The role of bricolage in countering resource constraints and uncertainty in start-up business model innovation

Abstract

Purpose - Drawing from resource orchestration theory, this research proposed an integrative model that leverages insights to counter resource constraints and uncertainty in start-up business model innovation (BMI). It investigated influences of entrepreneurial networks and effectuation on BMI through bricolage in uncertain environments.

Design/methodology/approach - The research surveyed 481 start-ups in China. Lisrel 8.80 and SPSS 22.0 were used to test the validity and reliability of key variables, respectively. In addition, hypotheses were examined through multiple linear regression.

Findings - First, entrepreneurial networks and effectuation were positively related to BMI, and combining these two factors improved BMI for start-ups. Second, bricolage contributed to BMI and played mediating roles in translating entrepreneurial networks and effectuation into BMI. Third, environmental uncertainty weakened the linkage between bricolage and BMI.

Research limitations/implications - Future research should replicate the results in other countries because only start-ups in China were investigated in the study, and it is necessary to extend this research by gathering longitudinal data. This research emphasized the mediating effects of bricolage and the moderating role of environmental uncertainty, and new potential mediating and moderating factors should be explored between resources and BMI.

Originality/value - There are three significant theoretical contributions. First, the findings add to the literature on the complex antecedents of BMI by combining the impacts of entrepreneurial networks and effectuation. Second, an overarching framework is proposed explaining how bricolage (resource management) links entrepreneurial networks and

effectuation and BMI. Third, this research reveals the importance of environmental uncertainty in the bricolage-BMI linkage, deepening the understanding of the bricolage boundary condition.

Keywords Business model innovation; Entrepreneurial Networks; Effectuation; Bricolage; Environmental uncertainty; Start-ups

1 Introduction

Rapid digital technology adoption is reshaping corporate landscapes and giving rise to novel business models (Ghinoi and Di Toma, 2022;D'Oria *et al.*, 2021). Firms have to innovate business models (BMs) to adapt to turbulent and fast-changing environments (Amit and Han, 2017;Andersen, Aagaard and Magnusson, 2021). Business model innovation (BMI) is an organization's ability to develop novel activity systems that create value for participants (Zott and Amit, 2010). For start-ups, BMI has evolved into a crucial means for overcoming roadblocks, realizing disruptive innovation, and outperforming the competition (Colovic, 2022;Snihur and Zott, 2020;Osiyevskyy and Dewald, 2015).

However, due to smallness and newness, start-ups face two significant challenges for BMI (Snihur and Zott, 2020;Zhou *et al.*, 2022). First, start-ups often face severe resource constraints in employing BMI (Park and Steensma, 2013;Yan *et al.*, 2020). Since innovation is so dynamic and complex, it is hard for start-ups to have sufficient resources for BMI (Abatecola, Cafferata and Poggesi, 2012;Yu and Wang, 2021a) because start-ups often have inherent limitations in acquiring sufficient resources (Gao *et al.*, 2021). Second, start-ups need more certainty in strategic decision-making to fulfill BMI than established enterprises (An *et al.*, 2019). Due to their lack of experience and information, decision-making is accompanied by high degrees of uncertainty (Alzamora-Ruiz, del Mar Fuentes-Fuentes and Martinez-Fiestas, 2021). Additionally, it is hard to allocate resources in uncertain environment for BMI (Yu *et al.*, 2018).

Thus, how to counter the resource constraints and uncertainty in BMI for start-ups represents an important research topic.

According to the resource-based view (RBV) (Barney, 1991), entrepreneurial networks are recognized as external organizational resources that can alleviate resource constraints for BMI (To, Au and Kan, 2019;Yu, Choi and Zheng, 2021a;Micheli, Berchicci and Jansen, 2020;Watson, 2007). Start-ups increasingly rely on stakeholders' participation to create value (Hollebeek *et al.*, 2022), and BMI encompasses many activities that cross traditional boundaries in the age of open innovation. Firms with BMI can benefit from network advantages such as cost savings, risk sharing, and complementary resource utilization (Micheli, Berchicci and Jansen, 2020). Thus, entrepreneurial networks are the crucial external driver of BMI (To, Au and Kan, 2019). BMI is driven by effectuation, which is particularly advantageous when dealing with highly uncertain contexts (Harms *et al.*, 2021b;Mauer *et al.*, 2018). As a critical organizational intangible resource, entrepreneurs' decision-making logic determines their understanding of strategic resource recognition and management (Carnes *et al.*, 2019;Alvarez and Busenitz, 2001;Khan *et al.*, 2020). Effectuation logic begins with the available resources and chooses achievable goals based on actions rather than pre-determined goals (Read *et al.*, 2009;Sarasvathy, 2001;Xia, Luo and Sun, 2020). It enables start-ups to transform uncertainty into opportunities (Sarasvathy and Dew, 2005;Pacho and Mushi, 2020).

Although entrepreneurial networks and effectuation play critical roles in achieving BMI, three significant research gaps exist. First, the existing research examines the impacts of entrepreneurial networks or effectuation on BMI from a single perspective. Since most start-ups face resource scarcity and uncertainty, a vital issue in BMI is considering countering resource constraints and simultaneously making good decisions. It is proposed that both effectuation and entrepreneurial networks contribute to BMI (Bashir, Naqshbandi and Farooq, 2020;Hock-Doepgen *et al.*, 2021;Martins, Rindova and Greenbaum, 2015). Effectuation

dictates the understanding of network resources (Sarasvathy, 2001;Kerr and Coviello, 2020), and enables entrepreneurs to discover hidden value from entrepreneurial networks to design new BMs (Ghinoi and Di Toma, 2022;Martins, Rindova and Greenbaum, 2015;Foss and Saebi, 2018). Therefore, investigating the combined effects of entrepreneurial networks and effectuation could be the key to better understanding how start-ups can counter the resource constraints in uncertainty for BMI.

Second, how entrepreneurial networks and effectuation improve BMI is still unclear. Based on resource orchestration theory, organizational goals can be achieved by managing resources effectively (Kraaijenbrink, Spender and Groen, 2010;D'Oria *et al.*, 2021;Nason and Wiklund, 2018;Sirmon *et al.*, 2011). Resource management behavior is important in turning resources into performance (Sirmon, Hitt and Ireland, 2007;Yu and Wang, 2021b;Yan *et al.*, 2020). Existing research emphasizes the direct impacts of entrepreneurial networks and effectuation on BMI while ignoring the importance of revealing the mediating paths to advance BMI with resource management. Following the framework of strategic resource-behavior-performance (D'Oria *et al.*, 2021), it is proposed that bricolage may help in understanding how start-ups manage resources to advance BMI with limited resources in uncertain environments (Do Vale, Collin-Lachaud and Lecocq, 2021;Yu and Wang, 2021a;Korsgaard, Muller and Welter, 2021). Bricolage is a resource management behavior that makes do by applying combinations of the resources at hand to new problems and opportunities (Baker and Nelson, 2005). Recent research suggests that bricolage helps start-ups to overcome resource limits and develop BMI (An *et al.*, 2018b;Zhao *et al.*, 2020;Yan *et al.*, 2020) and contributes to BMI by making do with available resources, recombining resources through improvisation, and networking with stakeholders (Korsgaard, Muller and Welter, 2021;Yan *et al.*, 2020). Therefore, bricolage could be an essential mediator in applying entrepreneurial networks and effectuation in facilitating BMI.

Third, empirical research on the moderating effect of environmental uncertainty between entrepreneurial bricolage and BMI represents a significant gap. Drawing from the resource orchestration theory, organizational performance depends not only on the efficiency of resource management but also on its fit with external environments (Sirmon, Hitt and Ireland, 2007). As a result, the link between bricolage and BMI is likely influenced by environmental uncertainty (Senyard *et al.*, 2014;Meng *et al.*, 2020;Senyard, Davidsson and Steffens, 2015). However, little empirical research has tested the moderating effects of environmental uncertainty (Steffens *et al.*, 2022;Wu, Liu and Zhang, 2017), and the related findings are inconsistent. Some studies found that entrepreneurs are more likely to celebrate challenges through bricolage, and thus, environmental uncertainty enhances the impacts of bricolage (Ma and Yang, 2022;Meng *et al.*, 2020). On the contrary, others indicate that entrepreneurial bricolage has negative impacts in response to uncertain environments (Senyard, Davidsson and Steffens, 2015). Consequently, the moderating effect of environmental uncertainty between entrepreneurial bricolage and BMI has to be investigated.

This research aimed to make three contributions. First, this study explored the impacts of entrepreneurial networks and their effectuation on BMI. Thus, it contributes to the existing theoretical explanations by addressing the issues of resource constraints and uncertainty in BMI for start-ups. Second, drawing from resource orchestration theory, this research offers an overarching model of explaining how resource management (bricolage) links organizational resources (entrepreneurial networks and effectuation) and BMI. Third, it explores the boundary conditions of bricolage by exploring the moderating influence of environmental uncertainty.

2. Hypothesis development

2.1 Entrepreneurial networks and BMI

Entrepreneurial networks have been described as external resources that rely on start-ups'

links to other organizations and individuals when launching new businesses (Chesbrough, 2010;Zhang *et al.*, 2021), such as the links to suppliers, industry associations, service companies, and customers (Watson, 2007). To overcome the limitations of newness and smallness, start-ups tend to acquire network resources to advance BMI (Yu and Wang, 2021a;Partanen *et al.*, 2020).

There are at least four advantages that benefit BMI from entrepreneurial networks (To, Au and Kan, 2019;Yu, Choi and Zheng, 2021b). First, entrepreneurial networks provide access to valuable resources and speed up BMI. For example, Fukugawa (2006) finds that start-ups can use networks to efficiently acquire and allocate complementary resources and remove restrictions on innovation. Similarly, Hewitt-Dundas (2006) indicates that external stakeholders offer organizations resources and capabilities to innovate. Second, entrepreneurial networks enhance efficiency through economies of scale. Embedding networks reduce costs and difficulties of getting heterogeneous resources and provide spillover resource support and benefits to BMI (To, Au and Kan, 2019). Third, inter-organizational learning advances the integration of knowledge and capabilities acquired from stakeholders and promotes BMI for start-ups (Bock *et al.*, 2005). Finally, entrepreneurial networks provide a solution to the insecurity produced by creating and applying new technologies while also decreasing BMI uncertainties (Diez, 2002). Consequently, it was therefore expected that:

H_1: Entrepreneurial networks positively influence BMI.

2.2 Effectuation and BMI

Effectuation refers to a decision-making logic that "takes a set of means as given and focuses on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001, p. 245). This logic relies on control rather than prediction in nonlinear and dynamic environments (Hubner *et al.*, 2022;Wiltbank *et al.*, 2006). Effectuation theory suggests that effectuation is advantageous in entrepreneurial environments characterized by

uncertainty and limited resources (Palmie *et al.*, 2019). There are four effectual principles: experimentation, affordable loss, flexibility, and pre-commitments (Chen, Liu and Chen, 2021b;Smolka *et al.*, 2018).

Evidence shows that effectuation positively influences BMI. For example, Chesbrough (2010) emphasizes that experimentation and effectuation are necessary for BM development. Similarly, Reymen *et al.* (2017) have noted the importance of effectuation used by start-ups to develop BMI. They found that effectual strategies help avoid high re-configuration costs and reduce uncertainties in BMI. In addition, recent empirical studies also show that effectuation relates positively to BMI (Futterer, Schmidt and Heidenreich, 2018;Harms *et al.*, 2021a).

There are good reasons to suggest that effectuation positively impacts BMI. First, experimentation encourages start-ups to reframe BMs. Entrepreneurs use means as a starting point to innovate BM. This often leads to autonomous entrepreneurial behavior and BM adjustment through trial and error (Sarasvathy, 2001). Second, affordable losses reduce downside risks and boost decision-making efficiency. Start-ups must endure the worst results and set a loss ceiling by operating affordable losses. This minimizes uncertainty, gives the entrepreneur psychological stability, and enhances BMI decision-making efficiency (Long, Wang and Wang, 2021). Third, maintaining flexibility facilitates embracing unexpected events (Welter, Mauer and Wuebker, 2016), which may create entirely new opportunities for start-ups. Capitalizing on the unexpected is an effective path for BMI (Read, Song and Smit, 2009). By embracing external uncertainties and concentrating on internal means, maintaining flexibility leads to innovating BM with new logic. Finally, establishing pre-commitments from stakeholders helps start-ups to obtain resources, share risk, and reduce uncertainty in BMI (Guo, 2019). It was therefore expected that:

H_2: Effectuation positively influences BMI.

2.3 Bricolage and BMI

Bricolage has been defined as "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker & Nelson, 2005, p. 333). It explains how entrepreneurs manage available resources to cope with problems and act quickly to exploit new opportunities in resource scarcity (Baker and Nelson, 2005). Bricolage has three core elements: The first is "making do", implying being action-oriented and actively addressing challenges. Second, "combinations of resources" means combining and reusing resources for new purposes. The last is " resources at hand", including existing resources and available low-cost resources (Baker and Nelson, 2005).

As a resourcing behavior, evidence indicates that bricolage can significantly advance BMI in resource-constrained situations (Janssen, Fayolle and Wuilaume, 2018). Senyard et al. (2014) found that bricolage is an effective path to innovation for new firms with limited resources. Yan et al. (2020) suggested that bricolage helps to overcome resource constraints and enhance BMI. Zhao et al. (2021) confirmed that bricolage enables quick and flexible responses to change BM design demands and positively impacts BM design. Pati et al. (2021) found that bricolage enhances the creative use of resources and positively influences BMI.

Two primary reasons, including a bias for action and recombination, explain why entrepreneurial bricolage promotes BMI (Guo, Su and Ahlstrom, 2016). First, bricolage-using start-ups are more likely to take action and use resources creatively (Guo, Zhang and Gao, 2018), such as adding new partners and novel actions or creating new transaction mechanisms through bricolage. These creative activities are beneficial for developing BMI (Pati *et al.*, 2021). Second, bricolage may lead to the recombination of resources. It encourages start-ups to

develop new partners, structures, and transaction mechanisms through reconfiguring and transposing resources to take advantage of new opportunities to stimulate BMI (Guo, Su and Ahlstrom, 2016). Overall, bricolage is likely to improve BMI. It was therefore expected that:

H_3: Bricolage positively influences BMI.

2.4 Mediating impact of bricolage between entrepreneurial networks and BMI

According to resource orchestration theory, goals can be achieved by resource management (D'Oria *et al.*, 2021;Nason and Wiklund, 2018;Sirmon *et al.*, 2011). Resource management behavior is the key link between strategic resources and performance (Sirmon, Hitt and Ireland, 2007). Bricolage emphasizes applying the actions of making do and combining resources at hand and is consistent with the key propositions of resource orchestration (Do Vale, Collin-Lachaud and Lecocq, 2021;Korsgaard, Muller and Welter, 2021). Hence, following the framework of strategic resource-behavior-performance, the mediating effects of bricolage are explored.

There are three reasons to argue that bricolage mediates the linkage of entrepreneurial networks and BMI. First, bricolage emphasizes using “resources at hand” from entrepreneurial networks, which helps fill BMI's resource gaps. Bricolage occurs within pre-existing networks (Baker, Miner and Eesley, 2003;Obstfeld, Ventresca and Fisher, 2020). Bricoleurs focus on exploring the "resources at hand", especially those existing in start-ups. Baker and Nelson (2005) suggested that entrepreneurs use an extraordinary variety of resources in innovation, and they engage in bricolage with financing, suppliers, industry associations, and service companies. It reduces resource costs and enhances the efficiency in reallocating network resources for BMI (Hoang and Antoncic, 2003).

Second, bricolage highlights “making do”, which enables start-ups to use entrepreneurial networks to solve problems creatively and quickly for BMI. “Making do” means applying trial-and-error learning to creatively explore network resources' functions (An *et al.*, 2017). It is

suggested to fully use the limited resources with immediate action (Baker, Miner and Eesley, 2003). In this process, the heterogeneous values of network resources may be realized (Wu, Liu and Zhang, 2017). It is also advantageous to seize fleeting opportunities and create novel business models quickly (Xiaobao *et al.*, 2022).

Third, bricolage stresses the importance of "resource combination for new purposes". Bricoleurs commonly extend the use of resources by combining resources. It involves experimental tinkering, reframing, and recombining available resources from entrepreneurial networks (Senyard, Baker and Steffens, 2010). Resource lock-in restrictions are removed by utilizing network resources in different combinations, and resource functions are creatively explored (Yan *et al.*, 2020). It also enhances bricoleurs' understanding of network resources and their potential to be combined, creating new opportunities for BMI. Therefore, it was proposed that:

H_4: Bricolage mediates the relationship between entrepreneurial networks and BMI.

2.5 Mediating impact of bricolage between effectuation and BMI

Effectuation highlights experimentation, affordable losses, flexibility, and pre-commitment to cope with uncertainty. It impacts BMI through bricolage as follows. First, experimentation advances the improvisation of resources for BMI. Improvisation is a part of bricolage (Di Domenico, Haugh and Tracey, 2010;Nelson and Lima, 2019). It reflects the action of the bricoleurs in combining and mobilizing resources creatively (Witell *et al.*, 2017). Improvisation with limited resources requires rigorous trial-and-error experimentation (Liu *et al.*, 2018). Through learning from mistakes, start-ups can gain new knowledge and skills (Duymedjian and Ruling, 2010), enabling them to cope with problems with different resource combinations for BMI.

Second, affordable losses drive start-ups to bricolage for BMI. A decision about bricolage needs to consider the firm's affordability of the loss (Sarasvathy *et al.*, 2008). This principle

highlights avoiding overspending on internal resources (Brettel *et al.*, 2012). It encourages bricoleurs to discover new value in existing resources and to obtain low-cost resources from networks (Witell *et al.*, 2017). By doing this, affordable losses facilitate bricolage, avoiding significant resource losses and generating more opportunities for new BMI solutions (Duymedjian and Ruling, 2010).

Third, maintaining flexibility leads to higher efficiency in resourcing for BMI. Flexibility encourages using contingencies as opportunities (Welter, Mauer and Wuebker, 2016). It promotes resource combination activities with novel start-up opportunities (Yang, Hughes and Zhao, 2021). Flexibility also drives start-ups to minimize the difficulty and cost of switching and deploying resources (Ebben and Johnson, 2005). It improves the efficiency in reallocating available resources at a low cost for BMI (Meng *et al.*, 2020). Doing so encourages bricoleurs to recombine resources dynamically and increases the novelty of value creation (Servantie and Rispal, 2018).

Finally, pre-commitments advance inter-organizational learning for BMI. Pre-commitments represent start-ups entering into agreements with stakeholders for value co-creation (Chandler *et al.*, 2011). They provide learning opportunities about transposing and recombining the resources at hand from networks (Guo, 2019). In addition, establishing pre-commitments helps start-ups to gain the latest technologies, new market information, and complementary resources (Guo *et al.*, 2020;Ioanna *et al.*, 2020). It was therefore expected that:

H_5: Bricolage mediates the relationship between effectuation and BMI.

2.6 Moderating effect of environmental uncertainty

The environmental context is an underlying premise for the resource orchestration theory (Sirmon, Hitt and Ireland, 2007). Scholars indicate that entrepreneurs need to manage resources dynamically in response to environmental contexts (Cui, Ye and Tan, 2022;Schriber and Lowstedt, 2018). External environment factors such as uncertainty shape bricolage by

influencing resource management behavior (Fisher, 2012;Senyard, Davidsson and Steffens, 2015;Wu, Liu and Zhang, 2017). Environmental uncertainty refers to the rate of change and the degree of instability in the environment (Paulraj and Chen, 2007;Dess and Beard, 1984). It is characterized by instability, complexity, and competition, presenting firms with uncertain conditions (Duncan, 1972). To maintain a competitive advantage in highly uncertain conditions, start-ups must integrate resources creatively and provide new solutions (Ma and Yang, 2022). This compels start-ups to rely on bricolage to achieve BMI. Therefore, it is proposed that environmental uncertainty is an important boundary condition for bricolage.

First, increasingly uncertain environments strengthen the importance of action, which increases the likelihood of achieving BMI. Turbulent and complex environments often generate new customer needs and potential demands, and start-ups rely on bricolage to respond to market shifts (Senyard, Davidsson and Steffens, 2015;Baker, Miner and Eesley, 2003). Bricolage can improve innovation and performance in uncertain environments (Meng *et al.*, 2020;Ma and Yang, 2022). Second, start-ups are more likely to seize opportunities in uncertain environments by bricolage (Senyard *et al.*, 2014). Bricolage improves opportunities to reconfigure resources unexpectedly (Senyard, Davidsson and Steffens, 2015). As a result, the impact of bricolage on BMI is strengthened, and increasing uncertainty may amplify the impact of bricolage on BMI through available resource timeliness (Meng *et al.*, 2020). In highly uncertain environments, start-ups may enhance resource management for BMI (Wu, Liu and Zhang, 2017). It was therefore expected that:

H_6: Environmental uncertainty positively moderates the bricolage-BMI linkage.

This conceptual model is depicted in Figure 1.

[Insert Figure 1]

3. Methodology

3.1 Data collection and sample procedure

Data and samples were gathered from Chinese start-ups. Start-ups in transition economies face significant resource constraints and high uncertainty for BMI due to an incomplete market system and underdeveloped institutions (Cai *et al.*, 2017;Wang, Yu and Meng). Thus, China, being the world' s largest transition economy, presents an ideal setting for gathering data and testing the research model. Start-ups and respondents were selected for the study following two criteria. First, the start-ups must be established for less than eight years (Zahra and Bogner, 2000;Hou, Xiong and Lin, 2022). Second, each respondent must be a middle or top manager, including core members of the entrepreneurship group. These respondents significantly impact strategic decisions and resourcing and are familiar with start-ups' external relationships and BMI. Therefore, they accurately understand the items and reflect on real situations (Xiaobao *et al.*, 2022).

The surveys were conducted between November 2019 and February 2020. Because COVID-19 had spread in China, the questionnaires had to be distributed online. Data were collected from three sources through the website "Wen Juanxing". First, the research team distributed questionnaires through personal relationships and contacted more participants by snowballing. Second, start-ups were contacted randomly through entrepreneurial associations and MBA centers in various provinces to collect data. Third, the "Wen Juanxing" company was commissioned to gather data. "Wen Juanxing" has an extensive sample database to collect valid data quickly. It is a professional survey company widely recognized in China's academic and business communities (Elfring and Hulsink, 2003).

The survey received 619 completed forms. A total of 201 invalid samples were excluded for three reasons. First, companies with no business licenses and older than eight years were eliminated. Based on respondents' enterprise background information (What is your company's

name), the qcc.cn (a corporate credit search website, https://www.qcc.com/) was visited to verify the validity of the respondents. Second, questionnaires not completed by middle or senior managers were removed. Based on individual information captured in the survey (What is your position in your company), respondents who did not meet the position requirements were omitted. Third, forms were discarded that had missing values and noticeable completion regularity (all the same question items, ABAB-style answers). Finally, 481 valid samples remained, with a 77.7% recovery rate. The essential characteristics of respondents are displayed in Table 1.

[Insert Table 1]

3.2 Measurements

This research relied on scales that have been widely used in the field and have been empirically validated. All responses were on a five-point Likert-type scale ranging from "1 = strongly disagree" to "5 = strongly agree". Table 2 shows all items.

3.2.1 Dependent variable

Business model innovation (BMI). According to Zott and Amit (2007), there were eight items to measure BMI over the past three years.

3.2.2 Independent variables

Entrepreneurial networks. Following the work of Watson (2007) and Presutti and Odorici (2019), networks were measured by five items. Respondents needed to estimate how much effort they exerted in building close relationships with outside organizations. Such as industry associations, service companies, banks, different levels of government departments, and tax offices.

Effectuation. Nine items measuring effectuation were derived from the scale developed by Chandler *et al.* (2011). Its dimensions included experimentation, affordable losses,

flexibility, and pre-commitments.

3.2.3 Mediating variable

According to Senyard *et al.* (2014), bricolage was measured using eight items. Respondents were asked to estimate the extent to which they used existing resources and found solutions to attain their goals.

3.2.4 Moderating variable

Environmental uncertainty was assessed with a four-item measure (Jaworski and Kohli, 1993;Wang, Yeung and Zhang, 2011). Participants assessed the environment's rate of change and degree of instability.

3.2.5 Control variables

This paper identified individual and organizational control factors to reduce endogenous effects on research. We took age, gender, level of education, and business experience as individual control variables. These factors significantly influence the BMI of start-ups (Futterer, Schmidt and Heidenreich, 2018). At the organizational level, firm size, industry, and enterprise types can all significantly impact BMI (Hannan and Freeman, 1984;Klevorick *et al.*, 1995).

4. Results

4.1 Reliability and validity

Several steps were followed to test reliability and validity. First, Harman's single factor test (SPSS 22.0) was used to test for potential common method bias. The result revealed that it explained 24.42% (< 40%) of the total variance. Thus, common method bias was not a serious issue in our study.

Second, Cronbach's α was used to examine the reliability of variables. The Cronbach's α for entrepreneurial networks, effectuation, bricolage, BMI, and environmental uncertainty

were 0.759, 0.710, 0.756, 0.811, and 0.650 (Table 2). These Cronbach's α（> 0.6）indicated acceptable internal consistency for all constructs (Hair *et al.*, 2010). Furthermore, a confirmatory factor analysis (CFA) revealed that the composite reliabilities (CRs) of all scales were above the minimum allowed criterion of 0.70 (Hair *et al.*, 2010). These results showed that the reliability of the measures was acceptable.

[Insert Table 2]

Third, confirmatory factor analysis (CFA) was applied to estimate the validity of constructs. The findings of the CFA revealed that factor loadings for all items ranged between 0.5 and 0.78 (Table 2). All factor loadings exceeded the recommended minimum of 0.4 (Presutti & Odorici, 2019). In addition, Table 3 shows the five-factor model fit indices were χ^2/ df = 2.68, $p < 0.001$, RMSEA = 0.059, NFI = 0.91, CFI = 0.94, IFI = 0.94, GFI = 0.86. Therefore, the five-factor model reflected the best fit (Hu & Bentler, 1999) and further indicated convergent validity (O'Leary-Kelly, 1998).

[Insert Table 3]

4.2 Descriptive statistics

Table 4 displays the descriptive statistics and correlations of variables. Ranges of 0.106 to 0.663 were observed for the Pearson correlation index of variables, considered to be within acceptable limits, and it showed significant positive correlations among the variables. To test multicollinearity, variance inflation factor (VIF) analyses were applied. The results (Table 5) showed that the highest VIF was 1.708, below 10. As a result, there was no significant threat of multicollinearity.

[Insert Table 4]

4.3 Multiple regression analysis and hypothesis testing

4.3.1 Direct effects of networks and effectuation

The impacts of entrepreneurial networks and effectuation were examined using hierarchical regressions. The findings indicated that the link between entrepreneurial networks and BMI was positive, and effectuation positively impacts BMI (Table 5, Model 2: $\beta_1 = 0.417$, $p < 0.001$; $\beta_2 = 0.308$, $p < 0.001$). As a result, hypotheses 1 and 2 were supported.

4.3.2 Mediating impacts of bricolage

A three-step analysis was used to examine the mediating impacts of bricolage (Baron and Kenny, 1986). To begin, BMI was regressed on entrepreneurial networks and effectuation. Second, bricolage was regressed on entrepreneurial networks and effectuation. Third, BMI was regressed on entrepreneurial networks, effectuation, and bricolage.

The results from Model 2 suggested entrepreneurial networks and effectuation were positively linked to BMI ($\beta_1 = 0.417$, $p < 0.001$; $\beta_2 = 0.308$, $p < 0.001$). Second, Model 7 reported the links of entrepreneurial networks- bricolage and effectuation- bricolage were both positive ($\beta_1 = 0.305$, $p < 0.001$; $\beta_2 = 0.424$, $p < 0.001$). Third, the independent variables (entrepreneurial networks and effectuation) and mediators (bricolage) were entered separately in Model 4. Model 4 indicated that the impact of bricolage on BMI was positive ($\beta = 0.454$, $p < 0.001$); thus, H_3 was supported. Model 4 found that the impact of entrepreneurial networks dropped from 0.417 in Model 2 to 0.278, and the impact of effectuation dropped from 0.308 to 0.116. The results are shown in Table 5. Thus, both H_4 and H_5 were supported.

[Insert Table 5]

Finally, bootstrapping was conducted to test the mediating effects (Hayes, 2013) by SPSS process 3.4. The confidence interval was 95%, with a bootstrap sample size of 5,000. The results showed (Table 6) that the bootstrapped 95% CI around the indirect effect of bricolage between entrepreneurial networks and BMI did not include zero and that the indirect effect was 0.215 (relative effect: 0.2153/0.4763*100% = 45.1%), (0.1615,0.2714). Hence, H_4 and H_5 were

supported.

[Insert Table 6]

4.3.3. Moderating impact of environmental uncertainty

Table 5 indicated that environmental uncertainty negatively moderated the relationship between bricolage and BMI, such that the relationship was weaker when environmental uncertainty was higher ($\beta = -0.085$, $p < 0.05$). Thus, H_6 was not supported. Figure 2 illustrates the interactions obtained in Model 5.

[Insert Figure 2]

Table 7 summarizes the findings for all hypotheses. Based on these findings, H_1, H_2, H_3, H_4, H_5 were accepted, but H_6 was rejected.

[Insert Table 7]

5. Discussion and conclusions

5.1 Discussion

According to resource orchestration theory, this research investigates the influences of entrepreneurial networks and effectuation on BMI through bricolage in uncertain environments. This study reached three main conclusions.

Entrepreneurial networks and effectuation related to BMI positively, and those two factors greatly improved BMI for start-ups. This demonstrated that entrepreneurial networks played a significant role in alleviating resource constraints in BMI (Partanen *et al.*, 2020). It also revealed that entrepreneurial networks are the crucial antecedent of BMI (Yi, Chen and Li, 2022;To, Au and Kan, 2019;Spieth, Laudien and Meissner, 2021). In addition, the findings indicated a positive relationship between BMI and effectuation for start-ups, which include flexibility, experimentation, and value co-creation with partners (Brenk *et al.*, 2019;Yang *et al.*,

2020). It also provided strong evidence that effectuation logic is particularly beneficial for coping with uncertainty and advancing BMI (Futterer, Schmidt and Heidenreich, 2018;Harms *et al.*, 2021b;Reymen *et al.*, 2017;Chen, Liu and Chen, 2021a;Mauer *et al.*, 2018). As a result, BMI depends on the combined impacts of external and internal factors (Bhatti *et al.*, 2021;Foss and Saebi, 2017;Heubeck and Meckl, 2021).

Second, bricolage contributed to BMI and played mediating roles in translating entrepreneurial networks and effectuation into BMI. This research provided evidence that bricolage is an essential component of BMI experimentation (Yan *et al.*, 2020;Zhao *et al.*, 2021). Start-ups can use bricolage to break resource bottlenecks and achieve goals (Baker and Nelson, 2005;An *et al.*, 2018a;Hou *et al.*, 2022). In addition, bricolage is also an effective path for transforming entrepreneurial networks and effectuation into BMI. Prior scholars emphasized the importance of resource management and investigated the direct link between strategic resources to performance (Nason and Wiklund, 2018). However, our study explores the mediating role of resource use, which extends the RBV literature and provides called-for research (D'Oria *et al.*, 2021;Kraaijenbrink, Spender and Groen, 2010). Integrating RBV and resource orchestration perspectives, this paper proposed the mediating role of bricolage. The finding confirms that bricolage is an important mediator between strategic resources and BMI in limited resources and uncertainty contexts (Guo, Su and Ahlstrom, 2016;Yan *et al.*, 2020). In short, this confirms that resource management is an important determinant of BMI (D'Oria *et al.*, 2021;Liu *et al.*, 2021;Zhao *et al.*, 2021;An *et al.*, 2017).

Third, contrary to our expectations, this research found that environmental uncertainty negatively moderates the bricolage-BMI linkage. Existing evidence shows that the moderating influence of environmental uncertainty is inconsistent. This result is consistent with Senyard,

Davidsson and Steffens (2015) research, which confirmed that uncertain environments reduce the linkage between bricolage and innovation. There are two possible explanations for this unexpected negative moderation. One reason may be that start-ups use bricolage to chase too many opportunities in highly uncertain environments (Senyard, Davidsson and Steffens, 2015). With start-ups already facing resource restrictions in BMI, constant tinkering and testing may result in misallocating human and financial resources. Another possible explanation is that bricolage may lead to confusion in start-ups regarding resource selection, choice, and combinations, resulting in increased costs and further market confusion (Gallo and Gardiner, 2007). It contributes significant empirical support to the research on the boundary conditions of bricolage.

5.2 Implications for theory

There are three significant theoretical contributions as follows. The findings enrich the research literature on the complex antecedents of BMI research by simultaneously exploring the impacts of entrepreneurial networks and effectuation. This approach provides empirical evidence for the linkage of external networks and BMI, responding to calls for exploring BMI antecedents beyond organizational borders (Yi, Chen and Li, 2022;Jabeen *et al.*). It also supports BMI's internal facilitators (decision-making logic) (Ghinoi and Di Toma, 2022;Martins, Rindova and Greenbaum, 2015;Foss and Saebi, 2018;Heubeck and Meckl, 2021). In addition, this research complements case study-based studies on BMI (Andersen, Aagaard and Magnusson, 2022;Spieth, Laudien and Meissner, 2021;Albats, Podmetina and Vanhaverbeke, 2021;Best *et al.*, 2022), and the empirical model consisting of the external and internal resources driving BMI is presented (Su, Zhang and Ma, 2020;Bashir, Naqshbandi and Farooq, 2020). This study provides important theoretical implications for addressing the issues of resource constraints and uncertainty in BMI (Ciszewska-Mlinaric, Obloj and Wasowska, 2016).

Second, this research proposes an overarching framework explaining how bricolage (resource management) transmits entrepreneurial networks and effectuation into BMI, better revealing the relationship between strategic organizational resources and BMI. Several researchers have argued that the role of resource management is one of the elements of RBV (Kraaijenbrink, Spender and Groen, 2010;D'Oria *et al.*, 2021). They emphasize that the value of resources can only be realized with efficient utilization (Sirmon *et al.*, 2011). Based on resource orchestration theory, this research proposed that bricolage effectively links strategic resources and BMI (Korsgaard, Muller and Welter, 2021). Additionally, this research demonstrated that bricolage is dependent on both internal and external resources. This finding expands bricolage research (Senyard, Davidsson and Steffens, 2015;Wu, Liu and Zhang, 2017), contributing to the bricolage literature on its antecedents and outcomes research (An *et al.*, 2018c;Yu and Wang, 2021b). Overall, the research offers empirical support for the notion that resource management is an important determinant of BMI (Sirmon, Hitt and Ireland, 2007;Hansen, Perry and Reese, 2004;Yu and Wang, 2021b;Yan *et al.*, 2020;Ndofor, Sirmon and He, 2011), and demonstrates views from a variety of important resource-based theorists (Barney, 1991;Sirmon, Hitt and Ireland, 2007;Sirmon *et al.*, 2011;D'Oria *et al.*, 2021).

Third, this study investigated the moderating role of environmental uncertainty in the bricolage-BMI linkage, deepening the understanding of this bricolage boundary condition. Although scholars indicate the effect of bricolage could be dependent on context (Yu *et al.*, 2020;Meng *et al.*, 2020;Senyard, Davidsson and Steffens, 2015), little research has examined the boundary conditions of bricolage (Steffens *et al.*, 2022) and there are inconsistent results about the moderating effect of environmental uncertainty (Ma and Yang, 2022;Meng *et al.*, 2020;Wu, Liu and Zhang, 2017). As such, this study enriches the boundary condition of bricolage by showing that environmental uncertainty weakens the bricolage-BMI relationship. It also suggests that some limits should be considered when applying bricolage in uncertain

environments (Senyard, Davidsson and Steffens, 2015;Baker and Nelson, 2005). Therefore, it responds to the call for exploring the contexts of bricolage, furthering understanding the usefulness of bricolage for BMI.

5.3 Implications for practice

The findings also carry practical implications. First, start-ups must build and expand entrepreneurial networks to gain more diverse resources. Entrepreneurs should establish relationships with external organizations, including industry associations, banks, government departments, tax offices, and service companies. Entrepreneurs must keep social contact for more cooperation by engaging actively in sporting events, annual company meetings, peer networking sessions, and other celebratory occasions. These social activities provide opportunities for broad and deep interactions between start-ups and network partners.

Second, entrepreneurs need to focus on training and practice for the effectuation logic to develop BMI. In highly uncertain environments, setting specific goals is difficult or even impossible. Hence, entrepreneurs should enhance effectuation by joining entrepreneurial courses and training. In addition, they should emphasize the application of effectuation. For example, they should proceed with existing networks and expand available resources by building pre-commitments and implementing BM through experimentation. They also must tolerate failures up to a certain level of loss, view new information or setbacks as opportunities, and co-create new BMs through interactive processes with stakeholders.

Third, entrepreneurs should apply bricolage to translate organizational resources into BMI. Although entrepreneurs often face severe resource constraints in employing BMI, they can overcome this challenge by reconfiguring available resources through bricolage. Entrepreneurs should be sensitive to and exploit available resources. To do this, they need to regularly evaluate existing resources and improve organizational flexibility. They also need to nurture an organizational culture that supports trial-and-error experiments, which can extend

resource functions and combinations. Furthermore, entrepreneurs need to make full use of available low-cost resources. They should be open to external resources from networks, such as engaging in bricolage with financing, suppliers, industry associations, and service companies. In short, entrepreneurs should make the most of existing and available low-cost resources and creatively combine them.

Finally, entrepreneurs should adopt a cautious approach to applying bricolage to BMI in highly uncertain environments. Bricoleurs may pursue excessive possibilities in uncertain environments, resulting in a lack of focus. Furthermore, excessive bricolage may create confusion in resource selection and combinations, leading to increased costs and confused goals in BMI. Hence, bricolage should be applied judiciously in highly uncertain environments.

5.4 Limitations and future research

Future research should address several limitations as follows. First, the survey is implemented only in China, with limited samples. Our research focuses on samples from China since entrepreneurship and innovation are characteristic and representative of China's expanding development and changing environments. It would be beneficial to replicate the findings in other countries.

Second, the cross-sectional nature of data may create potential causality issues. Although common method bias was assessed using Harman's single factor test and CFA, it was determined that it was not a significant issue in this study. Future research should build on this work by collecting longitudinal data.

Third, this research emphasized the mediating effects of bricolage because bricolage is regarded as effective resource management with resource constraints, which translates resources into BMI according to resource orchestration theory. Other potential mediating mechanisms exist between resources and BMI, and new mediating factors should be explored.

Finally, this research highlighted the moderating effect of environmental uncertainty because environmental uncertainty is a crucial external context that could impact the bricolage effect. Other contexts may impact the linkage of bricolage-innovation. Investigating the moderating effects of other organizational contexts will be valuable in the future.

References

Abatecola, G., Cafferata, R. and Poggesi, S. (2012) 'Arthur Stinchcombe's "liability of newness": contribution and impact of the construct'. *Journal of Management History,* 18 (4), pp. 402-+.

Albats, E., Podmetina, D. and Vanhaverbeke, W. (2021) 'Open innovation in SMEs: A process view towards business model innovation'. *Journal of Small Business Management,* 1-42.

Alvarez, S.A. and Busenitz, L.W. (2001) 'The entrepreneurship of resource-based theory'. *Journal of Management,* 27 (6), pp. 755-775.

Alzamora-Ruiz, J., del Mar Fuentes-Fuentes, M. and Martinez-Fiestas, M. (2021) 'Together or separately? Direct and synergistic effects of Effectuation and Causation on innovation in technology-based SMEs'. *International Entrepreneurship and Management Journal,* 17 (4), pp. 1917-1943.

Amit, R. and Han, X. (2017) 'Value Creation through Novel Resource Configurations in a Digitally Enabled World'. *Strategic Entrepreneurship Journal,* 11 (3), pp. 228-242.

An *et al.* (2018a) 'How Bricolage Drives Corporate Entrepreneurship: The Roles of Opportunity Identification and Learning Orientation'. *Journal of Product Innovation Management,* 35 (1), pp. 49-65.

An, W. *et al.* (2019) 'Configurations of effectuation, causation, and bricolage: implications for firm growth paths'. *Small Business Economics,* 54 (3), pp. 843-864.

An, W. *et al.* (2017) 'Entrepreneur's creativity and firm-level innovation performance: bricolage as a mediator'. *Technology Analysis & Strategic Management,* 30 (7), pp. 838-851.

An, W. *et al.* (2018b) 'How Bricolage Drives Corporate Entrepreneurship: The Roles of Opportunity Identification and Learning Orientation'. *Journal of Product Innovation Management,* 35 (1), pp. 49-65.

An, W.W. *et al.* (2018c) 'Entrepreneur's creativity and firm-level innovation performance: bricolage as a mediator'. *Technology Analysis & Strategic Management,* 30 (7), pp. 838-851.

Andersen, T.C.K., Aagaard, A. and Magnusson, M. (2021) 'Exploring business model innovation in SMEs in a digital context: Organizing search behaviours, experimentation and decision-making'. *Creativity and Innovation Management,* 31 (1), pp. 19-34.

Andersen, T.C.K., Aagaard, A. and Magnusson, M. (2022) 'Exploring business model innovation in SMEs in a digital context: Organizing search behaviours, experimentation and decision-making'. *Creativity and Innovation Management,* 31 (1), pp. 19-34.

Baker, T., Miner, A.S. and Eesley, D.T. (2003) 'Improvising firms: bricolage, account giving and improvisational competencies in the founding process'. *Research Policy,* 32 (2), pp. 255-276.

Baker, T. and Nelson, R.E. (2005) 'Creating something from nothing: Resource construction through entrepreneurial bricolage'. *Administrative Science Quarterly,* 50 (3), pp. 329-366.

Barney (1991) 'Special Theory Forum - RBV Editorial - The RBV Model of the Firm - Origins, Implications, and Prospects'. *Journal of Management,* 17 (1), pp. 97-98.

Baron, R.M. and Kenny, D.A. (1986) 'The moderator-mediator variable distinction in social psychological

research: conceptual, strategic, and statistical considerations'. *Journal of Personality and Social Psychology,* 51 (6), pp. 1173-1182.
Bashir, M., Naqshbandi, M.M. and Farooq, R. (2020) 'Business model innovation: a systematic review and future research directions'. *International Journal of Innovation Science,* 12 (4), pp. 457-476.
Best, B. *et al.* (2022) 'Business model innovation within SPOs: Exploring the antecedents and mechanisms facilitating multi-level value co-creation within a value-network'. *Journal of Business Research,* 141 475-494.
Bhatti, S.H. *et al.* (2021) 'Antecedents and consequences of business model innovation in the IT industry'. *Journal of Business Research,* 123 389-400.
Bock, G.W. *et al.* (2005) 'Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate'. *Mis Quarterly,* 29 (1), pp. 87-111.
Brenk, S. *et al.* (2019) 'Learning from failures in business model innovation: solving decision-making logic conflicts through intrapreneurial effectuation'. *Journal of Business Economics,* 89 (8-9), pp. 1097-1147.
Brettel, M. *et al.* (2012) 'Corporate effectuation: Entrepreneurial action and its impact on R&D project performance'. *Journal of Business Venturing,* 27 (2), pp. 167-184.
Cai, L. *et al.* (2017) 'Effectuation, Exploratory Learning and New Venture Performance: Evidence from China'. *Journal of Small Business Management,* 55 (3), pp. 388-403.
Carnes, C.M. *et al.* (2019) 'How Competitive Action Mediates the Resource Slack-Performance Relationship: A Meta-Analytic Approach'. *Journal of Management Studies,* 56 (1), pp. 57-90.
Chandler, G.N. *et al.* (2011) 'Causation and effectuation processes: A validation study'. *Journal of Business Venturing,* 26 (3), pp. 375-390.
Chen, Liu and Chen (2021a) 'The effectiveness of effectuation: a meta-analysis on contextual factors'. *International Journal of Entrepreneurial Behavior & Research,* 27 (3), pp. 777-798.
Chen, J.W., Liu, L.L. and Chen, Q.X. (2021b) 'The effectiveness of effectuation: a meta-analysis on contextual factors'. *International Journal of Entrepreneurial Behavior & Research,* 27 (3), pp. 777-798.
Chesbrough, H. (2010) 'Business Model Innovation: Opportunities and Barriers'. *Long Range Planning,* 43 (2-3), pp. 354-363.
Ciszewska-Mlinaric, M., Obloj, K. and Wasowska, A. (2016) 'Effectuation and causation: Two decision-making logics of INVs at the early stage of growth and internationalisation'. *Journal of East European Management Studies,* 21 (3), pp. 275-297.
Colovic, A. (2022) 'Leadership and business model innovation in late internationalizing SMEs'. *Long Range Planning,* 55 (1), pp.
Cui, T.R., Ye, J.H. and Tan, C.H. (2022) 'Information technology in open innovation: A resource orchestration perspective'. *Information & Management,* 59 (8), pp.
D'Oria, L. *et al.* (2021) 'The Evolution of Resource-Based Inquiry: A Review and Meta-Analytic Integration of the Strategic Resources-Actions-Performance Pathway'. *Journal of Management,* 47 (6), pp. 1383-1429.
Dess, G.G. and Beard, D.W. (1984) 'Dimensions of organizational task environments'. *Administrative Science Quarterly,* 29 (1), pp. 52-73.
Di Domenico, M., Haugh, H. and Tracey, P. (2010) 'Social Bricolage: Theorizing Social Value Creation in Social Enterprises'. *Entrepreneurship Theory and Practice,* 34 (4), pp. 681-703.
Diez, J.R. (2002) 'Metropolitan innovation systems: A comparison between Barcelona, Stockholm, and Vienna'. *International Regional Science Review,* 25 (1), pp. 63-85.
Do Vale, G., Collin-Lachaud, I. and Lecocq, X. (2021) 'Micro-level practices of bricolage during business

model innovation process: The case of digital transformation towards omni-channel retailing'. *Scandinavian Journal of Management,* 37 (2), pp.
Duncan, R.B. (1972) 'The characteristics of organizational environments and perceived environmental uncertainty'. *Administrative Science Quarterly,* 17 (3), pp. 313-327.
Duymedjian, R. and Ruling, C.C. (2010) 'Towards a Foundation of Bricolage in Organization and Management Theory'. *Organization Studies,* 31 (2), pp. 133-151.
Ebben, J.J. and Johnson, A.C. (2005) 'Efficiency, flexibility, or both? Evidence linking strategy to performance in small firms'. *Strategic Management Journal,* 26 (13), pp. 1249-1259.
Elfring, T. and Hulsink, W. (2003) *Small Business Economics,* 21 (4), pp. 409-422.
Fisher, G. (2012) 'Effectuation, Causation, and Bricolage: A Behavioral Comparison of Emerging Theories in Entrepreneurship Research'. *Entrepreneurship Theory and Practice,* 36 (5), pp. 1019-1051.
Foss, N.J. and Saebi, T. (2017) 'Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go?'. *Journal of Management,* 43 (1), pp. 200-227.
Foss, N.J. and Saebi, T. (2018) 'Business models and business model innovation: Between wicked and paradigmatic problems'. *Long Range Planning,* 51 (1), pp. 9-21.
Fukugawa, N. (2006) 'Determining factors in innovation of small firm networks: A case of cross industry groups in Japan'. *Small Business Economics,* 27 (2-3), pp. 181-193.
Futterer, F., Schmidt, J. and Heidenreich, S. (2018) 'Effectuation or causation as the key to corporate venture success? Investigating effects of entrepreneurial behaviors on business model innovation and venture performance'. *Long Range Planning,* 51 (1), pp. 64-81.
Gallo, M. and Gardiner, P.D. (2007) 'Triggers for a flexible approach to project management within UK financial services'. *International Journal of Project Management,* 25 (5), pp. 446-456.
Gao, J.G. *et al.* (2021) 'The Mechanism of Entrepreneurs' Social Networks on Innovative Startups' Innovation Performance Considering the Moderating Effect of the Entrepreneurial Competence and Motivation'. *Entrepreneurship Research Journal*.
Ghinoi, S. and Di Toma, P. (2022) 'Conceptualising business model innovation: evidence from the managers' advice network'. *Innovation-Organization & Management,* 24 (2), pp. 251-271.
Guo *et al.* (2020) 'Decision-making logics and high-tech entrepreneurial opportunity identification: The mediating role of strategic knowledge integration'. *Systems Research and Behavioral Science,* 37 (4), pp. 719-733.
Guo, H., Su, Z.F. and Ahlstrom, D. (2016) 'Business model innovation: The effects of exploratory orientation, opportunity recognition, and entrepreneurial bricolage in an emerging economy'. *Asia Pacific Journal of Management,* 33 (2), pp. 533-549.
Guo, R.P. (2019) 'Effectuation, opportunity shaping and innovation strategy in high-tech new ventures'. *Management Decision,* 57 (1), pp. 115-130.
Guo, Z., Zhang, J. and Gao, L. (2018) 'It is not a panacea! The conditional effect of bricolage in SME opportunity exploitation'. *R&D Management,* 48 (5), pp. 603-614.
Hair, J.F. *et al.* (2010) *Multivariate Data Analysis: A GlobalPerspective, 7th Edition.* New Jersey: Pearson Educational Inc.
Hannan, M.T. and Freeman, J. (1984) 'Structural Inertia and Organizational Change'. *American Sociological Review,* 49 (2), pp. 149-164.
Hansen, M.H., Perry, L.T. and Reese, C.S. (2004) 'A bayesian operationalization of the resource-based view'. *Strategic Management Journal,* 25 (13), pp. 1279-1295.
Harms *et al.* (2021a) 'Effectuation and causation configurations for business model innovation: Addressing

COVID-19 in the gastronomy industry'. *International Journal of Hospitality Management,* 95.
Harms, R. *et al.* (2021b) 'Effectuation and causation configurations for business model innovation: Addressing COVID-19 in the gastronomy industry'. *International Journal of Hospitality Management,* 95.
Heubeck, T. and Meckl, R. (2021) 'Antecedents to cognitive business model evaluation: a dynamic managerial capabilities perspective'. *Review of Managerial Science*.
Hewitt-Dundas, N. (2006) 'Resource and capability constraints to innovation in small and large plants'. *Small Business Economics,* 26 (3), pp. 257-277.
Hoang, H. and Antoncic, B. (2003) 'Network-based research in entrepreneurship - A critical review'. *Journal of Business Venturing,* 18 (2), pp. 165-187.
Hock-Doepgen, M. *et al.* (2021) 'Knowledge management capabilities and organizational risk-taking for business model innovation in SMEs'. *Journal of Business Research,* 130 683-697.
Hollebeek, L.D. *et al.* (2022) 'Stakeholder engagement and business model innovation value'. *Service Industries Journal,* 42 (1-2), pp. 42-58.
Hou, D.E., Xiong, A.H. and Lin, C. (2022) 'Executive cognitive ability and business model innovation in start-ups: The role of entrepreneurial bricolage and environmental dynamism'. *Frontiers in Psychology,* 13.
Hou, F. *et al.* (2022) 'Trickle-Down Effects of Entrepreneurial Bricolage and Business Model Innovation on Employee Creativity: Evidence From Entrepreneurial Internet Firms in China'. *Frontiers in Psychology,* 12.
Hubner, S. *et al.* (2022) 'Narratives in entrepreneurial ecosystems: drivers of effectuation versus causation'. *Small Business Economics,* 59 (1), pp. 211-242.
Ioanna, D. *et al.* (2020) 'An effectual approach to innovation for new ventures: The role of entrepreneur's prior start-up experience'. *Journal of Small Business Management,* 60 (1), pp.
Jabeen, F. *et al.* 'The role of open innovation in fostering SMEs' business model innovation during the COVID-19 pandemic'. *Journal of Knowledge Management*.
Janssen, F., Fayolle, A. and Wuilaume, A. (2018) 'Researching bricolage in social entrepreneurship'. *Entrepreneurship and Regional Development,* 30 (3-4), pp. 450-470.
Jaworski, B.J. and Kohli, A.K. (1993) 'Market Orientation: Antecedents and Consequences'. *Journal of Marketing,* 57 (3), pp. 53-70.
Kerr, J. and Coviello, N. (2020) 'Weaving network theory into effectuation: A multi-level reconceptualization of effectual dynamics'. *Journal of Business Venturing,* 35 (2), pp.
Khan, K.U. *et al.* (2020) 'Impact of intangible resources (dominant logic) on SMEs innovation performance, the mediating role of dynamic managerial capabilities: evidence from China'. *European Journal of Innovation Management,* 24 (5), pp.
Klevorick, A.K. *et al.* (1995) 'On the sources and significance of interindustry differences in technological opportunities'. *Research Policy,* 24 (2), pp. 185-205.
Korsgaard, S., Muller, S. and Welter, F. (2021) 'It's right nearby: how entrepreneurs use spatial bricolage to overcome resource constraints'. *Entrepreneurship and Regional Development,* 33 (1-2), pp. 147-173.
Kraaijenbrink, J., Spender, J.C. and Groen, A.J. (2010) 'The Resource-Based View: A Review and Assessment of Its Critiques'. *Journal of Management,* 36 (1), pp. 349-372.
Liu, W. *et al.* (2021) 'The more the better vs. less is more: Strategic alliances, bricolage and social performance in social enterprises'. *Journal of Business Research,* 137 128-142.
Liu, Y. *et al.* (2018) 'Improvisation for innovation: The contingent role of resource and structural factors in explaining innovation capability'. *Technovation,* 74-75 32-41.
Long, D., Wang, H.H. and Wang, P.L. (2021) 'Built to Sustain: The Effect of Entrepreneurial Decision-Making Logic on New Venture Sustainability'. *Sustainability,* 13 (4), pp.

Ma, T.N. and Yang, S.Y. (2022) 'Impact of entrepreneurial orientation on the performance of new ventures in China: the roles of entrepreneurial bricolage and opportunity recognition'. *Chinese Management Studies,* 16 (4), pp. 924-941.
Martins, L.L., Rindova, V.P. and Greenbaum, B.E. (2015) 'Unlocking the hidden value of concepts: a cognitive approach to business model innovation'. *Strategic Entrepreneurship Journal,* 9 (1), pp. 99-117.
Mauer, R. *et al.* (2018) 'Prediction and control: An agent-based simulation of search processes in the entrepreneurial problem space'. *Strategic Entrepreneurship Journal,* 12 (2), pp. 237-260.
Meng, M.M. *et al.* (2020) 'How does strategic flexibility affect bricolage: The moderating role of environmental turbulence'. *Plos One,* 15 (8), pp.
Micheli, M.R., Berchicci, L. and Jansen, J.J.P. (2020) 'Leveraging diverse knowledge sources through proactive behaviour: How companies can use inter-organizational networks for business model innovation'. *Creativity and Innovation Management,* 29 (2), pp. 198-208.
Nason, R.S. and Wiklund, J. (2018) 'An Assessment of Resource-Based Theorizing on Firm Growth and Suggestions for the Future'. *Journal of Management,* 44 (1), pp. 32-60.
Ndofor, H.A., Sirmon, D.G. and He, X.M. (2011) 'Firm resources, competitive actions and performance: investigating a mediated model with evidence from the in-vitro diagnostics industry'. *Strategic Management Journal,* 32 (6), pp. 640-657.
Nelson, R. and Lima, E. (2019) 'Effectuations, social bricolage and causation in the response to a natural disaster'. *Small Business Economics,* 54 (3), pp. 721-750.
Obstfeld, D., Ventresca, M.J. and Fisher, G. (2020) 'An assembly perspective of entrepreneurial projects: Social networks in action'. *Strategic Entrepreneurship Journal,* 14 (2), pp. 149-177.
Osiyevskyy, O. and Dewald, J. (2015) 'Explorative versus exploitative business model change: the cognitive antecedents of firm-level responses to disruptive innovation'. *Strategic Entrepreneurship Journal,* 9 (1), pp. 58-78.
Pacho, F.T. and Mushi, H. (2020) 'The effect of effectuation set of means on new venture performance: flexibility principle as a mediating factor'. *Journal of Entrepreneurship in Emerging Economies,* 13 (5), pp. 819-837.
Palmie, M. *et al.* (2019) 'Some principles are more equal than others: Promotion- versus prevention-focused effectuation principles and their disparate relationships with entrepreneurial orientation'. *Strategic Entrepreneurship Journal,* 13 (1), pp. 93-117.
Park, H.D. and Steensma, H.K. (2013) 'The Selection and Nurturing Effects of Corporate Investors on New Venture Innovativeness'. *Strategic Entrepreneurship Journal,* 7 (4), pp. 311-330.
Partanen, J. *et al.* (2020) 'Turning strategic network resources into performance: The mediating role of network identity of small- and medium-sized enterprises'. *Strategic Entrepreneurship Journal,* 14 (2), pp. 178-197.
Pati, R. *et al.* (2021) 'Entrepreneurial behavior and firm performance: The mediating role of business model novelty'. *R & D Management,* 51 (5), pp. 551-567.
Paulraj, A. and Chen, I.J. (2007) 'Environmental Uncertainty and Strategic Supply Management: A Resource Dependence Perspective and Performance Implications'. *Journal of Supply Chain Management,* 43 (3), pp. 29-42.
Presutti, M. and Odorici, V. (2019) 'Linking entrepreneurial and market orientation to the SME's performance growth: the moderating role of entrepreneurial experience and networks'. *International Entrepreneurship and Management Journal,* 15 (3), pp. 697-720.
Read, S. *et al.* (2009) 'Marketing Under Uncertainty: The Logic of an Effectual Approach'. *Journal of*

Marketing, 73 (3), pp. 1-18.
Read, S., Song, M. and Smit, W. (2009) 'A meta-analytic review of effectuation and venture performance'. *Journal of Business Venturing,* 24 (6), pp. 573-587.
Reymen, I. *et al.* (2017) 'Decision making for business model development: a process study of effectuation and causation in new technology-based ventures'. *R & D Management,* 47 (4), pp. 595-606.
Sarasvathy, S.D. (2001) 'Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency'. *Academy of Management Review,* 26 (2), pp. 243-263.
Sarasvathy, S.D. and Dew, N. (2005) 'New market creation through transformation'. *Journal of Evolutionary Economics,* 15 (5), pp. 533-565.
Sarasvathy, S.D. *et al.* (2008) 'Designing organizations that design environments: Lessons from entrepreneurial expertise'. *Organization Studies,* 29 (3), pp. 331-350.
Schriber, S. and Lowstedt, J. (2018) 'Managing asset orchestration: A processual approach to adapting to dynamic environments'. *Journal of Business Research,* 90 307-317.
Senyard, J., Baker, T. and Steffens, P. (2010) 'Entrepreneurial bricolage and firm performance : moderating effects of firm change and innovativeness'. *entrepreneurship*.
Senyard, J. *et al.* (2014) 'Bricolage as a Path to Innovativeness for Resource-Constrained New Firms'. *Journal of Product Innovation Management,* 31 (2), pp. 211-230.
Senyard, J., Davidsson, P. and Steffens, P. (2015) 'Environmental dynamism as a moderator of the relationship between bricolage and firm performance'. *Annual Meeting of the Academy of Management,* 2015. pp.1-1.
Servantie, V. and Rispal, M.H. (2018) 'Bricolage, effectuation, and causation shifts over time in the context of social entrepreneurship'. *Entrepreneurship and Regional Development,* 30 (3-4), pp. 310-335.
Sirmon, D.G., Hitt, M.A. and Ireland, R.D. (2007) 'Managing firm resources in dynamic environments to create value: Looking inside the black box'. *Academy of Management Review,* 32 (1), pp. 273-292.
Sirmon, D.G. *et al.* (2011) 'Resource Orchestration to Create Competitive Advantage: Breadth, Depth, and Life Cycle Effects'. *Journal of Management,* 37 (5), pp. 1390-1412.
Smolka, K.M. *et al.* (2018) 'Get it Together! Synergistic Effects of Causal and Effectual Decision-Making Logics on Venture Performance'. *Entrepreneurship Theory and Practice,* 42 (4), pp. 571-604.
Snihur, Y. and Zott, C. (2020) 'The genesis and metamorphosis of novelty imprints: how business model innovation emerges in young ventures'. *Academy of Management Journal,* 63 (2), pp. 554-583.
Spieth, P., Laudien, S.M. and Meissner, S. (2021) 'Business model innovation in strategic alliances: a multi-layer perspective'. *R & D Management,* 51 (1), pp. 24-39.
Steffens, P.R. *et al.* (2022) 'When Is Less More? Boundary Conditions of Effective Entrepreneurial Bricolage'. *Journal of Management*.
Su, J.Q., Zhang, S. and Ma, H.H. (2020) 'Entrepreneurial orientation, environmental characteristics, and business model innovation: a configurational approach'. *Innovation-Organization & Management,* 22 (4), pp. 399-421.
To, C.K.M., Au, J.S.C. and Kan, C.W. (2019) 'Uncovering business model innovation contexts: A comparative analysis by fsQCA methods'. *Journal of Business Research,* 101 783-796.
Wang, L.W., Yeung, J.H.Y. and Zhang, M. (2011) 'The impact of trust and contract on innovation performance: The moderating role of environmental uncertainty'. *International Journal of Production Economics,* 134 (1), pp. 114-122.
Wang, X.C., Yu, X.Y. and Meng, X.T. 'Entrepreneurial Bricolage and New Product Development Performance in New Ventures: The Contingent Effects of Founding Team Involvement'. *Entrepreneurship*

Research Journal.
Watson, J. (2007) 'Modeling the relationship between networking and firm performance'. *Journal of Business Venturing,* 22 (6), pp. 852-874.
Welter, C., Mauer, R. and Wuebker, R.J. (2016) 'Bridging Behavioral Models and Theoretical Concepts: Effectuation and Bricolage in the Opportunity Creation Framework'. *Strategic Entrepreneurship Journal,* 10 (1), pp. 5-20.
Wiltbank, R. *et al.* (2006) 'What to do next? The case for non-predictive strategy'. *Strategic Management Journal,* 27 (10), pp. 981-998.
Witell, L. *et al.* (2017) 'A bricolage perspective on service innovation'. *Journal of Business Research,* 79 290-298.
Wu, L., Liu, H. and Zhang, J.Q. (2017) 'Bricolage effects on new-product development speed and creativity: The moderating role of technological turbulence'. *Journal of Business Research,* 70 127-135.
Xia, L.H., Luo, B.A. and Sun, Y. (2020) 'How can entrepreneurs achieve success in chaos?: The effects of entrepreneurs' effectuation on new venture performance in China'. *Kybernetes,* 49 (5), pp. 1407-1428.
Xiaobao, P. *et al.* (2022) 'The Impact of Resource Bricolage on Entrepreneurial Orientation in Start-ups: The Moderating Roles of TMT Heterogeneity and TMT Behavioral Integration'. *Frontiers in Psychology,* 13.
Yan, S. *et al.* (2020) 'Top management team boundary-spanning behaviour, bricolage, and business model innovation'. *Technology Analysis & Strategic Management,* 32 (5), pp. 561-573.
Yang, D. *et al.* (2020) 'Market orientation, strategic flexibility and business model innovation'. *Journal of Business & Industrial Marketing,* 35 (4), pp. 771-784.
Yang, T., Hughes, K.D. and Zhao, W.H. (2021) 'Resource combination activities and new venture growth: Exploring the role of effectuation, causation, and entrepreneurs' gender'. *Journal of Small Business Management,* 59 S73-S101.
Yi, Y., Chen, Y. and Li, D. (2022) 'Stakeholder ties, organizational learning, and business model innovation: A business ecosystem perspective'. *Technovation,* 114.
Yu, Choi and Zheng (2021a) 'How Do Different Types of Entrepreneurial Networks and Decision-Making Influence the Identification of Entrepreneurial Opportunities?'. *Front Psychol,* 12 683285.
Yu *et al.* (2018) 'Managing uncertainty in emerging economies: The interaction effects between causation and effectuation on firm performance'. *Technological Forecasting and Social Change,* 135 121-131.
Yu and Wang (2021a) 'The effects of entrepreneurial bricolage and alternative resources on new venture capabilities: Evidence from China'. *Journal of Business Research,* 137 527-537.
Yu, W.Z., Choi, M. and Zheng, J.Z. (2021b) 'How Do Different Types of Entrepreneurial Networks and Decision-Making Influence the Identification of Entrepreneurial Opportunities?'. *Frontiers in Psychology,* 12.
Yu, X.Y. *et al.* (2020) 'Entrepreneurial bricolage and its effects on new venture growth and adaptiveness in an emerging economy'. *Asia Pacific Journal of Management,* 37 (4), pp. 1141-1163.
Yu, X.Y. and Wang, X.C. (2021b) 'The effects of entrepreneurial bricolage and alternative resources on new venture capabilities: Evidence from China'. *Journal of Business Research,* 137 527-537.
Zahra, S.A. and Bogner, W.C. (2000) 'Technology strategy and software new ventures' performance: Exploring the moderating effect of the competitive environment'. *Journal of Business Venturing,* 15 (2), pp. 135-173.
Zhang, H.F. *et al.* (2021) 'An integration of antecedents and outcomes of business model innovation: A meta-analytic review'. *Journal of Business Research,* 131 803-814.
Zhao, J. *et al.* (2020) 'How knowledge heterogeneity influences business model design: mediating effects of

strategic learning and bricolage'. *International Entrepreneurship and Management Journal,* 17 (2), pp. 889-919.
Zhao, J.Y. *et al.* (2021) 'How knowledge heterogeneity influences business model design: mediating effects of strategic learning and bricolage'. *International Entrepreneurship and Management Journal,* 17 (2), pp. 889-919.
Zhou, J. *et al.* (2022) 'How to Realize Business Model Innovation for New Ventures? Psychological Capital and Social Capital Perspective'. *Front Psychol,* 13 707282.
Zott, C. and Amit, R. (2007) 'Business model design and the performance of entrepreneurial firms'. *Organization Science,* 18 (2), pp. 181-199.
Zott, C. and Amit, R. (2010) 'Business Model Design: An Activity System Perspective'. *Long Range Planning,* 43 (2-3), pp. 216-226.