantwell and Piscitello, 2014; Crespo *et al.*, 2020), and subsequently, will fail to innovate (Scuotto *et al.*, 2017; Tsai *et al.*, 2022).

Host country context

Lastly, we analysed the importance of host country context for innovation performance of subsidiaries. The results are presented in Table 4. In general, these results reveal that the interplay between organizational agility and digital capabilities may be favorable for high innovation performance in Thailand, while local market competencies gained from inter-organizational networks seem to be core assets for high innovation performance in Vietnam.

Thailand case

For the Thailand subsample, configuration 1 with the highest raw coverage explains that competencies and agility help subsidiaries to timely address new opportunities and threats

Configuration Condition	Thailand high innovation performance			
	1	2	3	4
Organizational Agility	●	●	●	
Digital capabilities		●	●	●
Intra-organizational Network Strength		⊗	●	●
Inter-organizational Network Strength		●		●
Competencies	●		●	●
Raw coverage	0.60	0.20	0.50	0.52
Unique coverage	0.09	0.03	0.03	0.05
Consistency	0.92	0.95	0.93	0.91
Solution consistency			0.907	
Solution coverage			0.712	
Frequency cutoff			3	
Consistency cutoff			0.892	
Configuration Condition	Vietnam high innovation performance			
	1			2
Organizational Agility		●		
IT capabilities				●
Intra-organizational Network Strength		●		
Inter-organizational Network Strength		●		●
Competencies		●		●
Raw coverage		0.44		0.46
Unique coverage		0.03		0.05
Consistency		0.92		0.91
Solution consistency			0.908	
Solution coverage			0.492	
Frequency cutoff			3	
Consistency cutoff			0.890	

Table 4.
Innovation
performance split
sample

(Teece *et al.*, 2016; Shams *et al.*, 2020) and adapt its activities and business models to different external context through networks with host country actors. On the contrary, configuration 3 indicates that agile subsidiaries with advanced digital capabilities should rely more on internal networks in order to efficiently transfer and exploit already existing capabilities within MNEs and achieve high innovation performance (Crespo *et al.*, 2020). Configuration 4 reveals the relevance of balancing in-house R&D activities with open innovation to exploit internal and external knowledge for high innovation performance outcomes in the subsidiary (Scuotto *et al.*, 2017). In the context of globally dispersed MNEs, collaboration between geographically distributed units and their local networks is important in order to acquire distinct knowledge and transform it into innovation outcomes (Sajadirad *et al.*, 2019). It appears that in the Thailand subsample digital capabilities help in reaching and processing distant sources of knowledge (Scuotto *et al.*, 2017). This also explains why MNEs balance exploration and exploitation, i.e. gaining local market knowledge through ties with local actors (Chen *et al.*, 2021; De Beule and Van Beveren, 2019; Koch and Windsperger, 2017) while keeping at the same time strong intra-organizational network serving as a crucial innovation pipeline to exploit global knowledge resources within the MNE (Ciabuschi *et al.*, 2017; Ferraris *et al.*, 2017, 2020).

Considering the interplay between agility and digital capabilities (configurations 2 and 3), subsidiaries in Thailand lacking strong and trustful relationships with the local market (configuration 2) have to exploit locally global brands and knowledge resources by using exploitative networks and strong relationships with headquarters and peer subsidiaries (Wang and Wang, 2021; Faroque *et al.*, 2020). Otherwise, subsidiaries with strong connections with local customers, suppliers and governmental agencies, can use their agility and technological advancement in searching for relevant complementary knowledge and exploring new business opportunities in the host country to enhance innovation (Delgado-Márquez *et al.*, 2018; Chen *et al.*, 2021).

Vietnam case

In the Vietnamese subsample, there are only two configurations with very similar raw coverage scores, both of which do not simultaneously contain organizational agility and digital capabilities. This demonstrates that the juggling of organizational agility in combination with digital capabilities might be difficult in the Vietnamese context. Configuration 2 indicates that Vietnamese subsidiaries should take an advantage of their competencies, digital abilities and strong local networks, irrespective of their agility and internal networks. Configuration 1 reveals that organizational agility complemented by intra- and inter-organizational network strength and competencies leads to high innovation performance outcomes in Vietnamese subsidiaries. The Vietnamese case seems to hint toward the need to take local stakeholders more into consideration for innovation.

Because our data has been collected in two different countries, we were also able to perform a cross validation analysis (Table 5). It shows that the Vietnamese configurations

	Coverage value	Consistency value
<i>Thai sample</i>		
Vietnam Configuration 1	0.93	0.54
Vietnam Configuration 2	0.91	0.57
<i>Vietnamese sample</i>		
Thai Configuration 1	0.88	0.48
Thai Configuration 2	0.81	0.27
Thai Configuration 3	0.91	0.44
Thai Configuration 4	0.91	0.46

Table 5.
Sub-sample cross
validation analysis
results

found a somewhat better applicability in the Thai subsample as compared to the other way around. The Vietnamese configurations showed consistency values in the Thai subsample ranging from 0.93 to 0.91 and coverage values from 0.57 to 0.54. On the flip side, the Thai configurations showed consistency values in the range of 0.91 to 0.81 and coverage values from 0.48 to 0.27 in the Vietnamese subsample. This indicates further support for context specific equifinality for the roles of organizational agility and digital capabilities in innovation performance outcomes.

Conclusions and implications

Our study directly responds to the most recent call for a deeper understanding of the mutual and co-evolutionary interconnections between digital capabilities and organizational agility and how the balanced development of both sets of capabilities impacts organizational performance and competitiveness (Ciampi *et al.*, 2022). Using the reasoning of the configurational perspective and fsQCA (Kumar *et al.*, 2022), we uncover novel intricate interconnections between organizational agility and digital capabilities with complementing and substituting assets, such as competences and networks, in configurations that drive causally complex innovation performance. Identified configurations for high innovation performance may be interpreted as patterns of co-occurrence of assets which favor innovation performance in subsidiaries. Competencies are found to be the underlying mechanism to fully utilize agility, digital capabilities and networks in innovation process, but we empirically show that if only one of five observed assets is not feasible, all other assets have to be in place for high innovation performance to occur. Thus, we propose effective design and balanced development of resources and capabilities to create superior innovation performance (Ciampi *et al.*, 2022). Consequently, we expand existing literature by overcoming the traditional one-direction thinking approach, according to which different digital capabilities enable organizational agility (Ahn, 2020; Akhtar *et al.*, 2018) or agility allows companies to successfully exploit emerging digital technologies and perform digital transformation (Vial, 2019; Kozarkiewicz, 2020) and craft organizational digital mindset that is a critical dynamic capability for sensing, seizing and interpreting digital trends (Warner and Wäger, 2019).

Having in focus organizational agility and digital capabilities, the present study establishes a much-needed bridge between scholarly work on two vital capabilities for digital innovations (Gonçalves *et al.*, 2022). We also demonstrated that neither of these two are stand-alone capabilities that drive innovation performance but require other organizational capabilities and reconfiguration of resources (Kane *et al.*, 2015; Doz and Kosonen, 2010), to be considered as the new dynamic capabilities for a digital world (Millar *et al.*, 2018). This alludes that there is no guarantee for success in innovation even for agile companies with advanced digital capabilities, especially if they lack digital proficiency and strong internal or external relationships. Although there are alternative asset configurations that drive innovation performance, all configurations highlight that human and technological capabilities should be combined to perform at a level that neither can achieve independently.

Our results also manifest the idiosyncratic and context-specific nature of agility in MNEs (Fourné *et al.*, 2014) that require the examination of different contextual domains (Shams *et al.*, 2020; Kumar *et al.*, 2019). Exploring subsidiaries located in the two emerging economies of Thailand and Vietnam, we go beyond the traditional advanced economy contexts (e.g. Christofi *et al.*, 2021) as well as studies that focus mostly on R&D subsidiaries (e.g. Kafourous *et al.*, 2020), or the corporate level (e.g. Lee *et al.*, 2015; Teece *et al.*, 2016). The subsample analysis also indicated that asset configurations used in the possibly more fragile context of Vietnam appear to be a better fit in Thailand, as compared to the other way around. This further supports context specific equifinality for the roles of organizational agility and digital capabilities in innovation performance (Cepeda and Arias-Pérez, 2019; Sohag *et al.*, 2021) and reveals that the transfer of development strategies within MNEs, which assumes in the

literature to flow from the advanced to the less advanced economy (Doz *et al.*, 2001; Kotabe and Murray, 2018; Shams *et al.*, 2020), might flow in multiple directions when agility and digital capabilities are key strategic parameters. With cross validation analysis, we tested for the predictive validity of our model since we have data collected from two countries, which goes beyond the split sample approach commonly used in linear regression techniques.

Managerial and policy implications

Identified configurations of high and low innovation performance lay a basis for actionable dialogue with managers in subsidiaries and MNEs on why innovation performance sometimes occurs, and sometimes is absent and on the panoply of tools deployable to handle innovation performance in subsidiaries. Our findings guide managers to optimize the mutual relationships between digitalization and organizational agility for innovation in MNEs (Ciampi *et al.*, 2022). This study stimulates a new managerial complex thinking approach to effectively balance complementing capabilities and manage their complex interconnections for superior innovation (Scuotto *et al.*, 2017; Fourné *et al.*, 2014; Shams *et al.*, 2020; Ciampi *et al.*, 2022), rather than to focus on allocating resources to develop and deploy specific capabilities. It also advises managers on where to allocate their scarce managerial resources if innovation performance is needed and warns them that organizational agility and digital capabilities might not always take the front seat but ought to be used rather sparingly. In increasingly digital world, companies should focus strongly on digital competences and proficiency to fully utilize their agility, digital capabilities and networks to quickly deliver innovations and improve customer experience.

Policy makers in emerging market host countries are well advised to provide networking opportunities for the foreign-owned subsidiaries. Reducing these costs for MNEs can provide subsidiary managers with greater opportunities to leverage local networks and competencies with organizational agility to drive innovation performance. Our results indicate that digital capabilities also have the potential to drive innovation performance in combination with strong inter-organizational network relationships. Policy makers might therefore want to ensure that the technological competence of the host country aligns with the foreign-direct investment that the host country is trying to attract (Sohag *et al.*, 2021). This complementarity can lead to successful innovation outcomes for the subsidiary and thereby drive economic development through spillover effects in emerging economies.

Limitations and future research

Our study also has limitations which might point towards fruitful future research opportunities. We used a key informant approach in the foreign-owned subsidiaries although their views might diverge from those held at the headquarters and those of the network partners. Thus, future research could provide a multiple respondents approach for a more detailed picture. In addition, previous research on subsidiary performance show that the home-country shapes the performance in host countries (Bai *et al.*, 2018), and this was not considered in the study. Finally, the focus of this study was on innovation performance, which is only one component of subsidiary performance. Therefore, future research may consider broader organizational performance measures to better understand the boundary conditions of the applied concepts (Bai *et al.*, 2018). It is also noteworthy that we have explicitly discussed organizational agility, and that future studies could build upon a broader and holistic concept of agility or consider other agility subdomains (de Diego and Almodóvar, 2022; Sharma *et al.*, 2017; Haider *et al.*, 2021).

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Appendix 1

Table A1.
Respondents profile

	Thailand		Host country	
	Freq.	%	Vietnam	%
Managing Director/CEO	53	52	33	18
Other Board members such as HR, Marketing, etc.	45	45	144	80
Company affiliated experts and other advisors	3	3	3	2
Total	101	100.0	179	100.0

Appendix 2

Questionnaire items

Agility and
digitalization
for innovation

Competencies

Please indicate the capability or distinctive expertise of your site in the following areas relative to other subsidiaries in the corporation e.g. headquarters and/or other.

	Far below			Average			Far above	
Sales / Marketing	1	2	3	4	5	6	7	
Production of Goods or Services	1	2	3	4	5	6	7	
Purchasing	1	2	3	4	5	6	7	
Research & Development	1	2	3	4	5	6	7	
Logistics/Distribution	1	2	3	4	5	6	7	
Human Resource Management	1	2	3	4	5	6	7	
Other Administrative Functions (e.g. Legal, Financial, etc.)	1	2	3	4	5	6	7	

Innovation performance

Relative to competitors in your industry, how successfully has your subsidiary managed to create innovations in the following areas over the past three years?

	Far below			Average			Far above	
Products and services for customers	1	2	3	4	5	6	7	
Production methods and processes	1	2	3	4	5	6	7	
Management practices	1	2	3	4	5	6	7	
Marketing practices	1	2	3	4	5	6	7	

Organizational network strength

Indicate the *strength* of relationships you have with each of the following actors (please note: Local stands for businesses and other organisations in Thailand).

	Very weak			Some			Very strong	
Local Customers	1	2	3	4	5	6	7	
Local Suppliers	1	2	3	4	5	6	7	
Local Competitors	1	2	3	4	5	6	7	
Local Governmental Institutions	1	2	3	4	5	6	7	
Local Science Centres, & Universities	1	2	3	4	5	6	7	
Buyers within your Corporation	1	2	3	4	5	6	7	
Suppliers within your Corporation	1	2	3	4	5	6	7	
R&D and Innovation Centres within the MNE	1	2	3	4	5	6	7	
Headquarters	1	2	3	4	5	6	7	
Other subsidiaries within the Corporation	1	2	3	4	5	6	7	

Digital capabilities

Please rate your subsidiary's performance on each item, relative to other firms in your industry.

	Very poor			Neutral			Very well	
Clarity of vision regarding how IT contributes to business value	1	2	3	4	5	6	7	
Integration of business strategic planning and IT planning	1	2	3	4	5	6	7	
Management's ability to understand value of IT investments	1	2	3	4	5	6	7	
Funding for scanning and pilot-testing "next generation" IT	1	2	3	4	5	6	7	
Technology transfer mechanisms	1	2	3	4	5	6	7	

Subsidiary Agility

How easily and quickly can your subsidiary perform the following actions?

	not at all true			Neutral			very true		
We are quick to make and implement appropriate decisions in the face of market/customer-changes	1	2	3	4	5	6	7		
We treat market-related changes and apparent chaos as opportunities to capitalize quickly.	1	2	3	4	5	6	7		
We constantly look for ways to reinvent/reengineer our organization to better serve our market place.	1	2	3	4	5	6	7		
We fulfil customers’ rapid-response demands and special requests whenever they arise, and our customers have confidence in our ability	1	2	3	4	5	6	7		
Whenever there is a supply disruption, we can quickly make necessary alternative arrangements and internal adjustments	1	2	3	4	5	6	7		
We can quickly scale up or scale down our production/service levels to support fluctuations in demand	1	2	3	4	5	6	7		

	High Innovation Performance																	
	reduced consistency threshold of 0.85					Calibrated 10th, 50th and 90th percentile cutoff							Calibrated 15th, 50th and 85th percentile cutoff					
Condition \ Solution	1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	5	
Organizational Agility	●	●	●	●		●	●	●	●	⊗	⊗			●	●	●		
Digital capabilities	●			●	●				●	⊗	⊗	●			●		●	
Intra-organizational Network Strength		●		●	●	●	●					●	⊗	●	●		⊗	
Inter-organizational Network Strength	●	●	●		●	●		●	●	●		⊗	●		●	●	⊗	
Competencies			●	●	●		⊗	●		⊗	●	●		⊗		●	●	
Raw coverage	0.54	0.54	0.54	0.47	0.49	0.70	0.32	0.59	0.58	0.26	0.29	0.26	0.69	0.27	0.55	0.57	0.21	
Unique coverage	0.03	0.02	0.01	0.03	0.05	0.05	0.01	0.01	0.02	0.01	0.01	0.02	0.11	0.02	0.03	0.01	0.02	
Consistency	0.87	0.89	0.90	0.92	0.91	0.82	0.83	0.90	0.88	0.78	0.82	0.82	0.81	0.79	0.87	0.90	0.80	
Solution consistency			0.851						0.754						0.765			
Solution coverage			0.700						0.849						0.805			
frequency cutoff:			3						3						3			
consistency cutoff:			0.857						0.813						0.805			
Cut off points (Based on factor scores from PLS-SEM)					Percentile cut off points							Percentile cut off points						
	Fully in	cut off	Fully out			10th	50th	90th					15th	50th	85th			
Innovation Performance	1	0	−1			3	4.5	6					3.3	4.5	5.8			
Digital capabilities	1	0	−1			3	4.8	6					3.4	4.8	5.8			
Organizational Agility	1	0	−1			3.3	4.7	6					3.5	4.7	5.8			
Intra-organizational Network Strength	1	0	−1			3.2	4.4	6					3.4	4.4	5.8			
Inter-organizational Network Strength	1	0	−1			3	4.5	5.8					3.4	4.5	5.6			
Competencies	1	0	−1			2.9	4.3	5.6					3.3	4.3	5.3			

Table A2.
Sensitivity analysis
and calibration cut off
points

Corresponding author

Sladjana Cabrilo can be contacted at: sladjana@isu.edu.tw

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