Impacts of innovation on exports of manufacturing and processing Enterprise in Vietnam

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ABSTRACT
This study highlights the analysis and assessment of the impacts of implementation status of innovation on export in Vietnamese manufacturing - processing enterprise. By basing on two main resources: the statistics on expenditure of technology in production and the empirical result of data from the firm’s investigation for the period 2015 - 2018, this paper utilises Tobit method. The results confirm that innovation activities have a positive effect on export, especially, export intensity. The research is significant for manufacturing - processing enterprise, contributing to the firm’s prestige and credibility in the global market. These findings are robust implications for the management that promote export intensity on the effect of innovation.

Keywords: Innovation, Export intensity, Vietnam

1. Introduction
In the digital age, the repetition of innovation is more and more accelerating. Enterprises must advance the export intensity in order to remain competitive in the international market. In terms of growth strategies, innovation and export intensity are two majors to elements, which attracts a lot of academic research, and investigating the innovation-export relationship. At the micro-level, innovation is significant for the firm’s competitive advantage and determines potential advancement. According to the empirical research, Vernon (1966) and Krugman (1979) suggest that innovation is the motive behind exports. Via innovation activities, the firms gain and sustain their niche specialty domestically and internationally. Hence, we can see a positive relationship from innovation to export. The benefits of innovation for exporting are recognized as including the development of differentiated products and services, improving quality, reducing costs, hence giving rise to competitive advantages and market power, and accelerating a firm's entry into, and expansion within abroad markets.

In addition, Grossman and Helpman (1995) concur that firms can enhance the quality of their products and allow countries to expand exports intensity. As firms, evolving through innovation, have an inclination to be characterized by higher productivity, they are more likely to gain attraction abroad. Depending on expertise in delivering products with new value, enterprises should experience export demand. Consequently, the features of their products must be advanced customer's switching costs, and innovators strive to gain sustainable development in the competitive exports market.
This paper is structured as follows. Section 2 reviews the existing theoretical framework of the relationship between innovation and export, focusing on export intensity. Section 3, we provide the methodological aspect, data of research and some result analysis. Section 4, we have results analysis. Section 5, we draw up the final conclusions.

2. Literature review

There are many studies and approaches about the relationship between innovation and export in the world.

Lachenmaier & Wößmann (2006) examine whether innovation causes exports among German manufacturing firms or not, thanks to prediction of the product cycle models of international trade. The authors find that innovation resulting from a change in resources leads to the density of exports in total revenue of the firms' exports being about 7 percent higher than an average. Lachenmaier and Woßmann (2006) use the instrumental variable approach. According to statistics, the innovation firms show 12.6% higher share of exports compared to the non-innovation firms.

Anh Ngoc Nguyen and collaborators (2008) use the 2005 Vietnam Small and Medium Enterprises Survey (SME 2005) to investigate the link between innovation and exports. The survey was conducted four times in 1991, 1997, 2002 by the Ministry of Labor, Invalids and Social Affairs (MOLISA) and the Stockholm School of Economics and in 2005 by the Ministry of Labor, Invalids and Social Affairs and the University of Copenhagen. Going beyond previous studies which examine only product and process innovation, Anh Ngoc Nguyen and collaborators (2008) use three measures of innovation, namely product innovation, process innovation and modification of existing product. They use the STATA – IV probit – procedure which is designed to fit models with dichotomous dependent variables and endogenous regressors. Furthermore, STATA – biprobit – which is designed to fit the maximum likelihood two-equation simultaneous probit model. The results indicate that innovations are an important determinant of exporting for small and medium enterprises in the context of Vietnam.

Most recently, Lichao Wua, Yingqi Weib and Chengang Wangc (2021) use the ACIE database compiled by NBS covering all manufacturing firms in China with an annual turnover of more than RMB 5 million in the period 1998–2007. The database shows 31 China’s provinces. The result is recognition of the BG-innovation-export net takes our understanding further about the export intensity. By merging comprehensive datasets on manufacturing firms in China, the authors analyze that both innovation and Business Group affiliation have a positive impact on exports, but that BG affiliation plays a negative role in the innovation-export relationship.

3. Methodology

3.1. Data

The enterprise survey sample used in this paper is collected from the following sources: The first source is the data of the Enterprise Census 2016–2019 (collecting business information in 2015–2018) which takes information related to the business (human capital, enterprise size, capital level, level II economic sector, ownership form). The Enterprise Census is a business survey conducted annually by the General Statistics Office (GSO) since 2001 (data for the year of operation 2000). This survey collects surveys from all corporations, state-owned companies, foreign-owned companies, non-state companies with 10 or more workers (recently 20 or more workers), more than in Hanoi, Ho Chi Minh City and some other provinces), all small businesses in some provinces, all firms operating in housing production and trading, food services, and news and communications, and transportation. The remaining companies' samples represent 20% of the actual total. The second source is the data collected from the General Statistics Office to collect information on the use of technology in production by manufacturing enterprises. Data are randomly selected by the General Statistics Office.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Export intensity</td>
<td>0.2854624</td>
<td>0.4032801</td>
<td>0.2922841</td>
<td>0.4057478</td>
<td>0.29854</td>
<td>0.4083364</td>
<td>0.3019247</td>
<td>0.4079318</td>
</tr>
<tr>
<td>Innovation dummy</td>
<td>0.9194976</td>
<td>0.2720974</td>
<td>0.9201968</td>
<td>0.2710172</td>
<td>0.9292179</td>
<td>0.2564902</td>
<td>0.9198436</td>
<td>0.2715684</td>
</tr>
<tr>
<td>Product innovation</td>
<td>0.8037883</td>
<td>0.3971714</td>
<td>0.8046641</td>
<td>0.3965015</td>
<td>0.81411</td>
<td>0.389063</td>
<td>0.8018084</td>
<td>0.398686</td>
</tr>
<tr>
<td>Process innovation</td>
<td>0.6574017</td>
<td>0.4746273</td>
<td>0.6576808</td>
<td>0.4745366</td>
<td>0.6978417</td>
<td>0.4592468</td>
<td>0.6923265</td>
<td>0.461587</td>
</tr>
<tr>
<td>Size</td>
<td>4.475526</td>
<td>1.508212</td>
<td>4.492819</td>
<td>1.511998</td>
<td>4.51734</td>
<td>1.568149</td>
<td>4.485909</td>
<td>1.595683</td>
</tr>
</tbody>
</table>
3.2. Measurement of variables

**Dependent variable**
In line with the objectives of the study, our dependent variable is export. Following numerous studies (e.g., Basile, 2001; Dhanaraj & Beamish, 2003; Pla-Barber & Alegre, 2007), we operationalize export as the share of export sales over total sales.

**Independent variable**
Our independent variable is innovation. Following the OECD definition, we measure innovation by evaluating the output (i.e., product and process innovations) of the activity. Therefore, we also measured the outputs of innovation (innovation (product innovation/process innovation), product innovation, process innovation) by using three dichotomous variables that assume a value of 1 if the firm has produced the corresponding output of innovation and 0 otherwise.

**Control variables**
We control for several variables to address concerns about the potential endogeneity of the innovation measure and other firm-level unobserved heterogeneity. Previous studies suggest that firm size is associated with export (Caldera, 2010; Dhanaraj & Beamish, 2003). We include firm size which is measured using the natural log of total number of employees. Alarcón and Sánchez, 2016; Golovko and Valentini, 2011; Yang and Chen, 2012; Yang et al., 2004 suggests that a firm’s capital intensity can also affect export positively. Capital intensity is measured using the natural log of the share of capital over total number of employees. Some research has shown that human capital is a factor in export development, reporting a positive relationship (e.g. Amadu and Danquah, 2019; Ayllon and Radicic, 2019; Braymen et al., 2011; Yang et al., 2004). Finally, we introduce some additional dummy variables to account for idiosyncrasies associated with time, industry variations. Year dummies are included to capture time effects associated with exchange rates and other time-varying factors on export. Two-digit industry dummies are included to control for industry-specific idiosyncrasies that may have an impact on variations in the export of firms.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Side component</th>
<th>Code</th>
<th>Explanation</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation</td>
<td>Innovation</td>
<td>innovation</td>
<td>Enterprises practice innovation activities</td>
<td>innovation dummy =1:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dummy</td>
<td>Enterprises have processes one of two activities: product innovation, process innovation.</td>
<td>Enterprises have processes one of two activities: product innovation, process innovation.</td>
</tr>
<tr>
<td>Product innovation</td>
<td>Product innovation</td>
<td>product</td>
<td>Enterprises practice innovation activities</td>
<td>Product innovation =1:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>innovation</td>
<td>Enterprises have practice product innovation</td>
<td>Enterprises have practice product innovation</td>
</tr>
<tr>
<td>Process innovation</td>
<td>Process innovation</td>
<td>process</td>
<td>Enterprises practice innovation activities</td>
<td>process innovation =1:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>innovation</td>
<td>Enterprises practice process innovation</td>
<td>Enterprises practice process innovation</td>
</tr>
<tr>
<td>Export</td>
<td>Export intensity</td>
<td>export</td>
<td>The ratio of export sales / total sales</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>Human capital</td>
<td>HC</td>
<td>Labor quality of</td>
<td>Log (Wages/Employment)</td>
</tr>
</tbody>
</table>
3.3. Models specification

The model are defined as follows:

\[ \text{EXPINT} = \alpha_0 + \alpha_1 \text{INNOVATION} + \alpha_2 \text{CONTROL} + \varepsilon_i \]

Regarding the tobit model, the dependent variable is the export intensity of measurement. Important export rate as a percentage of turnover. This variable could not get the value from "0" to "1". Since it is not the same between the company in the selection of the output, the method of the modular the best method (OLS) is not suitable for model quantities, the resulting rule will be skewed and not the convention firm. quality according to Amemiya (1973), Greene (1981), Arabmazar and Schmidt (1982). James Tobin (1985) developed the Tobit model by using the Maximum Likelihood Ability (ML) method. According to Gujarati (2004), Tobit model is best reasonable for model estimation with moderation of dependent variable (limited in the range from 0 to 1). Therefore, the study group performed recovery with Tobit two limited models for the panel data.

First of all, in terms of dependent variables, we have three variables of Innovation and one export: innovation dummy, product innovation, process innovation, export intensity. Secondly, we have four control variables: Human capital, business size, capital intensity and business ownership. We also have table 2 to depict clearly about types of variables.

4. Results

Then, we have table 3 that shows the calculation models and results.

Table 3: Summary statistics: the innovation-export intensity relationship

<table>
<thead>
<tr>
<th>Variables</th>
<th>(Model 1)</th>
<th>(Model 2)</th>
<th>(Model 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation dummy</td>
<td>0.053***</td>
<td>-0.014</td>
<td></td>
</tr>
<tr>
<td>Product innovation</td>
<td></td>
<td>0.027***</td>
<td>-0.01</td>
</tr>
<tr>
<td>Process innovation</td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Human capital</td>
<td>-0.009</td>
<td>0.040***</td>
<td>0.040***</td>
</tr>
<tr>
<td>Size</td>
<td>0.161***</td>
<td>-0.007</td>
<td>0.161***</td>
</tr>
<tr>
<td>Capital intensity</td>
<td>-0.007</td>
<td>-0.007</td>
<td>-0.007</td>
</tr>
<tr>
<td>Ownership forms are divided into 3 groups: State-owned enterprises, private enterprises and Foreign - invested enterprises</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Summary of the Authors
Table 3 results show that innovation has a positive effect on the export intensity of Vietnamese manufacturing - processing enterprises. Specifically, according to Table 2, innovation variable has a regression coefficient of 0.053 and has statistical significance <1%, which shows a positive correlation between innovation and export intensity of enterprises. In Model 2, the product innovation variable also has a positive regression coefficient, equal to 0.027 and significant <1%, also shows a positive effect between the product innovation and export intensity. In model 3, the process innovation does not affect export intensity.

Therefore, of the two types of innovation, only product innovation causes the export intensity of enterprises in manufacturing and processing industries. This result is also propitiate with previous studies: process innovation does not directly affect internationalization (Cassiman et al., 2010; Tsukanova and Tatyana, 2019) or only when accompanied by product innovation (Becker and Egger, 2013; Tsukanova and Tatyana, 2019). The fact is that product innovation helps companies either satisfy customers better or open up new markets. Even though process innovation allows companies to improve production efficiency and saves costs later on, these benefits may not necessarily need to be sold overseas.

Regarding the side variables of firm's characteristics, human capital (HC), firm size (size), and capital intensity, all of them have statistical meanings for export intensity and coefficient. Business ownership variables, this study is researched for private enterprises and foreign-invested enterprises, through the test results present in the tables 2 above, it is found that the type of private firm is not statistically significant.

Based on tables 3, we see that foreign-invested enterprises have the greatest influence compared to other independent variables on whether the firms have the intensity of exports or not. According to our investigation, there are several possible causes for this outcome related to the top leaders' orientation, the strength of their resources and experience in the international trade market. Because a foreign-invested enterprise has already an element brought in from another country, strong thinking and direction beyond the border extends to the next world they own financial capital and the amount of human beings due to a large capital investment as well as knowledgeable leaders with international business experience.

5. Conclusion

The paper uses the tobit model to develop hypotheses about the relationship of innovation and exports in Vietnamese manufacturing and processing enterprises. In the test results from 2015-2018, manufacturing and processing enterprises believe that innovation affects exports, especially the intensity of exports. This result implies that the innovative activities that the manufacturing and processing enterprises are implementing and the intensity of exports has a positive impact on each other. In addition, enterprises should choose a manager with massive experience in the international market so that they can apply an appropriate export strategy and apply a method of contract negotiation with potential partners to minimize the risks arising from the environment and to contribute to increased export.

References


5. FIRM-LEVEL TECHNOLOGY AND COMPETITIVENESS IN VIETNAM EVIDENCE FROM A SURVEY IN 2013
