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Does Entrepreneurial Autonomy Foster SME Growth Under Technological Turbulence? The Empirical Evidence from Indonesia

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Abstract
This study aims to determine the impact of technological turbulence on the relationship between autonomy, pricing capability, and firm performance. The structural equation model was proposed to investigating the complex relationship of the observed variables. Hence, this study carried out a survey that involved small and medium-sized enterprises (SMEs) in Indonesia context. The results indicate that the pricing capability provides mediating effect on the relationship between autonomy and firm performance. Under moderate technological turbulence, the firms with high autonomy level achieve high performance by enhancing pricing capability. On the other hand, the firms with strong entrepreneurial autonomy suffer under high technological turbulence. This study extends the works on the entrepreneurial behaviors by answering the question on how technological turbulence influences the initiative to promote entrepreneurial autonomy.

Keywords Entrepreneurial autonomy · Pricing capability · Technological turbulence · Firm performance

Introduction

Entrepreneurial autonomy has been acknowledged as a main element of firm-level entrepreneurial behavior to generate the entrepreneurial value (Lumpkin et al. 2009). By investing their resources in a new venture, entrepreneurs do not only gain the monetary benefits of the investment decision but also gain a utility from working autonomy (Block, Sandner, & Spiegel, Block et al. 2015). Autonomy spurs creativity and involvement, which brings a positive impact on team cohesion (Kakar 2018). Under high level of autonomy, the team cohesion allows the firms to gain benefit from knowledge sharing (Llopis and Foss 2016).

To achieve the expected performance, it is essential for firms to adopt entrepreneurial autonomy at the pricing mechanism, which involves self-adjusts pricing parameters to consider both application and service requirements of users (Yeo, Venugopal, Chu, & Buyya, Yeo et al. 2010). This demonstrates pricing capability that shows how firms determine the price to make profit (Murray, Gao, & Kotabe, Murray et al. 2011). The fact that SMEs face complex relationship between pricing capability and performance requires a moderating variable that may explain the relationship (Banterle, Cavaliere, Carraresi, & Stranieri, Banterle et al. 2014).

However, autonomy may serve as a double-edged sword. Companies face the integration versus autonomy dilemma beyond business environment settings (Zhu, Xia, & Makino, Zhu et al. 2015). Unchecked autonomy can lead to ambiguity and inefficiencies, even organizational chaos (Mankins and Garton 2017). Experiencing a high level of job autonomy can foster unethical behavior (Lu, Brockner, Vardi, & Weitz, Lu et al. 2017). Secondly, many business leaders are rarely in the forefront of commercializing new technologies to meet the functional demands of mainstream customers (Bower and Christensen 1995).

The technological turbulence refers to the technological change, which bring uncertainty in the business process management (Didonet, Simmons, Díaz-Villavicencio, & Palmer, Didonet et al. 2012). Technology does not only play a pivotal role as an enabler of organizational changes that can lead to additional productivity gains (Dedrick, Gurbaxani, & Kraemer, Dedrick et al. 2003) but also poses a threat to firms, especially the small one with limited resources to seize the opportunities (Pratono 2016). Firms

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that pay effort to stay close to their customer by promoting entrepreneurial autonomy to their front-line staffs may fail to stay at the top of industry technologies change (Bower and Christensen 1995).

This study aims to understand the role of technological turbulence on the relationship between autonomy, pricing capability, and firm performance. The structural equation model was proposed to investigating the complex relationship of the observed variables. The results are expected to contribute the works on the entrepreneurial behaviors by answering the question on how technological turbulence influences the initiative to promote entrepreneurial autonomy.

Literature Review

Entrepreneurial Autonomy

Autonomy is associated with organization freedom and flexibility, which concern to encourage the organizational members to develop entrepreneurial initiative (Johanssen, Keränen, Hinterhuber, & Andersson, Johanssen et al. 2015). Autonomy is people's need to perceive that they have choices, that what they are doing is of their own volition, and that they are the source of their own actions (Fowler 2014).

Entrepreneurial autonomy plays a pivotal role for achieving strategic advantages and entrepreneurial outcomes (Lumpkin, Cogliser, & Schneider, Lumpkin et al. 2009). In the context of organization, autonomy refers to the relationship between units and sub-units on making decision and goal setting (Morgan, Katsikeas, & Vorhies, Morgan et al. 2012). In family business context, offering managers a higher level of autonomy is likely to promote collective-oriented ownership (Henssen, Voordeckers, Lambrechts, & Koiranen, Henssen et al. 2014).

The agency theory argues that the actors who engage in opportunistic and self-maximizing behaviors expect to develop autonomy beyond that the owner provides (Cavanagh, Freeman, Kalfadellis, & Herbert, Cavanagh et al. 2017). Stewardship theory views that organizational and collectivistic behavior provides higher utility for managers than individualistic attitude and self-serving behavior (Henssen, Voordeckers, Lambrechts, & Koiranen, Henssen et al. 2014).

Hypothesis Development

Entrepreneurial autonomy is essential in extending the subsidiary's role through subsidiary development, while assigned autonomy is less so (Cavanagh, Freeman, Kalfadellis, & Herbert, Cavanagh et al. 2017). Firms with strong entrepreneurial autonomy tend to encourage the front-liner staffs to set pricing competitiveness, which provides a foundation for value creation (Challagalla, Murtha, & Jaworski, Challagalla et al. 2014). They may gain benefit from shaping price structure across product ranges that help them to achieve the expected performance (Grewal, Roggeveen, Compeau, & Levy, Grewal et al. 2012).

Pricing capability requires firms to manage both price-related and nonprice drivers of price image as consumers from various informations than relying on actual prices (Hamilton and Chernev 2013). Firms with entrepreneurial autonomy develop self-adjust pricing based on the expected workload so that incentives can be offered to individual who improves expected performance (Yeo, Venugopal, Chu, & Buyya, Yeo et al. 2010). However, pricing competition may decrease the product quality that results in lower optimal prices (Meyer and Shankar 2016).

- Hypothesis 1. Pricing capability mediates the relationship between entrepreneurial autonomy and firm performance

In an attempt to deal with the autonomy's deficiencies, firms need to understand the condition that needs to be compromised and leads to a lack of overall team situational awareness (Demir, McNeese, & Cooke, Demir et al. 2017). In information technology industry, firms can generate value by giving autonomy to acquired local targets to best meet the needs of local consumers (Zhu, Xia, & Makino, Zhu et al. 2015).

- Hypothesis 2. Technological turbulence provides moderation effect on the relationship between entrepreneurial autonomy and firm performance

According to information processing theory, a mechanistic or directive approach should work well in a placid situation. Managers are likely to have the experience and knowledge necessary to develop sound strategies, guidelines, and procedures (Chen, Neubaum, Reilly, & LynnChen et al. 2015). Technology has been acknowledged to provide ample product development opportunities (Schilke 2014). Low environmental turbulence allows firms to predict environmental preference, to utilize new innovations, and to take more risks (Pratono and Mahmood 2015).

Under moderate technological turbulence, it is essential to encourage the front-liner team members to have the freedom to respond to market conditions in various ways that are most relevant to the situation on the ground (William, Colovic, & Zhu, William et al. 2017). Although firms facing resource constraints may see technological change as a threat, moderate technological turbulence can help firms to achieve their expected performance (Wu, Liu, & Zhang, Wu et al. 2017).

- Hypothesis 2.1. Under moderate technological turbulence, autonomy firms will achieve performance with pricing capability

The risks that spring at firms with entrepreneurial autonomy can become serious in a fast-changing technological turbulence. Although technology can provide ample product development opportunities, environments characterized by high dynamism pose considerable matching and inertia problems (Schilke 2014). This occurs as the firms are either immature in their technological capabilities or the firms relies too much on their capabilities to manage vulnerabilities (Rajesh 2017).

High technological turbulence fails to provide an ideal context to improve creativity (Wu, Liu, & Zhang, Wu et al. 2017). Highly dynamic technological environments imply that product lifecycles become comparatively short (Schilke 2014). Under high technological turbulence, firms with the high levels of autonomy are more likely to fail to identify the best pricing strategy to accomplish their expected performance (Chen, Neubaum, Reilly, & Lynn, Chen et al. 2015). The uncertainty, which springs from the limit of authority, reduces pricing capability to solve highly cognitively demanding tasks (Marquet 2015).

- Hypothesis 2.2. Under high technological turbulence, autonomy firms experience poor performance.

Method

The purpose of the model is to explain the moderating effect of technological turbulence on the relationship between entrepreneurial autonomy, pricing capability, and firm performance.

Measures

To propose the concept, this study builds on existing literature and there are multiple items for each construct (Table 2). The measures for autonomy were adapted from Lumpkin et al. (2009) (Table 1). A Likert scale 1 to 7 that indicates fully disagrees to totally agree, respondents evaluated the following statements: "[the firm] supports the effort of individual work autonomously", "[the managers] encourage individuals to decide for themselves what business opportunities to pursue", and "individuals pursuing business opportunities make decision on their own without constantly referring to their supervisor".

Table 1 Measures

Latent variables	Code	Measures
Entrepreneurial autonomy (AU)	A1	Our firm supports the effort of individual work autonomously
	A2	The top managers encourage individuals to decide for themselves what business opportunities to pursue
	A3	In our firm, individuals pursuing business opportunities make decision on their own without constantly referring to their supervisor
	A4	In our firm, top managers play a major role in identifying and selecting the entrepreneurial opportunities my firm pursue
Pricing capability (PC)	P1	Our firm uses pricing skills and system to respond quickly to market changes
	P2	Our firm develops knowledge of competitors' pricing tactics
	P3	Our firm is doing an effective job of pricing products
	P4	Our firm monitors competitors' price and price changes
	P5	Our firm responds quickly to competitors' pricing tactics
	P6	Our firm communicates pricing structure and levels quickly to consumers
Technological turbulence (TT)	T1	The technology in our industry is changing rapidly
	T2	Technological changes in our industry provide big opportunities in our business
	T3	A large number of new product ideas have been made possible through technological breakthroughs in our industry
	T4	Technological changes in our industry generate new ideas for product supply
Firm performance (FP)	F1	Our earning before interest and taxes is continuously above the industry average
	F2	Our return on investment is continuously above the industry average
	F3	Our return on sales is continuously above the industry average

The firm performance measures were adapted from Schilke (2014). A Likert scale 1 to 7 indicates the lowest to the highest performance. Respondents evaluated their performances, such as "[firm'] earning before interest and taxes is continuously above the industry average", "return on investment is continuously above the industry average", and "[firm's] return on sales is continuously above industry average.

The measures of technological turbulence were adapted from Jaworski & Kohli (1993) and Zhang & Duan (2010). The respondents evaluated the technological turbulence based on some below statements: "the technology [in our industry] is changing rapidly", "The technological changes provide big opportunities in our business", and "a large number of new product ideas".

Data Collection

The construct represents firms overall evaluation by the owner-managers. To estimate the model, this study conducted a survey that asked the managers' or owner-managers' perception of the observed variables. Respondents rated the questions on 7-point Likert scales that higher scores indicate greater levels of agreement with a particular statement.

Based on the population data provided from the SME directory published by the Indonesian Department of Trade and Industry, it shows that there were 35,489 registered SMEs. The sample is randomly selected from the directory. There were 390 respondents contributed to this survey. This number is sufficient, since the minimum sample size for representative of the population by a number between 30,000 and 50,000 is 380 (Krejcie and Morgan 1970).

Analysis

To test the hypothesis, this study used the SmartPLS software that provides three key results: (1) the outer loadings for the measurement models, (2) the path coefficients for the structural equation model, and (3) the R^2 values of the latent endogenous variables (FP and PC). After reliability and validity are established, the primary evaluation criteria involve the R^2 values and the significance of the path coefficient.

Findings

Table 2 shows profile of the 390 respondents. From the age, majority of the observed firms were less than 5 years of age. Nearly 20% of the observed firms have been aged for between 5 and 10 years. Only 0.26% of the firms were aged more than 50%. From the asset, over 60% of the firms managed asset between IDR500 million (USD325,000) and IDR10 billion (USD750,000), while 7% respondents mentioned that their firms managed asset less than IDR50,000.

From sales perspective, the majority of the firms gained annual sales between IDR300 million and IDR2.5 billion. Those groups represented 62% of total respondents. Another 19.50% experienced annual sales less than IDR300 per annum. From the industry classification, 48% respondents

Table 2 Respondent profile based on entrepreneurial autonomy level

Entrepreneurial autonomy level	1	2	3	4	5	6	7	Total
Firm assets								
Less than IDR50 million	3	4	3	4	8	5	1	28
Between IDR50 and IDR500 million	10	18	16	37	20	17	2	120
Between IDR500 million and IDR10 billion	20	34	30	70	52	34	2	242
Total								390
Firm annual sales								
Less than IDR300 million	7	12	12	17	14	13	1	76
Between IDR300 million and IDR2.5 billion	23	36	34	77	52	38	2	262
Between IDR 2.5 and IDR50 billion	3	8	3	17	14	5	2	52
Total								390
Industry classification								
Agriculture	9	15	6	8	21	8	5	72
Manufacture	0	1	0	4	5	2	2	14
Construction	4	3	2	4	9	1	1	24
Trade	8	27	18	39	46	38	13	189
Services	2	7	12	28	27	11	4	91
Total								390

run their business in trading sector, followed by agriculture and services, 18 and 16% respectively.

Table 3 shows the validity and reliability test. The Cronbach's alpha values are greater than 0.6, which indicates that the observed indicators are equally reliable and can be regarded as acceptable in exploratory research. The result shows that all latent variables have AVE greater than 0.50, which indicates that convergent validity is accepted. Thereafter, CRs are greater than 0.70, indicating that measures are reliable. The outer loading also shows the convergent validity also occurs at the individual items.

To assess the level of collinearity, Table 4 provides the values of variance inflation factors are less than 2.1. This indicates that there are no critical levels of collinearity. Table 5 shows that all items are significant with coefficients greater than 0.75. This indicates the high outer loadings on all constructs, which is also called indicator reliability and the communality of the items.

Table 6 shows that autonomy significantly influences firm performance through mediating effect of pricing capability. Autonomy has direct, positive, and significant impact on firm performance (SE = 0.039; $t = 3.723$). The significant effect of autonomy on pricing capability (SE = 0.042, $t = 11.71$) as well as pricing capability on firm performance (SE = 0.05, $t = 14.58$) shows that H1 is accepted. This shows that combination between direct and mediating effect indicates that pricing capability provides partial mediating effect on the relationship between autonomy and firm performance.

Both direct path c and indirect path a × b are significant and have similar positive direction. Specifically, the coefficients of mediating effect, 0.567 and 0.282, are greater than coefficient of direct effect 0.118. This indicates that autonomy is necessary to foster firm performance but not sufficient. Pricing capability fulfills the gap, as firms need to transform the delivering autonomy to pricing capability.

It appears that the direct impact of autonomy on firm performance is 0.118. In comparison, the mediating effect of pricing capability has stronger impact, as the coefficient of autonomy on pricing capability as well as coefficient of pricing capability on firm performance, 0.567 and 0.282 respectively, are greater than the direct impact. Combining pricing capability in such a way as allows firms to enhance the impact of autonomy on firm performance (Fig. 1).

Table 4 Collinearity VIF

Variables	Autonomy	FP	IT	PCxTT	PC
AU		1.499			1.000
FP					
IT		1.273			
PCxTT		1.608			
PC		2.096			

Table 4 shows that H2 is accepted. The moderating test of technological turbulence involves interaction effect of both technological turbulence and pricing capability (TT*PC). The result shows that there is a significant impact of technological turbulence on firm performance (SE = 0.034, $t = 8.915$). The significant impact of interaction effect (SE = 0.026, $t = 7.845$) indicates that H2 is accepted, which implies that technological turbulence provides moderating effect on the relationship between pricing capability and firm performance.

Figure 2 shows that different level of technological turbulence brings different impact of pricing capability on firm performance. Under low environmental turbulence, autonomy brings a positive impact with the performance. This indicates that H2.1 is accepted. On the other hand, high technological turbulence changes the positive impact of autonomy on performance into the negative one. This implies H2.2 is accepted that under high environmental turbulence, firms that rely on autonomy and higher pricing capability experience lower firm performance.

Discussion

The study provides an empirical evidence that pricing capability provides partial mediating effect on the relationship between autonomy and firm performance. This indicates that sales forces enjoy the autonomy to set pricing strategy that brings into firm performance. Entrepreneurial autonomy allows the firms to confidently articulate why the products offers greater values than the competitors through the pricing capability. This argues that combination between entrepreneurial autonomy and pricing capability enables firms to achieve greater performance.

Table 3 Construct validity and reliability

Variables	Cronbach's Alpha	rho_A	Composite reliability	AVE
AU	0.684	0.691	0.763	0.618
FP	0.912	0.917	0.930	0.654
IT	0.883	0.885	0.915	0.683
PC	0.822	0.841	0.880	0.647

Table 5 Outer loading

Path	Original sample (O)	Sample mean (M)	Standard deviation	*T* stat	*P* values
A1 ← AU	0.742	0.741	0.040	18.422	0.000
A2 ← AU	0.828	0.827	0.026	31.275	0.000
F1 ← FP	0.773	0.773	0.033	23.620	0.000
F2 ← FP	0.836	0.837	0.018	46.048	0.000
F3 ← FP	0.778	0.777	0.034	22.980	0.000
T1 ← IT	0.803	0.803	0.022	36.181	0.000
T2 ← IT	0.811	0.811	0.023	35.586	0.000
T3 ← IT	0.881	0.880	0.015	57.180	0.000
T4 ← IT	0.785	0.783	0.027	29.021	0.000
T05 ← IT	0.848	0.848	0.020	42.646	0.000
P1 ← PC	0.815	0.817	0.020	40.960	0.000
P2 ← PC	0.821	0.821	0.019	42.814	0.000
P3 ← PC	0.820	0.818	0.026	31.696	0.000
P4 ← PC	0.759	0.758	0.029	25.833	0.000

Pricing capability is essential resource that firms should consider it as top priority. If firms fail to set the right price, they will suffer from poor performance. Pricing capability allows firms to utilize their pricing skills, deploy resources to understand the pricing tactics of competitors, and communicate pricing structure. This only occurs under low technological turbulence when firms have capability to adapt the changing technology, the emerging opportunities, and the growing new ideas.

Turning to technological turbulence, the firms do not achieve performance as they adopt the entrepreneurial autonomy under unpredictable business environment. An attempt by firms with entrepreneurial autonomy to achieve performance has great risk to fail. This shows the capability of the managers to frame information and situations of technological turbulence either promotes the likelihood that the employees will perceive autonomy or undermines it. The capability to exploit technology is essential for the firms to conduct effective strategy of pricing products.

Under high technological turbulence, the capability of the observed firms to set pricing tactics, communicate pricing structure, and monitor competitors' price changes is not sufficient to gain a competitive edge. With opportunities faster than ever before, the observed firms fail to achieve a greater performance. This indicates that the SMEs suffer from poor performance when the changing technology goes beyond their capability to set the price. They face difficulty to set pricing under the high technological turbulence.

Managerial Implication

The managerial implication points out that the owner-managers who have intention to give autonomy to exercise the empowerment are encouraged to highlight pricing capability. This shows how the managers should enhance the clear role definition for their staffs with autonomy and pricing capability, which may change from time to time. This effort allows the organization members to focus accomplishing their job rather than worrying about the limits of their authority.

To promote the entrepreneurial autonomy under technological turbulence, the managers may face situations in which they had to balance conflicting demands. This requires capability to understand the certain process or organizational characteristics (Espedal 2017). In order to achieve the performance, managers must first be able to spot the technologies that meet the future demand by protecting them from the mainstream customers. The entrepreneurial autonomy seems to be the only way to do that is to create organizations that are

Table 6 Path analysis

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	*T* statistics (|O/STDEV|)	*P* values
AU → FP	0.118	0.114	0.044	2.655	0.008
AU → PC	0.567	0.569	0.045	12.557	0.000
PC → FP	0.282	0.281	0.046	6.186	0.000
TT × PC → FP	− 0.207	− 0.207	0.026	7.845	0.000
TT → FP	0.302	0.305	0.034	8.915	0.000

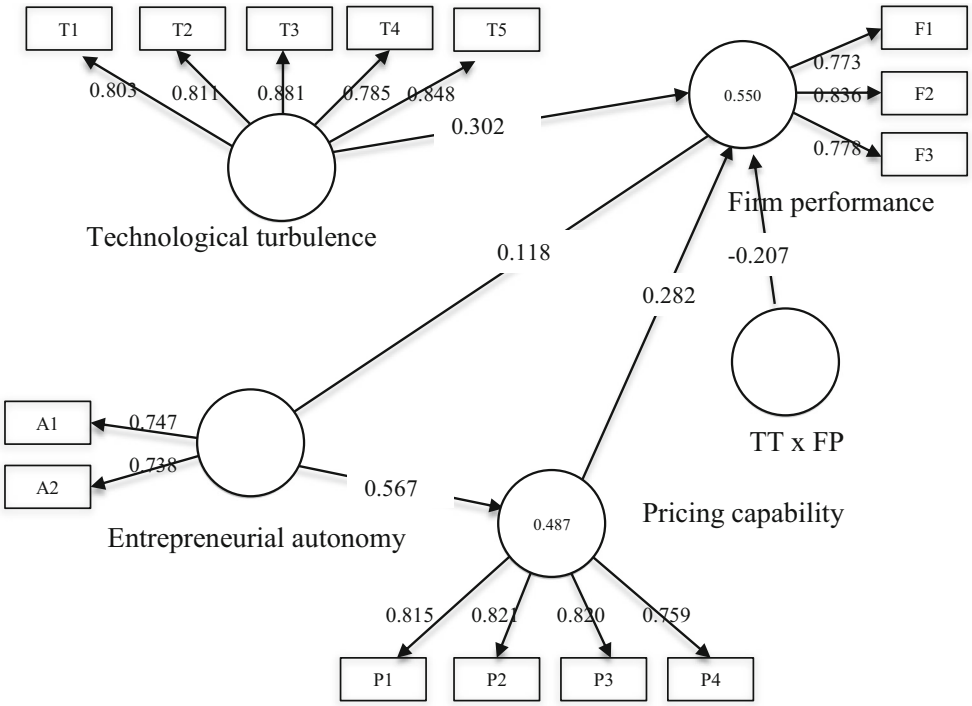

Fig. 1 Path analysis

completely independent of the mainstream business. The initiative to promote the entrepreneurial autonomy needs to be a commitment from the organizational members that they want more authority and more decision-making.

Promoting entrepreneurial autonomy behavior is not merely about leaving people alone. It is essentially to provide clear directions, expected performance, and rule of the games. To deal with technological turbulence, the firms with entrepreneurial autonomy require complementary investments in organizational capital such as decentralized decision-making systems, job training, and business process redesign. Adopting the new technology is not simply to use a tool for automating existing processes (Dedrick, Gurbaxani, & Kraemer, Dedrick et al. 2003). This requires the common understanding among various department, such as the R&D department and the line managers related to how technology

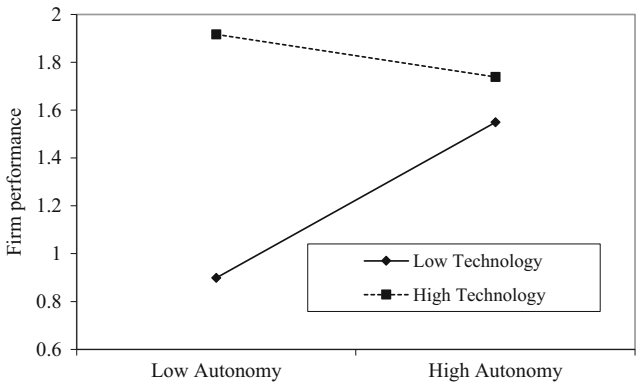

Fig. 2 Moderating effect of technological turbulence

can be used to achieve the performance at a particular process (Ray, Muhanna, & Barney, Ray et al. 2007).

Research Limitation and Future Research Direction

There are some limitations in this study. First is the cross-sectional data implies on snap shoot observation with Indonesia SME context. Future studies may examine panel data analysis in different environment context. In addition, this study relies on the owner-managers as source of information in each firm, which could be bias toward the real situation at the firms. Various stakeholders need to get involve to confirm the truly firm behavior at the observed organizations.

Secondly, the conclusion of this was derived from the data set at the SMEs in Indonesia context. To generalize the result, it needs to be replicated with other industries in different countries. This study also relied on the owner-managers to provide information. This study urges the future researchers to explore more valuable information by involving various stakeholders, who contribute to the firm capability to deal with technological turbulence. The results of the proposed model need to enhance managerial decision-making through identifying, classifying, and enhancing major technological capabilities of the firm.

Last, this study considered the financial performance. When firms allocate resources to promote entrepreneurial autonomy, there is an opportunity to explore other intangible values. The challenging issue for future study raises a question to what level of technological turbulence that allows firms to provide greater autonomy to their staff. This should be

followed by a standard procedure that allows business organizations to gain commitment from their members to take initiative to make needed creative decision.

Conclusion

This study extends the works on the entrepreneurial behaviors by answering the question on how technological turbulence influences the initiative to promote entrepreneurial autonomy. This article discussed two considerations: (1) the mediation role of pricing capability to support the entrepreneurial autonomy to achieve performance and (2) the moderation effect of technological turbulence on the mediating effect of pricing capability. The results contribute the works on the entrepreneurial behaviors, which does not only explain how technological turbulence influences the initiative to promote entrepreneurial autonomy but also explains how firms with entrepreneurial autonomy achieve performance by developing the pricing capability.

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