

Adoption of Technology Capability Through Export and Foreign Ownership to Improve Firm Productivity: A Systematic Literature Review

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Abstract

The purpose of this paper is to paper describes three ways to increase productivity because productivity is important for economy growth in globalization era. In the current era of globalization, the economy is one of the important things in every firm, so productivity, which is one of the indicators of economic growth, cannot be ignored. This paper describes three ways to increase productivity, namely, exports, foreign ownership, and information and communication technology (ICT). Therefore, this paper wants to make companies realize the importance of the impact of productivity on firms. The method used in this paper is the Systematic Literature Review (SLR), in which the process is to identify, evaluate, and interpret research results to provide answers to research. From the results of this paper, it can be found that exports and foreign ownership can have different impacts in different countries and in different fields, whereas ICT does not have different impacts on companies that use or do not use ICT.

Keywords

Productivity, Exports, Foreign ownership, Information and Communication Technologies and Improve Firm.

1. Introduction

Productivity is the comparison between the results achieved and the total resources used (Fithri & Sari, 2016). This comparison is more often described as a ratio of output to input, namely the relationship between how much output is produced and how many inputs are needed (Aipassa, 2015; Tania & Ulkhaq, 2014) to provide effective goals (Manullang, 2020). When more output is produced at the same cost, this is called an increase in productivity (Suryanto, 2020). Productivity is one of the important things for firms, so it is important to increase productivity. One of the three ways is to export, have foreign share ownership, and improve ICT, or information and communication technology.

Export is the process of selling goods or services from within the country to other countries (Purwaning Astuti & Juniwati Ayuningtyas, 2018; Wulandari & Lubis, 2019), which is one of the factors in increasing economic growth (Ginting, 2017). The reason companies export is because exports have minimal risk, are easy because they do not require high investment costs, make production more professional, optimize the distribution of resources around the world, and are supported by government policies (Ming & Zhijun, n.d.; Rahmadita, 2017). Countries with open economies need exports to play an important role in economic growth, especially for developing countries (Hodijah & Angelina, 2021; Suparlan & Prihartono, 2017).

In addition to exports, foreign ownership can play a role in boosting productivity. Foreign share ownership is a portion of the total shares (Taufik & Eka, 2010) owned by individuals, legal entities, and the government but not from firms'

original country (Bangun et al., 2018; Tangke et al., 2021). With foreign ownership, the firm can find out to what extent it can protect firm assets (Priyanto & Qibthiyah, 2020). There are several reasons why foreign individuals, foreign legal entities, and foreign governments choose to invest in other countries, namely if the invested country has low interest rates, increased economic growth, and the weakening of the country's exchange rate (Sari & Baskara, 2018), so FDI, or foreign direct investment, is often called a catalyst for economic development (Orlic et al., 2018). With the advancement of ICT in the Industry 4.0 era, digital updates are a necessary means for firms, especially those in the manufacturing industry. With the advancement of ICT, the firms' products have a positive effect (Li et al., 2022). Not only does it have a positive impact on the product, but the increase in ICT can also be a source of increasing firms' productivity (Abramova & Grishchenko, 2020).

This paper aims to make firms aware of the impact of exports, foreign share ownership, and information and communication technologies (ICT) on increasing firms' productivity because, by increasing firm productivity, it can increase revenue, so that it can provide benefits for firms that have not exported or have foreign share ownership by knowing that firms can increase firms' revenues by increasing firm productivity. This paper is structured as follows with the objectives and benefits described above: In Section 2, the research methodology is explained by asking questions about the importance of increasing productivity and the role of exports and foreign ownership in increasing firm productivity, and Section 2 explains the research criteria that will form the basis for the answers or results of this research. document. In Part 3, this paper describes the results of the questions contained in Part 2, which are based on the results of previous research studies. And in Section 4, the last section is a summary of the results of this paper.

2. Methodology

The approach to reviewing the role of exports and foreign share ownership in boosting firm productivity is the Systematic Literature Review (SLR), which is a process of identifying, evaluating, and interpreting research results to provide answers to research questions consisting of several stages, namely: defining research questions; determining the learning topic; extracting the necessary data; synthesizing the data; and explaining the results (Kitchenham & Charters, 2007).

The reason companies export is because exports have minimal risk, are easy because they do not require high investment costs, make production more professional, optimize the distribution of resources around the world, and are supported by government policies (Ming & Zhijun, n.d.; Rahmadita, 2017). Foreign ownership can help firms in international trade when firms cannot use the potential export proceeds to be able to finance the fixed costs of exports either directly or indirectly (Boddin et al., 2017).

This research question is based on the importance of firm productivity and the role of exports, foreign ownership, and ICT on the productivity of firms in the same field and not in the same field. (Table 1)

Table 1. Research question

ID	Research Question	Motivation
RQ1	Why is it necessary to increase productivity in the firm?	Identify why productivity needs to be increased
RQ2	What do exports increase firm productivity?	Identifying the role of exports can help increase productivity.
RQ3	What do foreign ownership increase firm productivity?	Identifying the role of foreign ownership can help increase productivity.
RQ4	What do information and communication technologies increase firm productivity?	Identifying the role of information and communication technologies can help increase productivity.
RQ5	Is there a difference in the influence of exports and foreign ownership in firm with different fields?	Identify whether the role of exports and foreign ownership have differences in different types of companies on productivity.

In Table 1, there are 5 questions that will be answered to draw conclusions from this paper. The questions are made with different motivational motivations. The motivation is useful for determining the direction or outcome of the questions that have been asked.

Inclusion and exclusion criteria were used to select the main study and to map previous journals. These criteria are shown in the table below:

Table 2. Inclusion and exclusion criteria

Inclusion Criteria	The published study is not more than 5 years old
	Studies that discuss productivity, exports, foreign ownership, foreign investment, and information and communication technologies
	Studies that discuss the role, impact, and influence of exports, foreign ownership, and information and communication technologies on productivity

It can be seen from Table 2 that this paper does not use articles for references that do not use Bahasa or English, which do not have strong validation and publications that exceed 5 years.

The mapping, search process flow diagram, and PRISMA flow diagram in this article are shown below:

Table 3. Mapping previous research

No.	Research title, researcher name, and year of published	Methodology	Research result
1.	Productivity Impact from Multiple Impact Perspectives, Souran Chatterjee and Diana Üрге-Vorsatz (2017).	Inductive approach i.e., it starts with observation and based on these pre-researched observations, this paper proposes a methodological framework to quantify productivity impact	This paper first identifies the key impacts due to building related improved energy efficiency measures and proposes the methodology to quantify and monetize the productivity impacts
2.	Improving Productivity in The Business of Construction, Tamlyn Snyman and John Smallwood (2017).	Questionnaires were distributed to owners, directors, and managers of general contracting organizations per email,	The study revealed that there is awareness among construction organizations that productivity is poor. The study also revealed that construction organizations do desire improvement within their organizations, but as acknowledged, they lack the innovation and technology needed to be productive per se.
3.	Export Markets and Firm Productivity in Sub-Saharan Africa, Stephen Esaku (2021).	Empirical Analysis	Overall, our findings suggest that although export market destinations do matter for productivity growth, exporters who simultaneously sell products to more than one market do receive the largest productivity growth premia.

No.	Research title, researcher name, and year of published	Methodology	Research result
4.	Exporting and Firm Productivity: Evidence for Egypt and Morocco, Inmaculada Martínez-Zarzoso (2020).	The methodology applied in this paper is the differences-in-differences matching estimator	The outcomes are very different for Morocco and Egypt, mainly indicating that exporting and importing is positively correlated to labor productivity and in some cases to TFP for Egyptian firms, but not for Moroccan firms, which do not seem to select into exporting or learn by exporting.
5.	Exporting and Productivity: Learning from Vietnam, Carol Newman, John Rand, Finn Tarp, and Nguyen Thi Tue Anh (2017).	Methodology applied in the literature for separating self-selection of productive firms into export markets from learning-by-exporting effects.	We find strong evidence that productive firms self-select into export markets. Our analysis also points to a positive association between exporting and productivity.
6.	The Spillover Effects of Export on The Productivity of Firms in Vietnam, Nguyen Anh Tuyet, Trieu Dinh Phuong (2020).	The authors calculate the aggregate yield factor with the strong estimation method of the production function combining the parameters and semi-parameters of Levisohn-Petrin for TFP measurements. The authors calculate the diffusion channels of export enterprises. This study estimates impacts of the diffusion of export channels on enterprises' TFP.	This research result shows that exports have positive effects on the productivity of business in Vietnam.
7.	The Role of Exports in The Transmission of Horizontal and Vertical Spillovers of Foreign Direct Investment: The Case of Turkish Manufacturing Industry, Felor Ebghaei, Arzu Akkoyunlu Wigley (2018).	This paper uses the following extended linear logarithmic Cobb–Douglas production function equation (1) and TFP equation (2) are constructed as benchmark equations.	This study claims that export increases the absorption capacity of firms such that they benefit more from the positive spillovers of FDI compared to non-exporting domestic firms.
8.	Indonesian Firms in Facing Globalization: Do Foreign Ownership and Export Matter? S. Suyanto, Y. Sugiarti (2020).	This current study extends the conventional neoclassical Cobb-Douglass production function by incorporating trade (export and import) and foreign investment as additional inputs.	The results showed that the inward-looking factor, either material, labor, capital, or energy, had a positive and significant impact on output productivity, respectively. Export had a significant positive effect on output, indicating the importance of export in increasing productivity. Import had a significant negative effect on output, suggesting the disadvantage of using

No.	Research title, researcher name, and year of published	Methodology	Research result
			imported material in production.
9.	Spillover Effects of Research and Development, Exports and Foreign Investment on Productivity: Empirical Evidence from Indian Manufacturing, V. Pradeep, Mita Bhattacharya, Jong-Rong Chen (2017).	A common approach in the empirical literature on spillovers is to estimate a Cobb–Douglas production function	The results were robust, controlling for input endogeneity, possible measurement errors, and unobservable effects and persistent errors related to panel estimations.
10.	Factors affecting Total Factor Productivity: Firm-level Evidence from Manufacturing Sector of Bangladesh, Selim Raihan, K. M. Nafiz Iftakhar Tulon, Mir Tanzim Nur Angkur (2017)	This paper has estimated the productivity by the technology parameter of the Cobb-Douglas production function.	With the quest of ascertaining the factors affecting total factor productivity of manufacturing firms in Bangladesh, this paper has extracted numerous useful insights that also have worthwhile policy implications.
11.	The Role of ICT Use in SMEs Towards Poverty Reduction: A Systematic Literature Review, Busisiwe Mbuyisa, Awie Leonard (2017).	The data used in this study is based on a review of literature on the role of ICT use by SMEs and the resulting impact on poverty reduction.	The literature review indicates that promoting the growth of SMEs is an important aspect of building a vibrant socio-economic environment.
12.	Measuring ICT externalities and their contribution to productivity: A bilateral trade-based approach, Keungoui Kim, Ahmed Bounfour, Alberto Nonnis, Altay Ozaygen (2021).	This study builds upon the model proposed by Basu et al. (2003), and its empirical implementation by Acharya (2016). ICT externalities are modeled as import data, following the approach adopted by Coe and Helpman (1995), who focused on R&D externalities.	Our findings suggest that ICT contributes not only directly to output growth but also, through spillover effects, to other industries, an effect that cannot be observed using traditional productivity functions.
13.	Aging labor, ICT capital, and productivity in Japan and Korea, Jong-Wha Lee, Eunbi Song, and Do Won Kwak (2020).	We suppose that an industry produces output using workers with different skills and of different ages and different types of capital that are ICT and non-ICT capital.	Our analysis revealed a complementary effect between ICT capital and older workers. This demonstrates that the aging process has positive effects on labor productivity when the older workers work in industries with a large share of ICT in the capital stock.
14.	Exports' Effects on Productivity from the View of Industry Heterogeneity, Yifan Jiao, Qing Liu, and Tianzhuo Liu (2018).	The method in the prior research was adopted to calculate the data of industrial added value in 2004 (Guo and He, 2007) and few of the data are obtained by using the linear interpolation method. For the data after 2008, following the practice of prior research (Gao and Li, 2011), this paper uses the	Overall, the productivity of the Chinese manufacturing industry shows a downward trend since 2008, and exports inhibit the growth of productivity, especially for the industries with low productivity.

No.	Research title, researcher name, and year of published	Methodology	Research result
		“industrial sub sectors added value growth rate” published by the National Bureau of Statistics of China for calculation.	
15.	Do foreign Mergers and Acquisitions Boost Firm Productivity? Marc Schiffbauer, Iulia Siedschlag, and Frances Ruane (2017).	We model the probability (propensity score) of foreign acquisition as a function of the following firm characteristics observed in the pre-acquisition period: the return on capital (firm profitability), the ratio of interest expenses to total assets (a proxy of perceived trustworthiness by financial institutions), a firm's age, size, and characteristic variables to capture ownership and solvency.	Our results indicate that the effects of foreign acquisitions vary across industries. It appears that foreign ownership led to higher TFP in information and communication technology (ICT) manufacturing industries but not in ICT service industries.

Table 3 contains previous journals discussing exports, foreign shareholding, and ICT. The results and research methods from the fifteen journals can be the basis or basis of this paper in answering the research questions that have been raised in this paper.

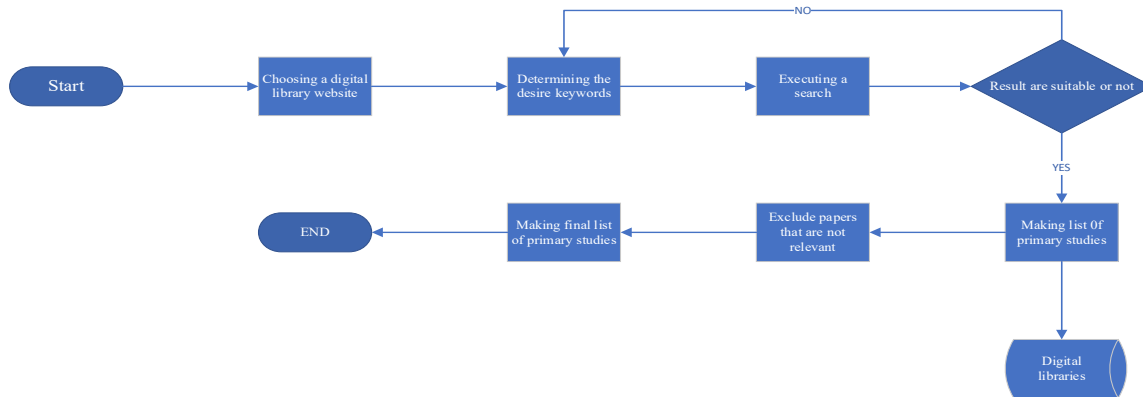


Figure 1. Search process flowchart

As Figure 1 shows, the search process consists of several stages, namely, choosing a digital library website, determining the desired keywords, executing a search for the desired keywords, checking whether the search results are suitable or not, and if not, returning to the stage of running a search for the desired keywords, and making a list of primary studies from the digital library to match the desired keywords. The keywords you search for should be adjusted to the topic, to increase the possibility of finding highly relevant articles. Here is a list of digital libraries searched:

- SAGE Journals (journals.sagepub.com)
- ScienceDirect (sciencedirect.com)
- Google Scholar (scholar.google.co.id)

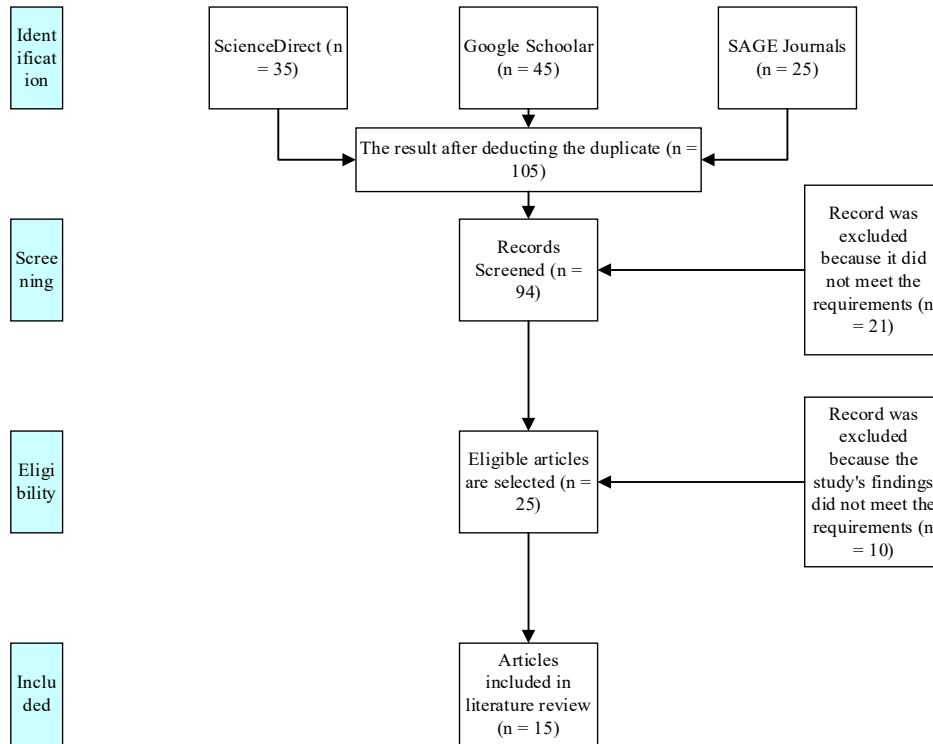


Figure 2. Literature Review Search Method

In Figure 2, it can be seen that this paper goes through 3 stages in the process of searching for articles that can be used as references. This paper uses 3 main websites to find references, namely ScienceDirect, GoogleScholar, and SAGE Journals. After doing the elimination process, there are 15 articles that can be used as the basis for the answers in this paper.

After selecting the main study selected to answer the research questions, three properties are used answer the research questions shown in the table below:

Table 4 Properties of Research Question

Property	Research Question
The importance of increasing productivity in firms.	RQ1
The role of exports, foreign ownership, and ICT in boosting firm productivity.	RQ2, RQ3, and RQ4

It can be seen from Table 4 that the three properties that are used to answer are: the importance of increasing productivity in companies; the role of exports, foreign ownership, and ICT in increasing company productivity; the influence of exports and foreign ownership on companies in various fields.

3. Research Result

In this section, the author answers the results of research questions that have been based on existing international journals or literacy from several countries and several years, as presented in the graph below:

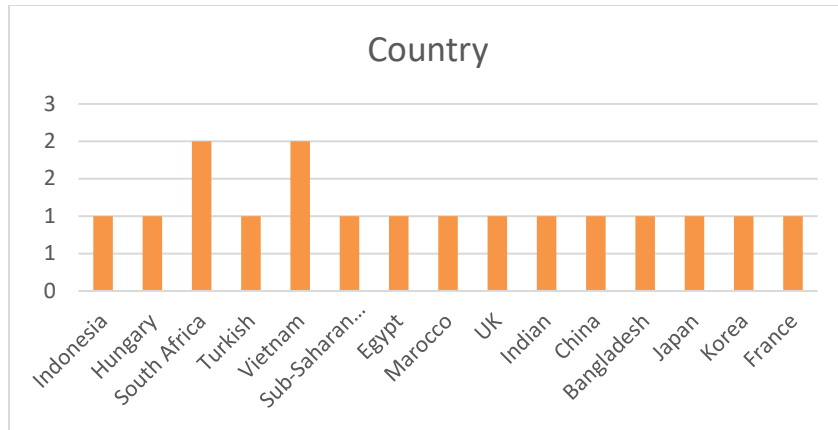


Figure 3. Country list

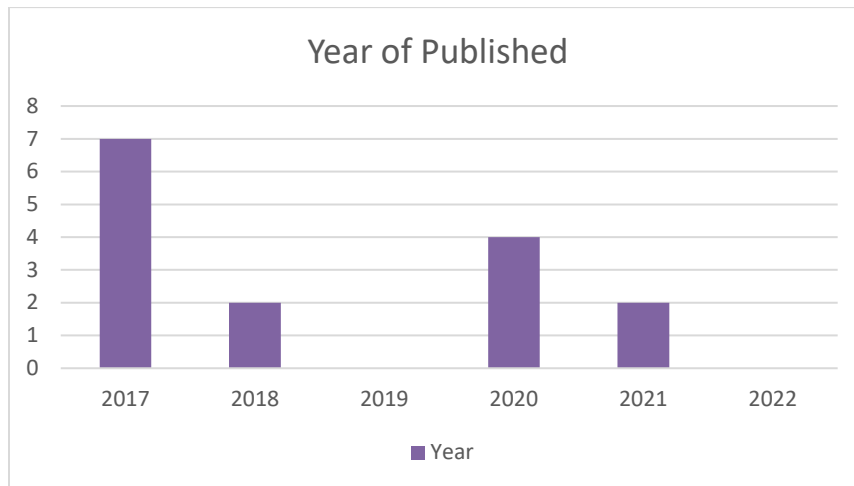


Figure 4. Year of published

The two figures above, namely Figure 3 and 4, are diagrams made to map articles used for reference based on the year of publication and the place where the research was carried out. So, it can be concluded that the research places for reference articles in this paper were carried out in various countries and the references for these articles were not more than 5 years ago.

3.1 The Importance of Increasing Productivity in Firms

Productivity is an important indicator of economic growth and development. With the increasing competence of the global economy, productivity in the long term will be difficult to ignore, so companies need to pay attention to productivity (Chatterjee & Ürge-vorsatz, 2017). However, companies are often more focused on increasing the amount of work done without considering profit. This is not uncommon because it does not give the firms a disproportionate profit. So, companies that adopt a strategy of increasing organizational size and work volume tend to generate profits that decrease or increase only slightly and not significantly. So, if the firms focus on increasing productivity, i.e., output is greater than input, the firms can benefit from cost and quality advantages (Snyman & Smallwood, 2017).

3.2 The Role of Exports in Boosting Firm Productivity

There are findings regarding a positive relationship between exports and productivity, as firms that export gain initial and accumulated productivity gains associated with years of export experience (Newman et al., 2017). Firms that export have greater productivity based on TFP compared to firms that do not export. These firms have high productivity after controlling for age, size, holdings, and other securities, and firms that export more than one market well (Esaku, 2021). There are findings in Vietnam that exports have a positive impact on companies through TFP because when companies are involved with exports, many people who have high skills and experience begin to enter

the business or firms, so that the products and services produced have an increase in quality, which makes the firms's business efficiency increase (Nguyen Anh Tuyet & Phuong, 2020). Then many companies from various fields do exports, such as, companies in Egypt that export tend to be more productive in sales, employ more labor, and have higher profits than companies that do not export, although there is no significant difference in total factor productivity and value added. employees (Martinez-Zarzoso, 2020). But not all companies in various countries get the same results as companies in Egypt. For example, companies in Morocco that export are not much different from companies in Morocco that do not export in terms of the average number of employees but do not appear to be more productive (Martinez-Zarzoso, 2020).

3.3 The Role of Foreign Ownership in Boosting Firm Productivity

Not only do exports affect productivity increases in companies, but foreign shareholding can affect productivity as well. There are findings in Turkey that the productivity of the manufacturing industry has a significant positive impact or influence on foreign share ownership. FDI increases the productivity of the manufacturing industry by increasing capital accumulation. Technology is in line with theoretical expectations and supports the use of new semi-finished goods (Ebghaei & Akkoyunlu Wigley, 2018). Whereas in Indonesia, the presence of FDI or foreign share ownership in local manufacturing companies in Indonesia can have a positive impact on firms' productivity, namely by increasing the firms's output (Suryanto & Sugiarti, 2020). Although foreign equity ownership has a favorable impact on firms in both countries, the presence of FDI in domestic manufacturing firms in US industries does not increase productivity with a greater presence of foreign affiliates, while domestic manufacturing firms in China show that FDI reduces productivity in the short run but increases productivity in the long run (Pradeep et al., 2017).

3.4 The Role of Information and Communication Technologies in Boosting Firm Productivity

Firms in Bangladesh that use ICT, benefit from lower communication and transaction costs, allowing them to maintain communication with clients and suppliers so that their productivity can increase (Raihan et al., 2017). ICT has an effect not only on big companies but on small and medium-sized enterprises as well. There are findings in South Africa that SMEs using ICT have increased productivity, revenue, and efficiency of internal business operations (Mbuyisa & Leonard, 2017). ICT does not only have an impact on firms that use ICT but can benefit the industry or firms that produce it. There are even some industries that do not use or produce ICT but still benefit from the spillover effect of ICT, even though the industry is only connected to profitable bilateral trade (Kim et al., 2021). ICT is not only beneficial for firms; ICT can also boost productivity indirectly through the employees who work for the firms. There are findings in Japan and Korea that ICT can help reduce productivity declines for elderly employees and prolong the working lives of an aging population (Lee et al., 2020).

3.5 The Effect of Exports and Foreign Ownership on Firms in Different Fields

Exports, foreign shareholding, and ICT do affect the productivity of firms. However, this influence cannot affect every industry in every country, such as in China, where there is a finding that since 2008, the productivity of manufacturing firms in China has decreased and exports have experienced barriers to productivity growth. There is a negative relationship between exports and productivity in industries with low energy consumption. In fact, it is supported by export policies carried out by the government if industries that have a high level of foreign capital have a positive relationship between exports and productivity caused by the large amount of processing trade (Jiao et al., 2018). While foreign share ownership, even though two companies have foreign share ownership, the resulting impact is not necessarily the same. There are findings on the influence of foreign ownership that have a different impact on companies that have different fields, such as IT manufacturing companies that have total factor productivity. Higher productivity than in IT service companies means that IT manufacturing companies have higher productivity. This proves that there is significant heterogeneity in the effect of foreign ownership on firms' productivity in different industries (Schiffbauer et al., 2017).

4. Conclusion

The competence of the global economy is increasing in the current era of globalization. Productivity in the long term will be increasingly difficult to ignore. Companies are often more focused on increasing the amount of work done without considering the advantages or disadvantages. So there needs to be an awareness of increasing productivity within the firms. Enterprise productivity can be increased in various ways. One of the three ways to increase it is by exporting, owning foreign ownership and information and communication technology.

Many companies in various countries have felt the positive impact of exports, such as companies in Vietnam and companies in Egypt. Exports can help increase the productivity of companies in both countries, especially those in Egypt that have experienced a significant impact from exports. Like exports, the effect of foreign ownership increases productivity in the manufacturing industry in Turkey by increasing capital accumulation. Technology is in line with theoretical expectations and supports the use of new intermediate goods. Then, after export and foreign ownership, there is ICT, which can help increase firms' productivity. However, unlike exports and foreign shareholding, ICTs can provide benefits that are not limited to the companies that use them.

While exports and foreign equity ownership can have a positive impact on companies in some countries, they may not have a positive impact on every firm in every country. For example, companies in Morocco do not have the impact of increasing productivity by exporting. Or in the US, the presence of foreign ownership does not increase productivity, and in China, domestic companies show that foreign ownership reduces productivity in the short run but increases productivity in the long run.

Not only that, exports and foreign shareholding have different impacts in different fields. As in China, between industries with low energy consumption and industries with high levels of foreign capital, the influence of foreign ownership can have a different impact on IT manufacturing firms that have higher total factor productivity than IT service firms. So, this shows that exports and foreign ownership can have different impacts in different countries and in different fields, whereas ICTs tend not to have different impacts on companies that use or do not use ICTs, even though the industry is only associated with profitable bilateral trade.

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