

# The effects of internal and external innovation strategies on process innovation in Vietnamese firms

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## Abstract

**Purpose** – This paper aims to investigate the antecedents of process innovation to provide more alternatives for Vietnamese firms as they are still struggling to find an appropriate innovation strategy.

**Design/methodology/approach** – The research analyzes the separate impacts of each innovation strategy on process innovation using logistic regression models. Data were collected using a stratified random sampling method.

**Findings** – The results show that having an innovation strategy is good for innovation, regardless of whether the strategy is internal or external. Internal and external strategies are proved not complements but substitutes. However, the internal strategy seems to be most beneficial. Weak institutional settings further strengthen the importance of internal strategies, whereas strong institutional settings favor external strategies.

**Originality/value** – This paper analyzes the impact of different innovation strategies on process innovation in Vietnamese firms using firm-level data. The findings strongly recommend that in weak institutional settings such as Vietnam, firms should focus on an internal strategy because the emphasis on external innovation strategies might be a western bias stemming from research in mostly strong institutional contexts.

**Keywords** Vietnam, Institutional quality, Process innovation, Innovation strategies, Firm level

**Paper type** Research paper

## Introduction

A growing body of literature recognizes the pivotal role of innovation (Kim *et al.*, 2018; Raghuvanshi and Garg, 2018). Innovation is a fundamental requirement for developing countries to flourish their economy, alleviate poverty and catch up with middle and higher-



income economies (OECD, 2012). Among innovation types, process innovation is often overlooked, yet it is considered a critical element for a firm's economic success as it is strongly associated with firms' productivity and competitive advantage (Kim and Phillips, 2013). Process innovation changes the way firms manufacture their products or positively deliver their service. In addition, through process innovation, firms can make changes across all value chain activities, such as improving inbound logistics, enhancing the manufacturing process, advancing media planning and reducing delivery time (Fondas, 1993).

A considerable amount of literature has been published on process innovation, suggesting that there should be further studies on the antecedents of process innovation, especially organizational factors in developing countries, which still have limited resources and weak institutions (Goel and Nelson, 2018; Van *et al.*, 2018). Vietnam is one of the developing countries, with more than 90% of firms being small and medium-sized enterprises with constrained resources (Tran and Jeppesen, 2016). With those conditions, firms in Vietnam are likely to favor process innovation over another type of innovation. Hence, it is critical to understand, which strategies Vietnamese firms should follow to strengthen their process innovation potential.

Firms can rely on different strategies to engage in process innovation (Goedhuysa and Veugelers, 2012). First, as most process innovation often involves small changes in the production method and operational routine of firms, firms can follow an internal innovation strategy by using collaboration between their departments, incorporating and applying useful techniques from skilled employees to reduce production and distribution times, making use of inputs in more efficient ways, developing their own technology and creating their machine tools to produce better products or services at a lower cost by Tseng and Tseng (2019). Second, firms can also adopt an externally-oriented innovation strategy. When following this strategy, firms usually look for partners with relevant knowledge and set transactions or collaborate (Nag and Mohapatra, 2012). Those partners could provide firms with external knowledge that would require more time and money to develop internally (De Clercq and Dimov, 2008). Extant empirical work suggests that both strategies can be successful (Freel and Robson, 2017). However, the external strategy is likely to be influenced by the firm's environment, whereas this is less likely the case for an internal innovation strategy. An externally-oriented innovation strategy puts firms in contact with external partners, requiring firms to govern these relationships actively. Regarding the external environment, how firms carry out the relationship is dependent on the institutional quality of the industry in which they operate [aka regional institutional quality (RIQ)] (Laursen *et al.*, 2012).

RIQ refers to low corruption, the strict rule of law and a high degree of regulatory quality within a region (Barasa *et al.*, 2017). When following an external strategy, firms are not a single player anymore. Therefore, they might need to seek information about their partners, requirements from the government or the legal procedures needed to ensure everything will be under control. Meyer *et al.* (2009) state that when firms do not have access to quality information prior to exchange with their partners, it can result in the collaboration being a failure. Poor institutional quality usually means a poor legal framework, shaky enforcement, fragile or no property rights, ineffective information system, regulatory regime and high corruption levels. Under poor RIQ, firms might spend more time and money but still not have enough information about their possible partners. Good regional institutions can decrease transaction costs (e.g. time searching for partners or failure from partner's dishonesty), uncertainty and support coordination between firms (Alonso and Garcimartin, 2013). Moreover, well-designed institutions also enhance trust and reciprocity among the

region's actors (Laursen *et al.*, 2012). They enable firms to share their information, ideas, expertise and coordination and control, which are considered key to collaborative strategies.

According to The World Bank (2020), Vietnam's economy showed basic strength and toughness. Its real gross domestic product grew by about 7% in 2019, one of the fastest growth rates in the region. The country does have businesses and industries that participate keenly in innovation. However, the whole innovation system is still shaky (OECD, 2012). Vietnam has shifted from a centrally planned to a market economy and improved itself from one of the world's poorest into a lower middle-income country (The World Bank, 2020). Hence, it also has numerous RIQ issues (Minh and Hjortso, 2015). As Vietnam firms are still struggling to find their way to be competitive in the changing environment, this research aims to contribute to the literature with another perspective on how firms in Vietnam should choose their strategy when pursuing innovation under institutional conditions.

## Literature review and hypotheses development

### *Process innovation*

Process innovation is defined as "a new or a significantly improved production or delivery method" (OECD and Eurostat, 2005, p. 49) that allows firms to create a competitive advantage (Goel and Nelson, 2018). The existing literature on process innovation focuses particularly on improving a firm's performance (Goel and Nelson, 2018). OECD and Eurostat (2005) conclude that process innovation could indeed be used to lower the unit costs in terms of both production and delivery. Moreover, previous work claims that process innovation stemming from an organization's routine could create a competitive advantage as it is tacit knowledge that is hard for competitors to copy. The reason is from the complex human and technological systems, which make it difficult to identify what contributes to the firm's success or failure (Greco *et al.*, 2015; Kim and Phillips, 2013).

### *Innovation strategy*

It is now well-established from various studies that firms can follow different strategies to innovate (Cruz-Cázares *et al.*, 2010; Goedhuysa and Veugelers, 2012). By choosing an internal innovation strategy, firms internalize their specific R&D activities and commercialize them through internal development, manufacturing and distribution (Chesbrough, 2017). Within such a closed innovation model, firms build on their own employees to offer valuable innovations. Besides, Feller *et al.* (2009) stated that firms would prefer an internal innovation strategy because it is easier to control. The reason is that managers know what the firms have and they can understand their people and activities within the firm better.

In contrast, firms could also follow an external innovation strategy, by buying a new technology that already exists in the market, collaborating with outsiders or hiring someone who has expertise in the field (Díaz-Díaz and de Saá-Pérez, 2014). This strategy optimizes external ideas and paths for use within the firm (Chesbrough, 2017). Firms using external innovation strategies collaborate with a broad range of partners, such as competitors, suppliers, clients or customers, consultants, universities and knowledge institutes in different geographical locations to support their innovation activities. Searching outside of the firm, they could access distributed knowledge from all over the world (Saebi and Foss, 2015). They can eliminate the development time involved in internal R&D, and they might be able to access fundamental research through more adequate external sources (Díaz-Díaz and de Saá-Pérez, 2014). Firms might also consider other factors such as uncertain results, costs and risks of an internal strategy, economies of scale, utilization of resources, technological know-how, productive capacity and managerial capacity when they choose an external strategy (Feller *et al.*, 2009).

The relationship between innovation strategy and process innovation is inconclusive. Some studies claim there is no significant relationship between the type of innovation strategy and process innovation (Goedhuysa and Veugelers, 2012), while Quintane *et al.* (2011) found a positive relationship between internal strategy and process innovation. In addition, Chudnovsky *et al.* (2006) state that external strategy does not affect process innovation, but internal innovative strategy positively influences process innovation. However, it is proposed that the effect of specific innovation strategies on process innovation might depend on the regional institutional environment (Peng *et al.*, 2009).

#### *Regional institutional environment*

Institutions are defined by North (1990) as a cluster of formal and informal rules that shape behaviors, including the legal system, as well as habits and customs. Those rules define patterns of behaviors and direct human interaction. In their study, Kaufmann *et al.* (2011) characterize institutional quality as:

- the process by which governments are selected, monitored and replaced;
- the capacity of the government to formulate and implement sound policies effectively; and
- the respect of citizens and the state for the institutions that govern economic and social interactions among them (p. 222).

Institutions could be considered as “strong” if they endorse the voluntary exchange underpinning an efficient market mechanism. On the other hand, they assume that institutions are “weak” if those conditions fail to ensure successful markets or yet undermine markets. Meyer *et al.* (2009) state that institutions are usually strong in developed economies and have a critical role, but their role may be almost invisible. However, when markets fail, as they are prone to do in some emerging economies, the absence of market-supporting institutions is apparent.

Peng *et al.* (2009) conclude that firms make strategic choices within institutional constraints. Institutions or the rules of the games in a country could affect firms’ business strategy choices. Therefore, institutional quality might also influence a firm’s decision regarding, which innovation strategy to follow (Lu *et al.*, 2008).

Several studies have mentioned that intellectual property protection, technological turbulence and competitive intensity encourage the use of an external innovation strategy (Saebi and Foss, 2015; Enkel and Gassmann, 2010). This means that firms may seek collaboration with other firms in their innovation efforts under proper institutional conditions. In a weak institutional environment, firms face difficulties in promoting innovation strategies internally and externally (OECD, 2012). On the other hand, Cassiman and Veugelers (2006) state that under a better institutional environment (e.g. easier to protect innovation), firms prefer to follow internal innovation strategies to protect their innovation output.

#### *Innovation strategy and process innovation*

Different effects of innovation strategies on process innovation can be found in the literature (Greco *et al.*, 2015; Bayona-Saez *et al.*, 2017). In low technology intensity sectors, external innovation strategy positively affects process innovation (Cruz-Cázares *et al.*, 2010). However, most innovation studies conclude that both innovation strategies positively influence innovation output but not with the same impact (Cruz-Cázares *et al.*, 2010). Deciding which strategy to follow is critical for creating a firm’s competitive advantage (Bowonder *et al.*, 2010). Moreover, from a resource-based view, firms by themselves could

use their internal resources to create new value and competencies (Sirmon *et al.*, 2007). Therefore, by following an internal innovation strategy, it is more possible for firms to create new process innovations. On the other hand, firms could save more time and money by collaborating with others while still fruitful innovation (Greco *et al.*, 2015). It should be noted that there is nothing to prevent firms from following both strategies at the same time or doing neither of the two. However, in this study, it is put forward that both internal and external innovation strategies have a positive relationship with process innovation output by testing the different effects of each strategy on process innovation:

- H1a.* Firms that use an internal innovation strategy are more likely to introduce process innovation compared to firms that do not.
- H1b.* Firms that use an external innovation strategy are more likely to introduce process innovation compared to firms that do not.

#### *Innovation strategy and regional institutional quality*

Firms following an internal innovation strategy have activities in-house to increase production or improve their services, and they make their own new technology (Goedhuyssa and Veugelers, 2012). Therefore, it seems less visible to outsiders. Contrarily, firms following external innovation strategy open their boundaries to outside innovation by externally contracting research and development and collaborating with others (Cassiman and Veugelers, 2006). Hence, these firms seem to be more visible to outsiders. Levin *et al.* (2013) reported that secrecy is considered the best way to protect a new process innovation because of its visibility. It is possible that the environment in which firms are embedded (i.e. RIQ) could moderate the relationship between innovation strategy and process innovation (Meyer *et al.*, 2009; Peng *et al.*, 2009), especially between external innovation strategy and process innovation rather than internal strategy and process innovation. According to open innovation theory, firms hardly ever create innovation alone (Greco *et al.*, 2015; Saebi and Foss, 2015). Their choice in which counterpart to collaborate with or what knowledge to share and learn from is likely moderated by other factors, including regional factors (Laursen *et al.*, 2012).

Therefore, it is proposed that RIQ will affect the relationship between external strategy and process innovation than on the relationship between internal strategy and process innovation:

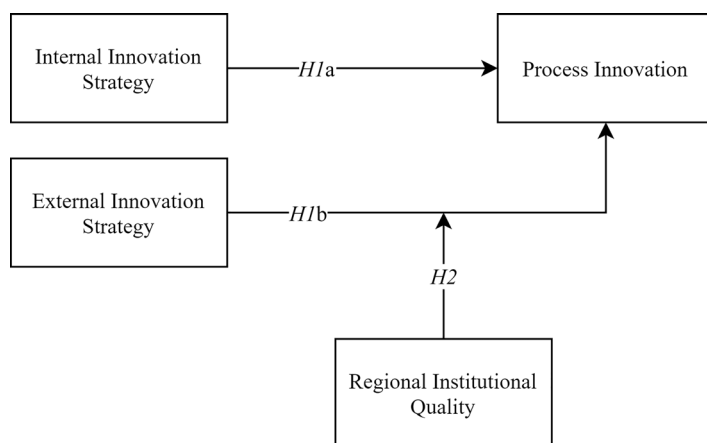
- H2.* The level of RIQ positively moderates the effect of external R&D on process innovation.

However, in this study, the moderation effect of RIQ on the relationship between internal R&D and process innovation will also be tested to evaluate what impact, if any, exists.

The hypothesized conceptual framework of this study is illustrated in Figure 1.

#### **Methodology**

The hypotheses are tested using empirical data from two main sources, namely, The World Bank Enterprise Survey (ES) conducted between November 2014 and April 2016 and the Innovation Capabilities Survey (ICS) conducted from October 2016 to February 2017. The ICS is conducted as a follow-up and complementary to the ES. This study used the most recent ES and ICS surveys in Vietnam with a merged data set consisting of 294 firms in four Vietnamese regions, including the Red River Delta, the North Central, Central Coastal Area, the South East and the Mekong River Delta.



**Figure 1.**  
Hypothesized theoretical framework

Process innovation is used as the dependent variable. The survey asks respondents whether the firm introduced any new or significantly improved processes in the past three years (Barasa *et al.*, 2017). A dummy variable was used for analysis. It takes the value of “1” when the answer is yes, meaning that a firm has introduced a new or significantly improved process and “0” if otherwise. This study measures internal innovation strategy by asking the respondents whether firms conducted internal R&D or not. If “yes,” then this variable takes the value of “1” and “0” if the answer is no. External innovation strategy is measured by asking whether the firm conducted external R&D or not. The value equals “1” if the answer is yes and “0” if the answer is no. This is in line with Cassiman and Veugelers (2006).

With moderation variable – RIQ, given its multi-dimensional nature, there is no good single item measuring it. Instead, a composite measure combining information from several RIQ measures used in Barasa *et al.* (2017) has been compiled. Various ES items are selected to calculate RIQ using a five-point scale, including regulatory quality, the rule of law and corruption. Firm size and firm age are used as control variables as they are common in previous studies (Cruz-Cázares *et al.*, 2010; Barasa *et al.*, 2017). The question used to determine size is: “how many permanent, full-time individuals work in this establishment?” Firm age is calculated by taking the difference between 2015 and the year in which the establishment began operations.

Because of the dependent variable’s binary nature, a logistic regression model has been used to analyze the data. In total, seven models have been used to test the hypotheses. Model 1 is a baseline model in which only control variables are included. Model 2 has the internal innovation strategy variable, so the effect of that strategy on process innovation can be examined. Model 3 is developed from the baseline model and has the external innovation strategy variable added. Model 4 includes both internal and external innovation strategy variables. Models 5 and 6 are used to test the moderation effect of RIQ on each innovation strategy’s relationship and process innovation. Model 7 is a full model, which provides main effects and moderation effects, including control variables.

## Results

Table 1 provides the descriptive statistics and correlation matrix for all variables. In the analyzed sample, firms have an average age of 13.77 years, and the average number is 149. In total, 48.98% of the sample firms reported that they had introduced new process innovations. This figure is markedly higher than the average rate of innovation observed in

the EU (21.6%). However, only 4.76% of the firms declared they have external innovation activities, whereas 16.67% of the sample firms reported having internal innovation strategies. Table 1 also demonstrates variance inflation factors (VIFs), which are all well below 10. The mean of VIF is only 1.16, so it can be concluded that multicollinearity is not an issue for this data.

Tables 2 and 3 establish the logistic regression model results. In the baseline model, the control variables show no significant association with firms' process innovation. However, in models with internal innovation strategy (Models 2, 4, 5 and 7), firms' age shows a significant negative correlation with firm innovation, suggesting that younger firms, which follow an internal innovation strategy are more likely to produce process innovations than their older counterparts.

Models 2 and 3 are used to test *H1a* and *H1b*, and the statistical results strongly support both hypotheses. Therefore, it can be concluded that firms that follow an internal innovation strategy are more likely to introduce process innovation, as are firms that follow an external innovation strategy. This is in line with the literature that when firms conduct R&D activities, it will result in process innovation whether those activities are carried out by themselves or together with outsiders (Quintane et al., 2011; Freel and Robson, 2017).

**Table 1.**  
Descriptive statistics  
and correlations  
(*n* = 294)

Variable code	Variable name	Mean	SD	VIF	Min	Max	1	2	3	4	5
1	PI	0.49	0.50		0.00	1.00					
2	Age (Log)	2.42	0.63	1.17	0.00	4.22	0.01				
3	Size (Log)	3.76	1.41	1.16	0.69	8.85	0.03	0.36			
4	IIS	0.17	0.37	1.22	0.00	1.00	0.44	0.07	0.13		
5	EIS	0.05	0.21	1.23	0.00	1.00	0.16	0.11	0.11	0.41	
6	RIQ	0.00	1.00	1.02	-0.84	2.18	-0.02	-0.12	-0.07	-0.05	0.05

**Notes:** PI: process innovation, IIS: internal innovation strategy, EIS: external innovation strategy, RIQ: regional institutional quality

**Table 2.**  
Logistic regression  
model results

Variable name	Model 1 PI == 1			Model 2 PI == 1			Model 3 PI == 1			Model 4 PI == 1		
	<i>B</i>	SE	P> z	<i>B</i>	SE	P> z	<i>B</i>	SE	P> z	<i>B</i>	SE	P> z
Age (log)	-0.02	0.04	0.59	-0.08**	0.03	0.02	-0.07	0.08	0.43	-0.08**	0.03	0.01
Size (log)	0.05	0.10	0.63	-0.03	0.13	0.80	0.03	0.11	0.79	-0.03	0.13	0.80
IIS				4.34***	1.25	0.00				4.63***	1.45	0.00
EIS							1.91**	0.83	0.02	-0.85	0.66	0.20
Constant	-0.18	0.22	0.42	-0.13	0.38	0.74	-0.07	0.29	0.82	-0.12	0.38	0.74

*Model information*

Type of model	Logistic regression	Logistic regression	Logistic regression	Logistic regression
Observations	294.00	294.00	294.00	294.00
Prob > $\chi^2$	0.87	0.00	0.00	0.00
Pseudo $R^2$	0.00	0.17	0.02	0.17
AIC	413.13	343.51	404.57	343.05
BIC	424.18	354.56	415.62	354.10

**Notes:** PI: process innovation, IIS: internal innovation strategy, EIS: external innovation strategy, RIQ: regional institutional quality; \**p* < 0.10, \*\**p* < 0.05, \*\*\**p* < 0.01

**Table 3.**  
Logistic regression model results

Variable name	Model 5 PI == 1			Model 6 PI == 1			Model 7 PI == 1		
	<i>B</i>	SE	<i>P</i> >   <i>z</i>	<i>B</i>	SE	<i>P</i> >   <i>z</i>	<i>B</i>	SE	<i>P</i> >   <i>z</i>
Age (log)	-0.09**	0.04	0.02	-0.09	0.11	0.45	-0.08*	0.04	0.06
Size (log)	-0.03	0.13	0.83	0.03	0.11	0.79	-0.04	0.13	0.79
IIS	17.39***	1.40	0.00				27.12***	1.73	0.00
EIS				2.04*	1.06	0.05	-10.80***	0.73	0.00
RIQ	0.03	0.13	0.84	-0.06	0.16	0.73	0.02	0.13	0.88
Moderations									
IIS*RIQ	-7.06***	0.54	0.00				-11.57***	0.74	0.00
EIS*RIQ				-0.27	0.51	0.60	5.06***	0.32	0.00
Constant	-0.12	0.41	0.77	-0.03	0.37	0.95	-0.10	0.40	0.80
<i>Model information</i>									
Type of model	Logistic regression			Logistic regression			Logistic regression		
Observations	294.00			294.00			294.00		
Prob > $\chi^2$	0.00			0.00			0.00		
Pseudo $R^2$	0.18			0.02			0.19		
AIC	341.07			404.05			340.05		
BIC	355.80			415.10			354.78		

**Notes:** PI: process innovation, IIS: internal innovation strategy, EIS: external innovation strategy, RIQ: regional institutional quality; \**p* < 0.10, \*\**p* < 0.05, \*\*\**p* < 0.01

However, remarkably, in Model 4, only the internal strategy has a positive effect. That means the two strategies do not complement one another but are substituted with the internal strategy being the stronger and seemingly more important of the two.

When the models are run with RIQ as moderation, it shows that RIQ does moderate innovation strategy on process innovation. Model 7 is the best as it has the lowest Akaike information criterion and Bayesian information criterion. This model's results reveal the statistically significant relationship between internal and external innovation strategy and process innovation. However, RIQ moderates those relationships differently. It was discovered that it is indeed a moderation that simply makes the positive relationship between internal innovation strategy and process innovation in a weak institutional setting stronger. However, the result strongly supports *H2* with a positive significant statistical outcome. In other words, the level of RIQ likely positively moderates the effect of external R&D on process innovation. Hence, *H2* can be accepted.

Figure 2 illustrates that internal innovation always pays off, but when the institutional environment is weak, then the effects are more pronounced. In other words, a lower level of RIQ increases the effect of internal innovation strategy on process innovation.

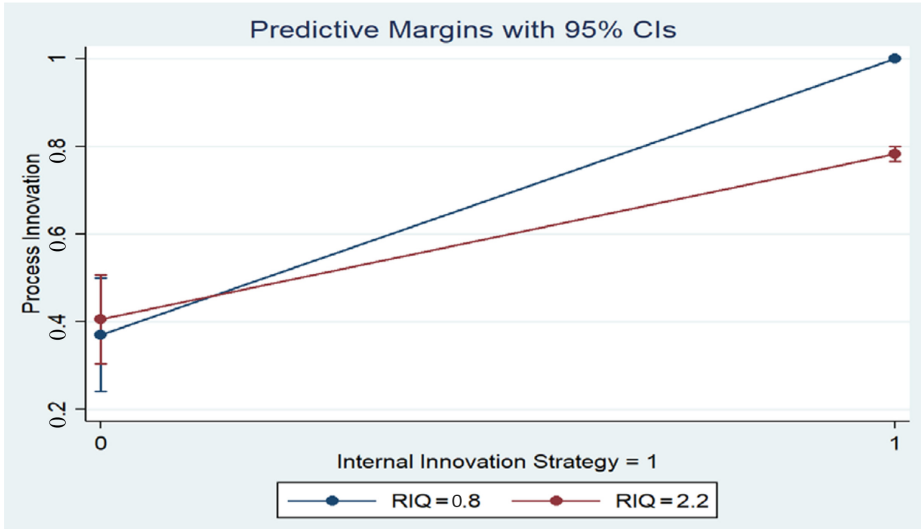
Figure 3 shows that the external innovation strategy only pays off when the institutional environment is strong; otherwise, it has a negative effect.

### Discussion

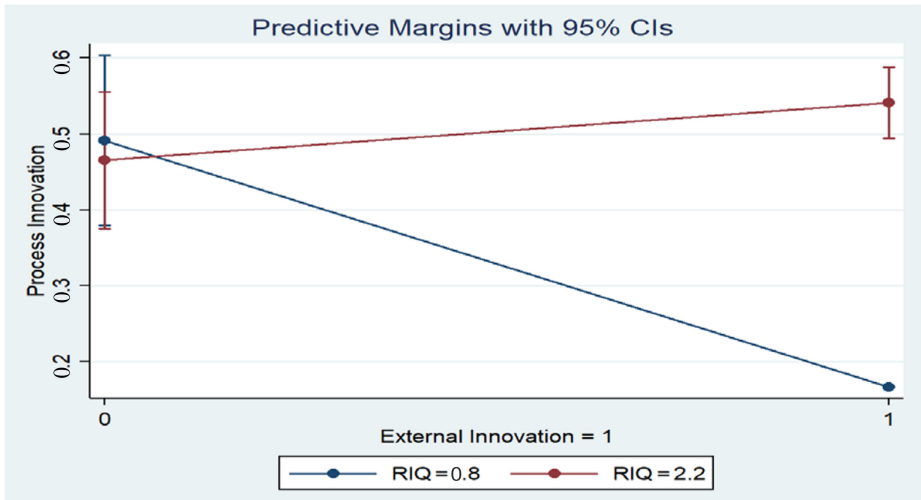
The World Bank surveyed four different Vietnamese regions, which are diverse in terms of geography and institutional backgrounds. Vietnam launched economic and political reforms in 1986, and the country has been committed to improving its institutions. Hence, it has improved incentives for production and growth. Vietnam's devolution has brought about many positive outcomes. First, the lower levels of government (e.g. provincial authorities) are decentralized. This comes together with ease of entry for non-state providers of services



**Figure 2.**  
Predictive margins of  
internal innovation  
strategy



**Figure 3.**  
Predictive margins of  
external innovation  
strategy



and greater autonomy for state facilities management. Hence, these changes are believed to support innovation and increase the variety of services. However, when provinces are empowered, they can enact different policies that favor their own region while ignoring the impacts of their policies on their neighbors (The World Bank, 2009). An example of this is when local authorities can allocate land and make different land-use management policies. Some regions have industrial zones-use policies that support firms and could attract investment more than the other regions. The provincial competitiveness index report, which is designed to assess the ease of doing business, economic governance and administrative reform efforts by

the Vietnamese provincial and city governments to promote the private sector's development, has shown a large variation in the RIQ in Vietnam. Although the overall situation has been improving, administrative procedures, land access and legal environment remain major obstacles for firms (e.g. the lowest score for the legal environment is 5.27 out of 10 in Phu Yen province while the highest is 7.91 in Bac Ninh province) (VCCI and USAID, 2020).

The study has proved that doing business in an institutional environment such as Vietnam, businesses should be aware of which strategy to follow, especially in innovation activities. This is vital for firms as innovation strategy is a sustainable innovation source (Freel and Robson, 2017). RIQ moderates each type of innovation strategy differently. It was found that RIQ negatively moderates the effect of internal innovation strategy on innovation output. When RIQ is weak, internal R&D will bring better process innovation performance, while external R&D is only useful under a strong institutional environment. This could be explained by the fact that when RIQ is feeble, that also means unstable laws, high crime and more obstacles when doing business. Under such a situation, firms might find it much more difficult to collaborate with others and/or protect their intellectual property (Lu *et al.*, 2008) and instead decide it is much safer to do it independently. This is also true when the external innovation strategy variable was tested, as it shows that external innovation strategy only bears fruitful results under a strong institutional environment. Under a poor institutional environment, it even has negative effects on process innovation. This is in line with Peng *et al.* (2009), as he also concluded that lagging or improper institutional infrastructures might discourage or even restrain innovation. The reason for this could be that a lack of enactment and/or enforcement of strong laws protecting intellectual property rights might cause ineffective collaboration when firms follow an external innovation strategy. For instance, when firms collaborate with partners in joint research, their partners break the contract and spread the idea around to not proceed with their research. Hence, it is a waste of time and money as the process may not result in any innovation outcome. This implies that it would be advisable for firms to either locate themselves in a region with better institutional quality for a greater likelihood of process innovation or simply adopt an internal strategy.

To enhance better innovation outcomes from any innovation strategy that firms pursue, the researchers suggest enhancing appropriate institutional systems, such as patent laws and copyright laws in Vietnam. The findings show that RIQ plays a vital role in moderating innovation strategies on process innovation. Hence, policymakers should focus on improving governance, especially strengthening the institutional environment in which firms operate by enhancing regulatory quality, enforcing the rule of law and fighting corruption. However, this challenge is not only for those creating nationwide policies but also for the local government in every region in Vietnam. A proper RIQ might decrease disparities in innovation output in each region of Vietnam.

In international integration, Vietnamese firms are still struggling to find a specific path to be innovative. Among the most critical questions, firms need to know, which strategy to follow. Hence, this study reveals that firms must also adopt more externally-oriented innovation strategies to take advantage of the improvement of institutional quality. Otherwise, the effect of the improvement could even be negative.

Moreover, another managerial implication for firms in Vietnam is managers should remember that only the internal strategy has a positive effect in Model 4, meaning that the two strategies do not complement one another but substitute with the stronger and more important internal strategy. Now, combined with the moderation effect of institutional quality, the findings strongly suggest that firms should focus on an internal strategy in weak institutional settings. The emphasis on external innovation strategies might be a western bias stemming from research in mostly strong institutional contexts. Hence, regarding the context of Vietnam,

this study helps firms choose an appropriate innovation strategy that could support them to be more competitive in the long term.

### Conclusion

This research's main goals are to test the relationship between innovation strategy and process innovation in Vietnam and later find if RIQ has any moderation effect on this relationship.

First, it has been found that having an innovation strategy is good for innovation, regardless of whether the strategy is internal or external. Indeed, R&D plays an essential role in process innovation as whether firms in Vietnam conduct R&D on their own or collaborate with outsiders, they increase their chances to create process innovations.

Second, the study shows empirical evidence that internal and external strategies are not complements but substitutes in Vietnam. Unlike when conducting internal R&D, firms can access new information from outside, which helps them attain and sustain innovation performance (Saebi and Foss, 2015). However, in all cases, the internal strategy seems to be most beneficial.

Third, the findings related to regional institution quality moderation on the relationship between innovation strategies and process innovation are of particular interest. They reveal that weak institutional settings further strengthen the importance of an internal strategy, whereas strong institutional settings favor external strategies.

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