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Research article

Dynamic entrepreneurship, planned innovation, and firm profitability: evidence from a Southeast Asian country

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ABSTRACT

This study applies the theory of planned behaviors to evaluate economic outcomes resulting from planned innovation and dynamic entrepreneurship of Vietnamese firms. The analysis uses data on Vietnamese small and medium manufacturing firms from surveys conducted by United Nations University World Institute for Development Economics Research (UNU-WIDER) during 2005–2015. Employing various estimation techniques including normal standard one-side regressions (fixed effect models, panel robust model, and Pds-lasso) and two-side structural two-stage models (extended regression model, treatment effect model, and IV-Lasso), we analyze the impacts of innovation activities on firm profitability in connection to the role of dynamic entrepreneurship and planned innovation. We measure planned innovation by the interaction between intention to innovate and firm innovation activities. The study shows that planned innovation is associated with higher profitability for firms. This holds true for all three innovation activities including introduction of a new product, introduction of a new production process and improvements to existing products/processes. In light of the theory of planned behaviors, entrepreneurial intentions embedded in planned innovation can underlie a comprehensive plan and action that drives the innovation process. The findings suggest that for small and medium enterprises (SMEs) to thrive, willingness to pursue innovation by the firm owners is key to success as the intention to innovate will enable firms to gain a planning advantage. This advantage leads to a better resource allocation within the firms, shaping more effective strategies to implement a planned innovation. Overall, the study provides an important implication for the introduction of support schemes that promote innovation for SMEs in Vietnam. Any support schemes, introduced either by the public or private sector to target SMEs, should be engaged with the group of dynamic entrepreneurs who have intentions to innovate to warrant a higher chance of success.

1. Introduction

Originated in ancient Greece as the "change into the established order" (Godin 2012), innovation has quickly adapted to various aspects of life, including economics with the contribution of Schumpeter (1934). From the corporate perspective, Schumpeter (1942) defines innovation as a change(s) in any dimensions of firms, from products, processes, marketing to organizations. Innovation is essential for a firm's survival and long-term prosperity because it is a powerful explanatory factor behind differences in firm performance (Fagerberg et al., 2004). In their meta-analysis of the innovation-firm performance relationship, Rosenbusch et al. (2009) confirm that the impacts of innovation on firm performance are highly contextual-dependent, i.e., depending on firm age, type of innovation applied, and cultural context. Tran (2019) further asserts that contextual factors, organization, and environment also underlie firms' probability to involve in innovative activities.

Whilst current empirical evidence provides a number of interesting insights into the linkage between innovation and firm performance, little is known about the role of dynamic entrepreneurship and planned innovation in this domain. Dynamic entrepreneurs are firm owners who

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started their business out of an opportunity, rather than a necessity, are more likely to get involved in innovation activities (Darnihamedani and Hessels 2016). Amongst many traits of dynamic entrepreneurs, willingness to pursue innovation (or the intention to innovate) is an outstanding characteristic that distinguishes them from their static counterparts, since it encourages entrepreneurs to seek ways to build larger and stronger firms (Audretsch et al., 2006) and underlies the planning of actions to move forward the innovation plan (Bird 1988). Olivari (2016) further claims that entrepreneurs in pursuit of ventures that are innovative and potentially achieve high growth rates are expected to generate a larger economic impact. Small firms in developing countries tend to have limited capacity and resources for innovation activities (Osano and Koine 2016), and dynamic entrepreneurs are expected to play a more pronounced role in driving innovation activities to improve firm performance. Surprisingly, this area has never been thoroughly investigated in the literature.

This study is amongst the first attempts to fill this gap by empirically examining the role of dynamic entrepreneurship and planned innovation toward firm performance using a data sample of small and medium enterprises in the context of a Southeast Asian country. Since innovation at the firm level is a broad concept and often spans over many managerial dimensions[1], examining a potential linkage between innovation and firm financial performance should base on a theory from management arenas. Accordingly, this study is grounded in the theory of planned behaviour (Ajzen 1991), which postulates a linkage between intentions for innovation and subsequent behaviours and actions. Within this theory, the intentionality framework of Bird (1988) and his followers (Boyd and Vozikis 1994; Hornsby et al., 1993) sheds light on the importance of planning on the success of innovation activities. Altogether, these studies vindicate the robustness and validity of the theory of planned behaviours as an underpinning as to how entrepreneurial intentions can aid in predicting subsequent behaviours and actions.

This study uses data retrieved from the surveys conducted during 2005–2015 by the UNU-WIDER, on non-state small and medium manufacturing enterprises in Vietnam. The study employs various econometric techniques including the normal standard one-side regression (fixed effect models, panel robust model, and pds-lasso) and two-side structural two-stage models. Across all two-side structural models where heterogeneity and endogeneity have been addressed, the estimated results reveal that innovation is negatively linked with firm profitability, and this finding is consistent for all categories of innovation considered. Interestingly, planned innovation (innovation activities that are intentional and planned), appears to improve firm profit margin. The theory of planned behaviours suggests that dynamic entrepreneurs are more likely to drive innovation to success due to their genuine intention to innovate and a series of commitments, planning and actions that guide the innovation process.

Compared to prior studies on innovation and firm performance in Vietnam, the present study is distinctive in several ways. Whilst the prior studies report a positive effect of innovation on various economic outcomes of Vietnamese firms, from labor productivity (Pham and Ho 2017) to export participation (Nguyen et al., 2007), they reveal little evidence on the role of innovation on firm financial outcomes. The present study exclusively links innovation to firm financial performance measured by profit margin. In the absence of market-based measurements such as Tobin's Q or market-to-book value due to data unavailability, profit margin is commonly adopted in the literature (Freel and Robson 2004; Simpson et al., 2006; Shin et al., 2017) and is well expected to indicate firm financial performance. Furthermore, this research explores a much wider time span of data from 2005 – 2015 compared to previous studies, which allows a more precise discovery of the dynamics of innovation over time. Importantly, our measurement of innovation is more original and succinct. While Pham and Ho (2017) consider firms having investment in introducing a new product/new process or in improvement in existing products as a dichotomous indicator of innovation, we use innovation outcomes of firms, namely whether firms successfully introduced a new product, a new process/new technology or improved existing products. Indeed, our measurement is more closely built on the original concept of innovation by Schumpeter (1942), who defined innovation as a realized change(s), rather than an investment, in any dimensions of firms.

The remainder of the paper proceeds as follows. The literature review section lays out a narrative of innovation, firm financial performance, and the role of dynamic entrepreneurs and planned innovation and formulates the conceptual framework under the theory of planned behaviours. The methodology section describes our sample, followed by our empirical strategies and model specification. The final section discusses the findings and implications and concludes the paper.

2. Literature review

2.1. Innovation and entrepreneurship

Schumpeter (1942) clarified two concepts of innovation: innovativeness and capability to innovate. While the former indicates the openness of organizational culture to new ideas, the latter demonstrates the ability to adopt or implement new ideas/processes/products successfully. At the firm level, both are featured in innovation activities that can be classified as radical or incremental changes in existing products/processes, and the introduction of new products/processes.

Grounded in the same roots of Schumpeter (1942), innovation and entrepreneurship are continuous and complementary processes (Landstrom et al., 2015). Although innovation is often seen at the beginning of a venture and entrepreneurship is apparent at the end of the process, innovation and entrepreneurship are considered tightly interlinked phenomena (Braunerhjelm et al., 2009). Innovation is a source of entrepreneurship and entrepreneurship, on the other hand, creates favorable conditions for innovation to develop and realise its values (Zhao 2005). The combination of the two will generate favourable outcomes for firms (Braunerhjelm et al., 2009). For example, current evidence suggests a positive relationship between entrepreneurship on firm performance, including financial performance, employment growth, and competitive advantage (see Johansson 2005; Praag and Versloot 2007). According to Darnihamedani and Hessels (2016), entrepreneurs are people with a strong desire to seek and create new opportunities through innovative, proactive, and risk-taking behaviors. Innovation, therefore, becomes a tool that entrepreneurs exploit for a different business or service (Drunker, 1985). Many empirical studies take innovation in the context of entrepreneurship into consideration (see Drunker, 1985; Hamel 2002; Leal-Rodriguez et al., 2016; Schmitz et al., 2016) and conclude that companies with a stronger entrepreneurial spirit will innovate vigorously and frequently (Miller and Friesen 1982; Olivari 2016).

Relations between innovation and firm financial performance have also gained much attention in the empirical literature, though the empirical evidence remains inconclusive. Successful innovative firms can enjoy a better financial outcome due to higher revenues and/or lower expenses. The former can be achieved via prolonged monopoly rents with unique patents and the introduction of new products, enabling several advantages including an increase in product consumption in new markets and/or new products and retention of existing customers, and acquisition of new customers (see Schumpeter (1942); Johne and Davies (2000)). The latter, on the other hand, can be attained with a considerable reduction in production costs, administration and transaction costs as well as reducing costs of supplies due to the value-creating strategies (see Peters 2008). Existing studies often capture innovation by using proxies

[1] Different types of innovation involve different processes of the supply chain—procurement, inventory management, demand management, order fulfilment, production, logistics and distribution, and product development (Croxton et al., 2001).

such as the ratio of R&D expenses to total assets, the number of patents, the number of new and/or improvements to existing products and processes. Many conclude that innovation is an important driver of firm performance measured by operating profit margin, sales growth, firm productivity, gross and net margins, return on assets, or Tobin's Q (Freel and Robson 2004; Gunday et al., 2011; Fu et al., 2018; Shin et al., 2017). Other studies reveal evidence in support of a positive relationship between innovation and firm productivity for small and medium enterprises in both developed countries and developing countries (Hall et al., 2009 for manufacturing SMEs in Italy; Freel and Robson 2004 for small firms in Scotland and Northern England; Wright et al., 2005 for small businesses in Indiana, U.S.; Fu et al., 2018 for manufacturing firms in Ghana; Gunday et al., 2011 for Turkish manufacturing firms). In Vietnam, existing findings suggest that innovation improves labor productivity (Pham and Ho, 2017), plays as an important catalyst for export activities of Vietnamese SMEs (Nguyen et al., 2007). Nham et al. (2016) find that innovation promotes firm performance among supporting industries in Vietnam with firm performance being captured by entrepreneurs/owners' assessment in three criteria including production, market, and financial performance with the 5-point Likert scale.

Whilst vast empirical evidence suggests a positive role of innovation on firm economic outcomes, some evidence indicates no connection or even a negative relationship between innovation and firm performance. This occurs due to diminishing research efforts and resource inefficiencies by firms (Simpson et al., 2006), or heavy investment costs that are rarely recovered, or dissatisfied and stressed workers during the innovation process (Freel and Robson 2004). Indeed, innovating firms have to spend a huge amount of resources and capital on research and developments. On the other hand, the expected impact of innovation may be lagged and only realized over a long-term horizon. As a result, innovating firms may suffer from a decline in firm profitability in the short-term (Teece 2006; Pisano and Teece 2007; Mackelprang et al., 2018).

Empirical research also explores the complexity of the impact of innovation on firm performance considering both internal and external factors to firms. Literature review indicates that internal factors, including owner's attributes and business strategies, navigate the innovation – firm performance relation (see Choi et al., 2011; Aghion et al., 2013; Nham et al., 2016; Chen et al., 2016; Shin et al., 2017; Chen et al., 2018; Tran 2019). Specifically, foreign ownership is important to the relationship between innovation and firm performance for Chinese firms (Choi et al., 2011); while less so for Taiwanese firms (Chen et al., 2016); greater institutional ownership is associated with more innovation and favourable performance in major US firms (Aghion et al., 2013). In addition, the presence of females as owners or Board of Director members is likely to increase the innovative activities and success (Chen et al., 2018). Innovation has more pronounced impacts on younger firms as the flexibility allows younger firms to adapt well to changing environments (Rosenbusch et al., 2009). However, Amoroso (2017) and Spitoven et al. (2013) show that firms with established R&D cooperation strategies with institutional and market agents might enhance their capacity to innovate and achieve better performance results. For external factors, a greater degree of competition requires firms to develop creative and innovative strategies to increase operational efficiency and not fall behind competitors (Miles and Snow 1978; Miller 1988). Nonetheless, Schumpeter (1942) claim that innovation can also deteriorate with competition as competition reduces the expected payoff from R&D. A less regulated environment encourages firms to adopt an environmental innovation strategy (Ramanathan et al., 2016; Eiadat et al., 2008); government funding is proved to motivate technological innovation in South Korea (Kim and Lee 2011) and Vietnam (Tran, 2019). Also, Chadee and Roxas (2013) find that transparency and corruption affect innovation by impacting costs, opportunities and risks associated with innovative activities in emerging economies.

Surrounded by a dynamic environment with increased competition and rapid changes in market trends and industry innovation, firms constantly need to innovate to keep up with their rivals (Drunker, 1985). However, not all firms cope with competition with the same level of innovation: some entrepreneurs demonstrate a higher engagement in innovation than others (Szirmai et al., 2011; Olivari, 2016; Block et al., 2015). Willingness to innovate or intention to innovate is an outstanding character of dynamic entrepreneurs (also called opportunity entrepreneurs) as opposed to necessity-based entrepreneurs (Audretsch et al., 2006; Darnihamedani and Hessels 2016)[2]. Dynamic entrepreneurs are more willing to take risks (Block et al., 2015); more likely to confront the uncertainty with innovation (Miles and Snow 1978); associated with a lower rate of business failure (Minniti et al., 2006) and potentially generate higher income (Block and Wagner 2010). It is important to note that Block and Wagner (2010) attribute the success of opportunity entrepreneurs to "planning advantage". This finding supports the view of Bird (1988), Boyd and Vozikis (1994), and Hornsby et al. (1993), suggesting that well-planned entrepreneurial endeavors are associated with a higher chance of success.

To our best knowledge, few studies have attempted to link dynamic entrepreneurship to firm financial performance nor investigated the role of planned innovation in the nexus of innovative activities and firm performance. The most related study is Olivari (2016) which documents that innovative entrepreneurs play a central role in firm performance and identifies entrepreneurial traits that are relevant for firm innovation propensity. The study does not, however, examine the role of planned innovation and dynamic entrepreneurship in connection to firm performance. This leaves room for us to explore this potential relationship in the present study.

2.2. Theory of planned behaviour and firm innovation

Theory of planned behaviour (TPB, henceforth) (Ajzen 1991) explains how dynamic entrepreneurship, via planned innovation, is crucial for the success of innovation activities in improving firm performance. Much research in entrepreneurship applied this theory to empirically demonstrate that starting and growing a business or other entrepreneurship-related behaviours are all planned behaviours (Kolvereid and Isaksen 2006; Krueger et al., 2000). Notably, Krueger et al. (2000) conclude that intentions are the single best predictor of any planned behaviors, while Kautonen et al. (2013) further confirm a causal relationship between intention to do business and specific actions for venture preparation.

Arguably, a key factor in the venture creation process is the concept of intentionality (Bird 1988; Kolvereid 1996). Intentionality, according to TPB, captures the motivational factors that influence a specific behaviour, regulating how hard an individual is willing to try, and how much effort an individual plans to exert in the behavior (Ajzen 1991). As a result, an individual with a stronger intention to perform a behavior will have more chance to perform it. Bird (1988) developed an important link between intentionality and actions, in which intentionality is the state of mind directing a person's attention, experience, and action towards a specific target. It determines the form and direction of firms, as well as provides plans for all changes, thus affecting the firm's survival and growth (Bird, 1988). We summarize the framework of TPB in Supplementary figure 1.

As a result, whenever entrepreneurs have the intention to embrace any innovation activities, or plan to innovate, it often goes along with their confidence and commitment to achieving success. As Olivari (2016) claimed, innovative entrepreneurs frequently work on something different and new, which involves high levels of uncertainty, they must have the willpower to work and believe in those innovations as real possibilities. That willpower, commitment, confidence, and belief will

[2] In Global Entrepreneurship Monitor research, necessity and opportunity entrepreneurs are differentiated according to their motivation to start business: while the former is more need-based and the latter is more opportunity-pursued (https://www.gemconsortium.org/report).

then underlie a comprehensive planning of actions (Boyd and Vozikis 1994). Bird (1988) also emphasizes that the ultimate observable result of intentionality is actions. While intention or willingness to innovate is an abstract concept and is difficult to measure, their translation into planning of actions is much easily captured. By nature, innovation is subject to uncertainty because of its novelty in ideas and its complex connection with various parties, internal and external to the firms. Any activities that involve the generation, adoption and implementation of new ideas or practices are highly risky and can easily fail. In this context, planning is vital for the success of innovation activities as it guides firms to allocate resources, ensure the availability of requisite expertise, and establish an effective framework for firms to implement the innovation activities (Boyd and Vozikis 1994; and Hornsby et al., 1993). Furthermore, planning is an effective communication channel within firms. As Mumford et al. (2008) argue, any innovative ideas must go under a long way of investigation to see whether they are worth pursuing or not. Thus, sharing information is a must, and a plan will provide sufficient information to the whole firm about which innovative ideas are valued, why they are valued and how they will be conducted. In short, TPB explains that, *planned innovation*, just like any entrepreneurial intention, is supposed to link to subsequent planning and actions. Among owners/managers of small firms, dynamic entrepreneurs, given their intention to innovate and a series of plans and actions that guide the innovation process, are more likely to realize the planned innovation efficiently. This is summarized in Supplementary figure 2.

However, to the best of our knowledge, there have not been any papers discussing dynamic entrepreneurship in relation to planned innovation and the resulting innovation outcomes. This is rather surprising, given the strong theoretical linkage of dynamic entrepreneurship vis-à-vis planned innovation and firm performance in light of TPB. In this paper, we aim to void this gap by considering the role of dynamic entrepreneurship and planned innovation on firm financial performance.

3. Methodology

3.1. Sample description

This study uses six rounds of firm-level data surveys on non-state small and medium manufacturing enterprises in Vietnam. Those surveys were conducted during the period 2005–2015 by the UNU-WIDER in collaboration with the University of Copenhagen and a range of Vietnamese government agencies[3]. Each round covers some 2,600 firms, of which a significant number of firms were revisited from the previous round. These surveys were conducted in 10 provinces in Vietnam (Ho Chi Minh City, Ha Noi, Hai Phong, Long An, Ha Tay, Quang Nam, Phu Tho, Nghe An, Khanh Hoa, and Lam Dong), employing a stratified random sampling method according to ownership structures to ensure that different types of non-state firms, both formally registered and informal firms, were adequately captured. According to UNU-WIDER, joint ventures were excluded due to the vague nature of state involvement. Using a rough estimate, the number of firms in the dataset is about a tenth of the total number of non-state manufacturing SMEs. This shows a significant effort from the survey teams, and a stratified random sampling method is appropriate to generate samples that well represent the population.

The surveys provide excellent firm-level information on a wide range of firm characteristics including ownership, industry, enterprise history, production characteristics, wage and employment, investment, assets and liabilities, access to credit and government support programs, economic constraints and potentials, performance, and types of innovation. The types of innovation are straightforward, indicating whether a firm introduced a new product/process or simply an improvement to existing products/processes in the preceding year[4]. The surveys also provide information on firms' intention to innovate, captured through the firm owners' response to a survey question "*Do you plan to start up new projects/product lines in the near future?*" (Appendix A provides a full description of all variables).

Descriptive statistics presented in Appendix B show that more firms innovated by improving existing products (*inno_impro*) than by introducing a new product (*inno_new*) and a new process (*inno_pro*). This indicates that novelty is much riskier and thus requires more efforts and resources to facilitate, decreasing chances of new products/processes being chosen as the company's strategies. In developing countries, this is understandable since small firms (the focus of this paper) are constrained by their capital, knowledge, human resources, etc., to conduct investments in highly innovative activities (Osano and Koine, 2016).

3.2. Regression strategy

This study aims to assess the impact of planned innovation and dynamic entrepreneurship on firm financial performance for small and medium enterprises in Vietnam. Based on the literature, we specify the following model:

$$\begin{aligned} prof\_margin_{i,t} = {} & \beta_1(intent)_{i,t-1} + \beta_2(inno)_{it} + \beta_3[(intent)_{i,t-1} * (inno)_{i,t}] \\ & + \beta_4(wf\_man)_{i,t} + \beta_5\left(wf\_pro\right)_{i,t} + \beta_5(lab\_rev)_{i,t} \\ & + \beta_7(equ\_asset)_{i,t} + \beta_8(rd\_asset)_{i,t} + \beta_9(auto\_sys)_{i,t} \\ & + ownership_{i,t} + industry_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where

- $prof\_margin_{it}$ denotes the profitability of firm i at time t and is measured by the ratio of gross profit to total revenue. Note that this proxy of firm performance is commonly used in previous empirical studies on firm financial performance (see Reddy et al., 2010; Al Manaseer et al., 2012), and especially in studies that link innovation to firm financial performance (Freel and Robson 2004; Simpson et al., 2006; Shin et al., 2017). We also acknowledge that profit margin is only an accounting-based measurement of performance that captures the historical profitability of firms, while market-based measurements such as Tobin's Q, market-to-book value, market value added etc. can capture the growth potential of firms that is partly driven by the firms' managerial business decisions including decisions to innovate. Unfortunately, such information on market value or value added is not available from our dataset.
- $Intent_{i,t-1}$ is a dummy variable that indicates the intention to innovate of the firm owner of firm i in period t-1. Capturing the firm owner's dichotomous response to a survey question "*Do you plan to start up new projects/product lines in the near future?*", this variable is a proxy for the nature of the dynamic entrepreneurship of the firm. As discussed earlier, intention to innovate is one of the traits that distinguishes dynamic entrepreneurs from static ones. Dynamic entrepreneurs are opportunistic and risk-taking, thus preferring to exploit an invention, or more generally, an untried technological possibility for a new commodity or producing an old one in a new procedure (Audretsch et al., 2006). Since it takes time for innovation intention to realize with innovation activities (either new products, new processes, or improvements in products/process), the one period lag for this variable is required.
- $Inno_{i,t}$ represents the three different activities of firm innovation, including introduction of new product (*inno_new*), introduction of new production process (*inno_pro*) and improvements to existing products/processes (*inno_impro*). Note that Nguyen et al. (2007) and Nguyen et al. (2020) used the same measures of innovation in their

[3] https://www.wider.unu.edu/database/viet-nam-sme-database.

[4] Note that, the same measures of innovation have been applied in previous studies on firm innovation using the same dataset (D. Nguyen, Nguyen and Nguyen, 2018; S. K. Nguyen, Vo and Vo, 2020).

studies of innovation and firm exporting behaviors and firm profitability.

- The key variable of our analysis is the interaction between intention to innovate and innovation, $Intent_{i,t-1}$*$Inno_{i,t}$. Indicating planned innovation activities, so-called *planned innovation*, this interaction allows us to test a *novel* prediction of the theory of planned behaviours suggesting that planned innovation will drive firm performance. This occurs because planned innovation will result in a series of plans and actions that guide the innovation process (Bird 1988; Boyd and Vozikis 1994; Audretsch et al., 2006; Darnihamedani and Hessels 2016).
- The specification (1) also includes a vector of control variables that potentially determine the firm's profitability. Indeed, motivated by Frydman et al. (1999), Gittell et al. (2004), El-Sayed Ebaid (2009), we include the following control variables: percentage of top managers over total workforce (*wf_ma*), percentage of professional employees over total workforce (*wf_pro*), ratio of labor over revenue (*lab_rev*), equity to asset ratio (*equ_asset*), ratio of R&D expenditure to total assets (*rd_asset*), the availability of automatic system (*auto_sys*), and two other control groups – *ownership* categories and types of *industry* (Appendix A provides a full description of all variables).

To capture a possible causal relationship between innovation, planned innovation, and firm profitability, we implement the following steps in our econometric analysis:

- We first employ three panel regression techniques: Fixed effects model (FEM), panel robust regression (panel robust), and Pds-Lasso model[5].
  - FEM controls for individual heterogeneity and multilevel hierarchical characteristics removing the time-invariant correlation between the identity error noise and predictor variables.
  - The panel robust model provides a robust estimation that solves the issues of heteroscedasticity and auto-correlation.
  - "Pds-lasso", is employed to strengthen the results with a more precise comparison. Unlike other linear regressions, "Pds-lasso" demonstrates a shrinkage regression rather than resorting to a group of classical assumptions of un-biasness and smallest variance (Belloni et al., 2016). It may bring better absolute values and standard calibrations for the coefficient's magnitudes, which leads to more structural inferences for the regression (Tibshirani 1996; Zou 2006; Belloni et al. 2012, 2016).
- To further address a potential endogeneity, i.e., the biasness of reverse causality and the noise correlations, we apply more advanced methods of the extended regression model (ERM), treatment effects model (treatment), and instrumental variables of the least absolute shrinkage and selection operator (IV-Lasso). Generally, these methods address the problem of endogeneity based on a two-stage correction in which the first stage focuses on a group of exogenous variables, while the second stage takes the adjusted values of endogenous variables (innovation) to regress on the outcome variable (profit margin).
  - ERM (Stata Corp, 2017) and treatment effects model (Cameron and Trivedi, 2005; Wooldridge, 2010) facilitates a normal standard linear two-stage correction for endogenous issues,
  - IV-Lasso model (Belloni et al., 2012; Chernozhukov and Hansen 2013) advances the corrections through two main mechanisms. It first improves the weak identification of instrumental variables, and second checks the robustness and sensitivity of the two-stage modeling mechanism[6].

4. Empirical results and discussions

Tables 1 and 2, respectively, present our results estimated from the normal standard one-side regressions (FEM, panel robust model, and pds-lasso in Table 1), as well as the advanced models of two-side IV correction (ERM, treatment effect model, and IV-lasso).

For the first standard panel regressions in Table 1, the results of robust estimation and Pds-Lasso (already defined the issues of heteroscedasticity and auto-correlation) firstly reveal an adverse effect of innovation toward profitability among three innovation variables: (i) innovation by creating new products (*inno_new)*; (ii) innovation by making improvements (*inno_impro*); and (iii) innovation by creating new production process (*inno_pro)*. These results are in line with the theory of creative destruction (Foster 1986), which suggests a diminishing research return and resource inefficiency, eroding the real value of innovation as rivals would soon imitate the "new" products/processes. These findings are profoundly consistent with Freel and Robson (2004) and Simpson et al. (2006), who studied 1,347 enterprises in England and 200 businesses in the United States. They find that innovation is an expensive and risky activity, rarely recovered, associated with market risk, dissatisfied workers, and its effect is not clearly shown in a short-term horizon. Besides, for small firms, being the first in innovation is challenging due to limited capacity and resources, shortages in innovation clusters, constraints in the technological network, or underdeveloped technology and infrastructures (Freel and Robson 2004). Secondly, Table 1 presents an interesting finding regarding the variable of lagged intention to innovate. Notably, this factor has a negative effect on firm performance, although its coefficient is only significant under the Pds-Lasso model. This result is relatively consistent with findings from Hmieleski and Baron (2009) that firm performance, with regards to the dynamic environment, may respond negatively to entrepreneurship since entrepreneurs exerting more optimism are overconfident to manage their self-efficacy (Baum and Locke 2004). Another potential rationale for the unfavorable effect of intention to innovate is that when firms set aside financial and non-financial resources for future investments, the current operating pattern could suffer from a lack of funding and resources. This reason could be highly valid, especially for small firms in a developing country. In Vietnam, where financial markets are still nascent and there are inadequate institutions, it could heighten information asymmetry and agency cost, further limiting firms' access to external financing (Osano

[5] This study employs two robust methods, namely the "Lasso" regression and the treatment effect model, to provide a better explanation of coefficients rather than the marginal effects suggested by Hainmueller et al. (2019) and Brambor et al. (2006). As for the former method, the "Lasso" mechanism will advance the estimation by generating an exact reconstruction of the true regression population, while the marginal effects tend to be more overwhelming the probability of the estimation. Marginal effects are quite conservative as there are unknown coefficients especially for random effects, leading to a less stringent prediction for the regression (Genovese et al., 2012; Brink-Jensen and Ekstrøm 2014). Also, the "Lasso" regression with a shrinkage mechanism can optimize the computational speed of estimation in the presence of interaction effects, especially for the interaction between one main regressor and other moderators (Wu et al., 2009). For the latter method, treatment effect models address issues of selection bias and contain possible corrections for the average treatment, thereby revealing the true dimensional predictor with the hidden marginal effects already tackled.

[6] Compared to current methods of GMM those require an extended time period and lagged instrumental variables, our standard two-stage regression models (ERM and treatment effect) and IV-lasso model provide better estimates of a possible causal relationship, especially for the case of weak instrumental variables. In the first stage, we include a selected group of exogenous variables based on the literature. First, we use the R&D intensity as a possible exogenous factor predicting innovation activities of the firms (Hall et al., 2011). Second, based on Hall and Maffloli (2008), we consider the current proportion of machines over firm total assets as another exogenous element underlying innovation activities. Lastly, motivated by Lin et al. (2011) and S. K. Nguyen (2019), we include the provision of managerial incentives, measured by the percentage of female managers over the total workforce of a firm as a possible predictor of innovation activities.

Table 1. One-side causal impacts panel estimates of the impact of innovation and planned innovation on firm performance.

	FEM			Panel-Robust Model			Pds-Lasso		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intent (t-1) (Intention to innovate)	0.004 (0.005)	0.003 (0,006)	0.005 (0.005)	-0.008 (0.006)	-0.009 (0.008)	-0.007 (0.006)	-0.017*** (0.006)	-0.018*** (0.008)	-0.018*** (0.006)
Inno_new (Innovation by new products)	-0.003 (0.010)			-0.017* (0.010)			-0.027*** (0.011)		
Inno_pro (Innovation by new process)		0.003 (0.009)			-0.011* (0.006)			-0.022*** (0.006)	
Inno_impro (Innovation by improvement in product/process)			0.003 (0.009)			-0.010** (0.005)			-0.020*** (0.005)
Intent_new (Intention to innovate * innovation by new product)	-0.002 (0.019)			0.008 (0.018)			0.015 (0.017)		
Intent_pro (intention to innovate * innovation by new process)		-0.004 (0.014)			0.005 (0.011)			0.014 (0.010)	
Intent_impro (Intention to innovate * innovation by improvement in product/process)			0.004 (0.010)			0.007 (0.010)			0.009 (0.010)
Wf_man (workforce of manager)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.002)	-0.005*** (0.002)	-0.005*** (0.001)
Wf_pro (Workforce of professionals)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Lab_rev (Total labor cost/total revenue)	0.187*** (0.014)	0.188*** (0.014)	0.187*** (0.014)	0.151** (0.062)	0.150** (0.063)	0.150** (0.063)	0.121* (0.071)	0.122* (0.070)	0.120* (0.070)
Equ_asset (Total equity/total assets)	-0.016* (0.010)	-0.016* (0.010)	-0.016* (0.010)	-0.004 (0.008)	-0.005 (0.008)	-0.005 (0.008)	0.004 (0.010)	0.004 (0.010)	0.003 (0.010)
Auto_asset (Automatic system)	-0.018** (0.009)	-0.018** (0.009)	-0.018** (0.009)	-0.012* (0.007)	-0.012* (0.007)	-0.011* (0.007)	-0.007 (0.007)	-0.008 (0.007)	-0.007 (0.006)
Ownership	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.243*** (0.019)	0.237*** (0.020)	0.241*** (0.019)	0.262*** (0.018)	0.265*** (0.019)	0.262*** (0.018)	0.252*** (0.019)	0.260*** (0.018)	0.252*** (0.018)
No. obs.	6648	6648	6648	6648	6648	6648	6648	6648	6648

One-side causal impact estimates of Eq. (1). Columns (1) through (3) present results from fixed effects model; (4) through (6) are the results from the panel robust model, and (7) through (9) are the results from "pds-lasso" estimation. Note: *** denotes significance at the 1%, ** 5% and * 10% level.

and Koine 2016). Thirdly, the key variable of interest of planned innovation – the interaction between the lagged intention to innovate and innovative activities – unlike our expectation, is not statistically significant. As concerned in the methodology section, this may come from the potential biasness of endogeneity in innovation variables which will be thoroughly addressed in the following section.

Addressing the previous possibility of endogeneity, Table 2 presents the results from two-side structural models, including extended regression models (ERM), treatment, and IV-Lasso. Similar to our hypothesis of the creative destruction theory (Foster 1986), the estimations reveal an adverse impact of innovation on firm profitability among different models. Such innovative activities are somehow expensive, risky and inefficient for small and medium enterprises to increase firm growth or profitability (Freel and Robson 2004). Unfortunately, the lagged intention to innovate has also been re-confirmed to have negative effects on firm performance, not to mention that its coefficients have been consistently significant for all estimations at this time. With regards to theoretical and empirical evidence, these findings have correctly presented the unfavorable effects of lagged intention to innovate, which is not sufficient for increasing firm profits (Baum and Locke 2004; Hmieleski and Baron 2009). Nevertheless, surprisingly, innovation activities that are carried out with initial intentions, captured by *planned innovation,* appear to lead to higher firm profits. These results are in line with both theoretical and empirical literature on TPB. Based on TPB, innovation carried out with careful planning is associated with a favorable outcome of firm performance; and dynamic entrepreneurs, those with *an intention to innovate*, can play a key role in the success of innovation, leading to better profitability (Bird 1988; Boyd and Vozikis 1994; Audretsch et al., 2006; Darnihamedani and Hessels, 2016). Indeed, entrepreneurial intentions embedded in planned innovation can underlie a comprehensive action, which allows firms to allocate resources as well as establish an effective framework for firm's development (Hornsby et al., 1993; Darnihamedani and Hessels 2016). It is also worth noting that the coefficient of *intent_pro* (planned innovation for new processes) is consistently positive and significant across three models, while the positive coefficient of *intent_new* (planned innovation for new products) and *intent_impro* (planned innovation for improvements to existing products/processes) are only significant in the IV-Lasso estimate. It is likely that more complex and risky innovations such as the introduction of new processes would require more careful planning with budgeting and plans of collaboration. Meanwhile, the role of proper planning tends to be less important for improvements to existing products. Besides, this result is highly consistent with the TPB, since according to this theory, firms through planning can evaluate the worthiness (benefits and costs) of the innovation projects and whether firms have proper preparations for the projects.

Lastly, it is highlighted that the results from the two tables are obtained with the introduction of control variables – specified in the research methodology section. Specifically, we control for other factors that can affect firm profitability, including the ratio of managers and professional workers to the total workforce, the availability of automatic systems, the R&D expenditure, and labor cost efficiency. The results are unchanged.

Table 2. Two-side structural two-stage estimates of the impact of innovation and planned innovation on firm performance.

	ERM			Treatment			IV-Lasso		
2ND STAGE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intent (t-1) (Intention to innovate)	-0.014*** (0.005)	-0.018 (0,006)	-0.020*** (0.005)	-0.020*** (0.005)	-0.020*** (0.006)	-0.021*** (0.005)	-0.083*** (0.014)	-0.103*** (0.014)	-0.041*** (0.008)
Inno_new (Innovation by new products)	-0.492*** (0.078)			-0.028* (0.015)			-0.580*** (0.107)		
Inno_pro (Innovation by new process)		-0.094*** (0.021)			-0.056*** (0.008)			-0.111** (0.031)	
Inno_impro (Innovation by improvement in product/process)			-0.144*** (0.020)			-0.208*** (0.008)			-0.210*** (0.031)
Intent_new (Intention to innovate * innovation by new product)	0.016 (0.017)			0.016 (0.017)			0.570*** (0.109)		
Intent_pro (intention to innovate * innovation by new process)		0.023** (0.012)			0.024** (0.012)			0.115*** (0.031)	
Intent_impro (Intention to innovate * innovation by improvement in product/ process)			0.011 (0.009)			0.014 (0.009)			0.203*** (0.031)
Wf_man (workforce of manager)	-0.006*** (0.002)	-0.006*** (0.002)	-0.005*** (0.002)	-0.007*** (0.002)	-0.005*** (0.002)	-0.010*** (0.003)	-0.008*** (0.002)	-0.006*** (0.002)	-0.005*** (0.002)
Wf_pro (Workforce of professionals)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
Lab_rev (Total labor cost/total revenue)	0.152*** (0.010)	0.151*** (0.010)	0.141*** (0.010)	0.137*** (0.010)	0.182*** (0.008)	0.139*** (0.010)	0.152*** (0.014)	0.147*** (0.011)	0.136*** (0.010)
Equ_asset (Total equity/total assets	-0.018** (0.007)	-0.009 (0.007)	-0.013* (0.007)	-0.011 (0.007)	-0.009 (0.007)	-0.012* (0.007)	-0.019 ((0.010)	-0.016* (0.008)	-0.014* (0.007)
Auto_asset (Automatic system)	-0.023*** (0.007)	-0.021*** (0.007)	-0.018** (0.007)	-0.016** (0.007)	-0.024*** (0.007)	-0.016** (0.007)	-0.064*** (0.014)	-0.038*** (0.009)	-0.023*** (0.008)
Ownership	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.325** (0.019)	0.330*** (0.019)	0.284*** (0.017)	0.265*** (0.017)	0.359*** (0.016)	0.274*** (0.017)	0.446*** (0.042)	0.411*** (0.030)	0.299*** (0.021)
1ST STAGE	***Inno_new***	***Inno_pro***	***Inno_impro***	***Inno_new***	***Inno_pro***	***Inno_impro***	***Inno_new***	***Inno_pro***	***Inno_impro***
rd_asset (R&D expenditure/total assets)	0.047* (0.027)	-0.259*** (0.060)	-0.173*** (0.048)	0.135 (0.222)	-0.579*** (0.183)	-1.976*** (0.422)	N.A	-0.222*** (0.053)	-0.131*** (0.042)
machine_asset (Machine/total assets)	0.121*** (0.039)	0.214*** (0.073)	1.029*** (0.066)	0.973*** (0.244)	0.421*** (0.163)	3.348*** (0.240)	0.157*** (0.043)	0.086 (0.065)	0.669*** (0.052)
wf_man_woman (Workforce of woman manager)	-0.219*** (0.024)	-0.683*** (0.039)	-0.350*** (0.031)	-1.630*** (0.197)	-1.854*** (0.106)	-1.688*** (0.157)	-0.149*** (0.024)	-0.441*** (0.036)	-0.152*** (0.029)
Constant	0.140*** (0.007)	0.580*** (0.012)	0.231*** (0.010)	-1.042*** (0.046)	0.225*** (0.031)	-0.683*** (0.040)	0.325*** (0.031)	0.800*** (0.047)	0.342*** (0.038)
VAR (*profit_margin*) (profit margin)	0.037*** (0.007)	0.022*** (0.001)	0.019*** (0.001)						
VAR (*inno_new*) (innovation by new product)	0.087*** (0.002)								
CORR (*inno_new, profit_margin*) (impact of innovation by new product on profit margin)	0.732*** (0.056)								
VAR (*inno_pro*) (innovation by new process)		0.139*** (0.003)							
CORR (*inno_pro, profit_margin*) (impact of innovation by new process and profit margin)		0.237*** (0.055)							
VAR (*inno_impro*) (innovation by improvement in product/ process)			0.225*** (0.005)						
CORR (*inno_impro, profit_margin*) (impact of innovation by improvement in product/process on profit margin)			0.451*** (0.052)						
athrho				0.020 (0.051)	1.116*** (0.036)	0.191*** (0.051)			
lnsigma				-2.021*** (0.012)	-1.814*** (0.017)	-2.014*** (0.012)			
High-dim instruments							3	3	3
Selected instruments							2	3	3
No. Obs.	3659	3659	3659	3659	3659	3659	3,659	3,659	3,659

Two-side structural two stage estimates of Eq. (1). Columns (1) through (3) present results from the extended regression model (ERM); (4) through (6) are the results from the treatment model; and (7) through (9) are the results from "IV-Lasso" model. Note: *** denotes significance at the 1%, ** 5% and * 10% level.

5. Conclusions

This study analyses the role of dynamic entrepreneurship and planned innovation in the nexus of innovation activities and firm profitability, using panel data of non-state small and medium manufacturing enterprises in Vietnam during 2005–2015. The study offers several unique features. First, innovation activities are broadly captured by either introduction of new products/processes or improvements to existing products/processes. Second, dynamic entrepreneurship in the context of innovation is acknowledged through the intention to innovate of firms' owners and this intention underlies planned innovation that is proven key to success. Third, the study applies the theory of planned behavior to explain the possible causal linkage between planned innovation and firm financial performance. Last but not least, the study applies a wide range of econometrics models to derive the un-biasedness and non-error endogeneity estimates of the impact of innovation activities on firm performance.

The study makes contributions to the literature on several grounds. Theoretically, drawn on a pronounced theory of management, theory of planned behavior, it derives a *new* innovation concept, so called *planned innovation*, indicating innovation carried out by dynamic entrepreneurs who are embedded with an intention to innovate. The study then expands the theory of planned behavior to predict firm financial performance in connection to the role of dynamic entrepreneurship and planned innovation. On this basis, the study argues that an interdisciplinary view from both economic and management perspectives is essential to investigating the nexus of entrepreneurial intentions, willingness to innovate, and the resulting economic outcomes at the firm level. Empirically, the study provides *new* evidence of positive impacts of planned innovation on firm profitability for small firms in a developing country. This occurs because planned innovation underlies a series of commitments, planning and actions by dynamic entrepreneurs that guide the innovation process and achieve higher firm profitability. The study also finds that the role of planned innovation towards firm financial performance is much more pronounced when complexed innovations are carried out rather than more simple ones.

Findings of the study provides important implications. Despite the technicality challenges pertaining to small firms, especially in the context of developing countries, the intention to innovate of the firm owners is a crucial factor driving innovation to success and improving firm financial performance. Another implication is relating to the introduction of support schemes that promote innovation for SMEs in Vietnam. Any support schemes, introduced either by the public or private sector to target SMEs, should be engaged with the group of dynamic entrepreneurs who have intention to innovate to warrant a higher chance of success.

The nexus between dynamic entrepreneurship, planned innovation, and firm performance is complex and highly contextual-dependent on internal and external factors to the firm. Whilst the present study highlights the role of dynamic entrepreneurship and planned innovation toward firm financial performance, much needs to explore to gain more insights into this narrative. Future research is needed to examine the role of contextual dimensions such as industry competition, technology dynamics, regulations, and government supports, just to name a few, on the relation between planned innovation and firm performance. This will further our understanding of planned innovation and help navigate more channels through which planned innovation could be promoted among small firms to achieve better firm performance.

Declarations

Author contribution statement

Kien Son Nguyen: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Tra Thi Thu Pham: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Hieu Hoang Nguyen: Analyzed and interpreted the data; Wrote the paper.

Liem Thanh Nguyen and Vinh Xuan Vo: Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data associated with this study is available online from the UNU-WIDER in collaboration with the University of Copenhagen, Vietnam Small Medium Enterprise Survey https://www.wider.unu.edu/database/viet-nam-sme-database.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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