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The Importance of Interfirm Networks in Enhancing Innovation Capability and Exporting in High-Tech Industry

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Abstract

This study investigates how interfirm networks affect firm performance through a multi-mediation model of innovation capability and exports in the context of high-tech industries in Indonesia as one of the emerging economies. As part of domestic and international business networks, the firm can benefit from various forms, such as being a supplier to another firm in the next value chain, learning external knowledge, resource sharing, and, in turn, increasing firm performance. However, there is no guarantee that firms engaging in the interfirm network will increase their performance through innovative capability and internationalization through exporting activities. This study utilizes the large and medium manufacturing industries 2017 dataset from an annual survey conducted by Statistics Indonesia. We created a total sample of 2,578 firms from 7 industries in Indonesia's high-tech industries based on two-digit International Standard Industrial Classification (ISIC) manufacturing industries. By employing Structural Equation Model (SEM) – Path Analysis, this study found that the interfirm network positively and significantly affects the firm's performance. Meanwhile, a significant but not unidirectional effect was found in the relationship between interfirm networks and innovation capability, as well as innovation capability on firm performance. Export plays an important role in improving the company's performance, either directly or as a mediator. However, the mediating effect of innovation capabilities and export activities on interfirm networks and firms' performance is much smaller than the direct effect of interfirm networks on firms' performance.

Keywords: Interfirm Network; Innovation Capability; Export; Firm Performance; High-Tech Industry.

1. Introduction

Research on interfirm networks and involvement in networks that encourage the internationalization of firms with the concept of sharing knowledge within firms and between firms is increasingly becoming a concern in research with a focus on business economics [1-3]. Previous research has found that networking with multinational companies (MNEs) will become the main source of external knowledge entry [4-5]. Although network theory shows that the opportunities obtained by the firm are the result of the network built by the firm, it is still unclear what kind of network can increase the opportunities obtained by the firm [6] and how the influence of firm internationalization in the form of exports can increase company productivity [7]. Business environment with conditions of uncertainty and instability due to globalization, technological, economic, and social changes, and increasingly fierce competition in the market. In the past, in a less globalized environment, firms could survive with a less dynamic strategy, with a management model based on continuity and activity confined to the domestic market. Companies must continue to adapt every time to compete in the market. The strategy of conducting internationalization is one of the firm's strategies to survive in business [8].

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Internationalization of firms is a process of increasing firm involvement in cross-border international operations, which includes various activities, including export and licensing activities [9]. Internationalization of firms is seen as business organizations that play a prominent role in driving economic growth and creating innovation in the world economy [10]. Resource-based theory (RBT) underlines the importance that a firm must be able to manage its resources well to compete with other firms in achieving competitive advantage with three stages of the life cycle [11] consisting of the introduction stage [12-15], growth stage [16, 17], and maturity stage [18-20]. Studies related to RBT are getting more attention in management science, especially those related to firm performance. Previous research related to this includes studies linking company resources such as the firm's international orientation, technology, marketing, company group affiliations, foreign participation, company size, royalty expenditures, R&D spending, advertising spending, innovation strategy, business strategy, networking, knowledge and expertise, company status, export commitment, type of industry, assets, international experience, IT investment [21-27]. From previous studies conducted in both developed and developing countries, it is evident that research focusing on firms in Indonesia is still very limited, especially for firms in the high-tech industry. Based on a study of previous studies in Indonesia, there are not many studies that discuss how interfirm networks play a role in firm performance. They also did not specifically examine the high-tech industry, even though the measurement of firm performance in this industrial category is very important because it is the main pillar in nation-building. A high-tech industry is an industry with a classification of economic activities based on the use of high-tech processes for inputs such as labor on a STEM (Science, Technology, Engineering, and Mathematical) basis, R&D activities, and the use of high-tech production methods or producing high-tech products as output [28-29].

In the literature on the drivers of firm performance, scholars generally accentuate the direct influence of innovation on firm performance or the direct influence of exports [8, 26]. Previous studies have mainly focused on interfirm networks, innovations, and exports as separate factors affecting firm performance, leaving the effects of all these factors interacting with each other relatively unexplored (see Figure 1). Less attention has been paid to the role of innovation and exports in mediating the effect of interfirm networks on firm performance. This study wants to explore further whether the influence of the interfirm network on firm performance will have more impact if the firm is also actively innovating and carrying out export strategies. This topic is increasingly important in developing countries due to the growth in both the complexity of expanding market share and the firm growth that requires knowledge creation through generating, transferring, and acquiring new knowledge.

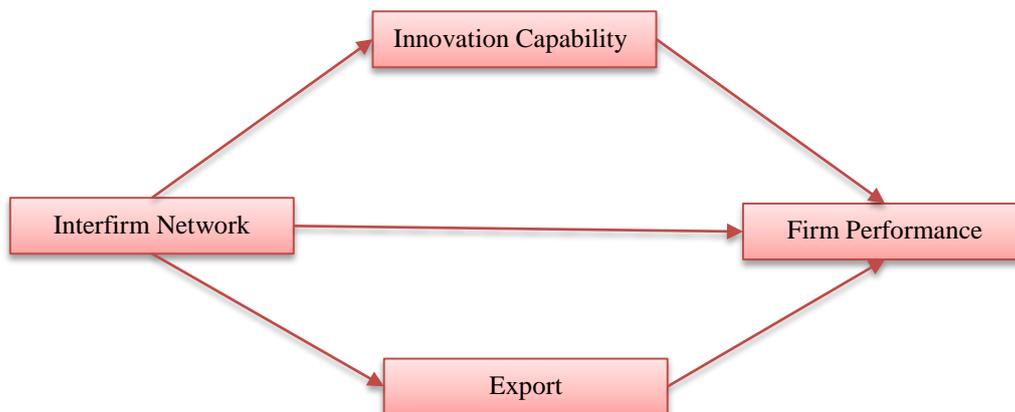


Figure 1. Interfirm Network, Innovation Capability, Export, and Firm Performance Model

The major purpose of this paper is to examine the effect of a firm's involvement in the network on firm performance by looking at the mediating role of innovation carried out by firms and export activities in Indonesia's high-tech industry. Based on the Scopus database, there is very limited research that focuses on the high-tech industry in Indonesia. Specifically, that uses a database on large and medium manufacturing firms based on the industrial survey 2017 enumerated by Statistics Indonesia [30], including the limited research evidence that addresses the role of a firm's involvement in business networks. This condition opens opportunities for research on this topic, enriches existing theories, and contributes to decision-makers on how to advance firm performance within the high-tech industry in Indonesia.

2. Theory and Hypothesis Development

2.1. Interfirm Network and Firm Performance

Interfirm network as a corporate strategy to obtain tangible and intangible benefits for the firms can be seen in the form of firms' involvement in the network carried out in value chain activities. Previous research has shown that involvement in the value chain can increase firm performance [31-33]. The rationale of learning by the interfirm network

is that firms involved in the network will benefit in the form of getting new knowledge from outside, both domestically and internationally, through knowledge and technology transfer, information of the foreign market, being a supplier to other firms in the value chain etc. Liu et al. (2021) [34] argue that the relationship with the firm's business partners in the production process that involves the value chain with a network of foreign firms has a positive impact on increasing the internationalization of the firms. In developing countries contexts with relatively weaker institutions, firms do not tend to invest significantly in technology and innovation. Instead of creating radical innovation that costs a lot of money in terms of research and development expenditure, firms tend to be part of the local and global value chain. As a form of interorganizational network, business groups have produced relational benefits between affiliated companies by creating technological and managerial capabilities [24]. The presence of business groups as inter-organizational networks depends on the company's internal, unique, and specific capabilities. Meanwhile, the strength of the network in encouraging the improvement of company performance is comparable and as important as increasing the company's competitiveness from the company's R&D activities [34]. Therefore, with Indonesia's high-tech industry as a developing country as a context, hypothesis 1 is as follows:

Hypothesis 1: Interfirm network will have a positive and significant impact on firm performance.

2.2. Increasing Firm Performance through Interfirm Network and Innovation Capability

Several studies related to firm performance and the factors that influence it have been carried out. It can be distinguished from external factors and internal factors. The factors in question include ownership, firm resources, technology, innovation made by the firms, and other factors such as the characteristics of the firm's operations [35-36]. Internal and external factors that affect performance are suggested to be further developed and considered as potential mediators for measuring firm performance [25]. The firm's decision to enter the global market is a strategic decision that requires consideration of the benefits and costs of this decision. The physical distance approach explains that firms entering new markets are usually carried out in stages, starting from culturally close markets to broader markets. Based on this approach, research was conducted on company involvement in the domestic value chain as a stepping stone to global involvement [37].

Another factor that drives the firm's performance can also be seen in terms of the innovations carried out. Innovation is a factor that drives economic growth, increases competitiveness and increases firm productivity in both developed and developing countries [38]. Although firms in developing countries operate under technological limitations with low managerial levels and production skills, every firm innovation has an important role in company development [39]. Innovation is important for a firm's export performance only if the firm operates in a highly competitive environment and when consumer needs are highly dynamic [40]. Innovation capability is needed by firms to compete internationally and needs to be supported by the strength of the firm's capital and the exported high-tech products [41]. With an approach to see how involvement in this firm network can affect the firm's innovation and will also ultimately affect the firm's performance, therefore the hypotheses are as follows:

Hypothesis 2a: Interfirm network will have a positive and significant impact on innovation capability

Hypothesis 2b: Innovation capability will have a positive and significant impact on firm performance

Hypothesis 2c: Innovation capability mediates the relationship between interfirm network and firm performance

2.3. Increasing Firm Performance through Interfirm Network and Export

To compete internationally, it is necessary to be supported by the strength of the firm's capital and the high-tech products being exported [41]. Involvement in corporate networks can be linked to the firm's export activities [42]. Firms generally start the internationalization process by exporting. Firms with limited experience and resources in the early stages of internationalization usually rely on network capabilities. Therefore, building a network is important in the early stages of the internationalization of the firm. In the international business environment with many risks and uncertainties, making the ability to build networks is critical to dealing with volatile circumstances [43].

Export activities as part of the firm's internationalization reflect the firm's decision to participate in the global market but do not reflect the allocation of added value in the firm's production chain [44]. Exports are expected to increase the achievement of firm performance. From research conducted in Indonesia on the manufacturing industry listed on the Indonesia Stock Exchange from 2012 to 2016, exports had a significant positive impact on firm performance based on the achievement of the firm's historical targets [45]. However, other studies have found the negative effect of exports on firm performance due to the costs of internationalization that arise [46].

Departing from previous research where the role of exports still produces different effects on firm performance, therefore the hypotheses are as follows:

Hypothesis 3a: Interfirm networks will positively and significantly impact export.

Hypothesis 3b: Export will positively and significantly impact firm performance.

Hypothesis 3c: Export mediates the relationship between interfirm network and firm performance.

3. Data and Variables

3.1. Study Context and Data

The high-tech industry in Indonesia was chosen as the study context because it is the mainstay of economic growth and is the focus of development, as indicated in the 2020–2024 National Mid-Term Development Plan [47]. The high-tech industry is also the focus of the Making Indonesia 4.0 roadmap launched by the government to enter the era of the industrial revolution 4.0 by focusing on five main sectors, namely food and beverages, textiles, and clothing, automotive, chemical, and electronics. Three of the five primary sectors, namely automotive, chemical, and electronics, are considered high-tech industries. Given the importance of this industry in Indonesia, however, it turns out that only a few studies have focused on this area, especially those investigating the influence of interfirm networks, innovation, and exports on firm performance. According to Tse et al. (2017) [48], firms in developing countries generally need to learn a lot from companies in developed countries. The high-tech industry in Indonesia also needs to have a strategy for building strong networks between companies both at home and abroad and improving mastery of technology and other managerial aspects. Liu et al. (2021) [34] state that the strength of the network in encouraging the improvement of firm performance is comparable and as important as increasing the company's competitiveness from the firm's R&D activities. Therefore, with the importance of interfirm networks in strengthening firms, there is a need to investigate the role of these networks in supporting the performance of the high-tech industry.

This study utilized secondary data on medium and large manufacturing industries in 2017 taken from official government publications, *Statistics Indonesia* [30]. It is a cross-sectional data enumerated for 2017, but it was just issued in 2020 whose classification of the manufacturing industry is based on the number of workers in the company. As one-shot cross-sectional data, it is only taken once in a certain period which is used to answer research questions [49–53]. This data source has been widely used in other studies and is proven reasonably and reliable [7, 5, 54].

The population of Indonesia's manufacturing industries in 2017 was 33,577 firms [30], whereas the number of firms in the high-tech industry was 4,903, which is 14.6% of total manufacturing industries in Indonesia. It consists of 7 industries based on two-digit International Standard Industrial Classification (ISIC) manufacturing industries, namely chemical, pharmaceuticals, computer, electronic and optical products, electrical equipment, machinery and equipment, motor vehicles, trailers, and semi-trailers, as well as other transport equipment. After cleaning the data and omitting missing data for each variable, the final sample was 2,578 firms, 52.5% of total high-tech industries in Indonesia and 7.7% of Indonesia's manufacturing industries. This data was also used in previous research on technological capabilities derived from the firm's royalty expenditures and foreign ownership [55].

3.2. Dependent Variable

Firm Performance (FP)

Following previous research in the field of management and economics, this research uses firm performance as the dependent variable in measuring performance in the form of company productivity using company value-added data [8]. Research on Indonesia's case that was utilized this data was also utilized value-added as a proxy for firm performance. Adopting research from Venkatraman and Ramanujam (1986) [56], in this study, firm performance is defined as the result of the firm's ability to achieve its goals by using its resources to increase the firm's competitiveness, where performance measurement is through the firm's value-added obtained from the added value of output by deducting input costs.

3.3. Independent Variable

Interfirm Network (INF)

We measure the interfirm network by using the firm's revenue from industry services both domestically and abroad [30]. In the context of the manufacturing industry, the interfirm network is defined as involvement in corporate networks in the form of being part of the inter-firm production process, which has the effect of strengthening the firms with wider access to resources [34]. The data is in the log-transformed.

Innovation Capability (IN)

We measure innovation capability using a dummy measurement by giving 1 for innovative firms and 0 for the opposite [57]. The innovations carried out can be in the form of product innovation [58], process innovation [59], marketing innovation, and organizational innovation. In the context of the manufacturing industry, innovation is highly correlated with new insights, technological improvement, and business development [48]. BPS-Static Indonesia [30]

provides data on whether firms do innovation in product, process, marketing, and organization in that year. We sum up the frequency of each company that innovates in each area so that if the company does not innovate, then 0, while if it innovates in all areas, the value is 4.

Exports (EX)

Following research from Sala-Rois et al. (2020) [8] and Ni and Kurita (2020) [51], we use a dummy measurement by giving 1 for the firm doing the export and 0 otherwise. This export information is obtained from the status of the exported production, whether it is exported alone or by other parties [30]. Export is defined as the firm's international trade activities by utilizing existing production capacity and maximizing the firm's profit level through the global market so that it can support the firm's growth. Through exports, which are part of the firm's internationalization, firms can increase their competitiveness, especially in terms of management expertise and technological capability [60].

3.4. Control Variable

Dummy Industry

We include six dummy industries based on ISIC by giving 1 for firms that include in certain industries within high-tech industries and 0 for the others. There is 7 type of industries in high technology industries, namely chemical and chemical products (ISIC 20), pharmaceuticals (ISIC 21), computer, electronic and optical products (ISIC 26), electrical equipment (ISIC 27), machinery and equipment (ISIC 28), motor vehicles, trailers, and semi-trailers (ISIC 29), as well as other transport equipment (ISIC 30). We use ISIC 20 as a reference.

Productivity

We measure productivity by the amount of production produced by the firm. We use log-transformed firm's productivity to control for firm's capital size.

Number of Employees

Similarly, we use log-transformed number of employees to control for firm size [61]. Large employee numbers result in a large capital value [48].

3.5. Estimation Method

This study uses a quantitative approach with the method of Structural Equation Modeling (SEM) – Path Models. Quantitative data analysis in this study consisted of 2 parts: descriptive data analysis and SEM – Path Model. Descriptive data analysis is used to provide an overview of the data in general and simplify large amounts of data in the form of summaries and measurements in the form of tables, graphs, or diagrams. The path model, also known as path analysis, is used to determine the effect of exogenous variables on endogenous variables. There is a direct and indirect effect where the variable is an observed variable. SEM - Path This model is widely known and widely used in research in economics, business and other social sciences where the variables are observed, not latent [62-64].

The formulation of the model is carried out in multimediation model approach to examine the direct and indirect effects of the independent variables on the dependent variable or through more than one mediator. One approach to computing the indirect effect of the hypothesis is by using method of product of the coefficients. This method calculates the indirect effect by multiplying the regression coefficients of the path. Further, we do this step for each of the mediator variables in the model. Thus, we use the coefficients for each of the mediator variables in the model. Testing is done using *Stata Software*. We obtain the necessary coefficients using the *Sureg* (seemingly unrelated regression) command.

3.6. High-Tech Industry in Indonesia

We classify firm in High-Tech Industry if the production process of a product involves high technology like STEM (Science, Technology, Engineering, and Mathematic) labor, research and development intensity, and high technology production method [28]. Based on two-digit ISIC, the high-tech industry involves 7 (seven) industries are Chemicals and Chemical Products (ISIC 20), Pharmaceuticals (ISIC 21), Computer, electronic and optical products (ISIC 26), Electrical equipment (ISIC 27), Machinery and equipment (ISIC 28), Motor vehicles, trailers, and semi-trailers (ISIC 29), and Other transport equipment (ISIC 30).

Based on Statistics Indonesia, there were 33,577 firms in the large and medium manufacturing industries in 2017. Figure 2 shows the distribution of the manufacturing firms based on 2 digit ISIC that is the largest number of firms is from the Chemicals and Chemical Products industry (ISIC 20) with 7,507 firms. Meanwhile, the smallest number of firms is Coke and the refined petroleum products industry (ISIC 19).

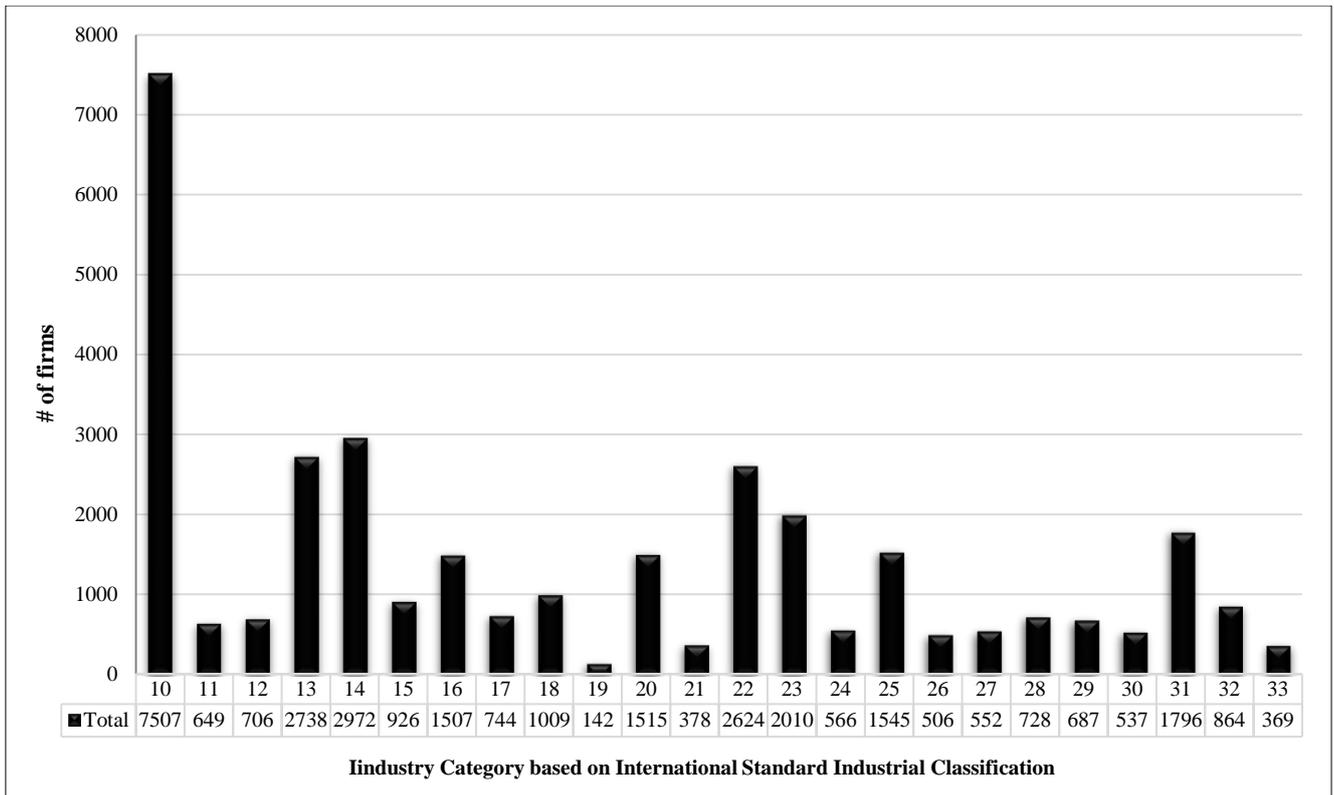


Figure 2. Number of large and medium manufacturing industries based on 2 digit ISIC

Based on Figure 3, it can be seen that most of the developing industries in Indonesia are dominated by low technology industries (Low Technology Industries), as many as 22,239 companies out of a total of 33,577 companies (66%). The second-largest position is the medium-tech industry with 6,435 firms (19%), and the least is the high-tech industry with 4,903 (15%). Although the number of firms in the high-tech industry is only 15% of the total manufacturing firms in Indonesia, the output contribution given by this industry is 30% of the total output of all large and medium manufacturing industries. The output contribution of the high-tech industry is higher than the medium-tech industry (the output contribution of medium-tech is 16%, and the low-tech industry is 54%).

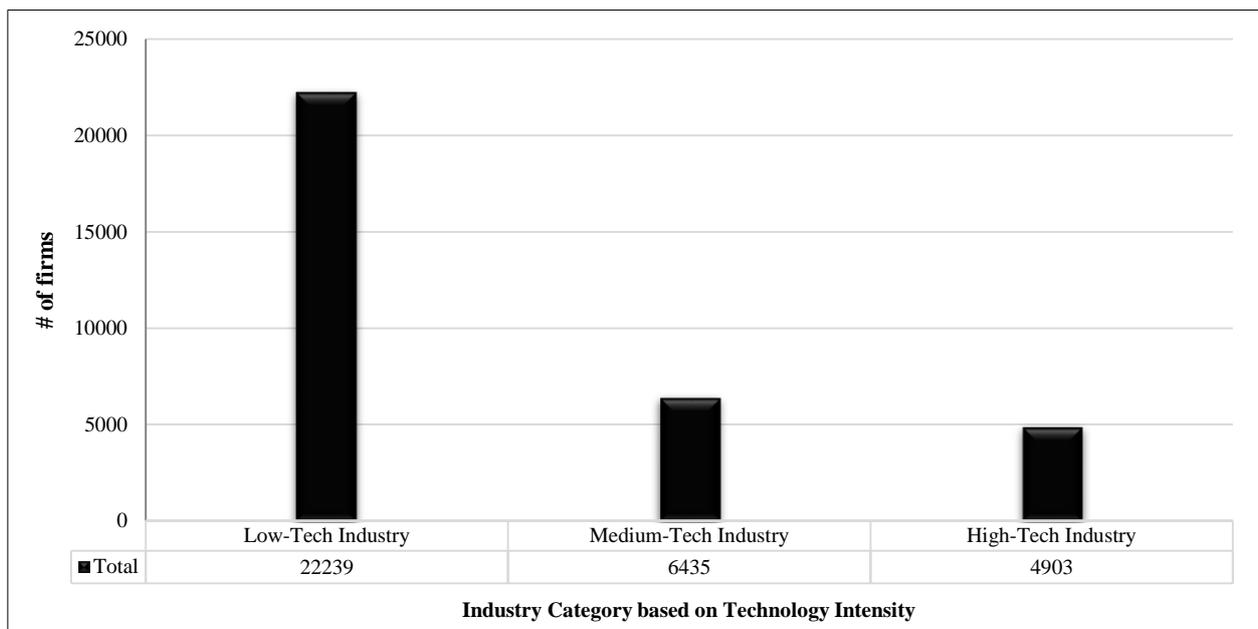


Figure 3. Indonesian manufacturing industry based on technology intensity

Figure 4 shows from 4,903 firms in the high-tech industries, the largest number of firms is from Chemicals and Chemical Products industry (ISIC 20) with 1,515 firms. Meanwhile, the smallest number of firms is Pharmaceuticals

(ISIC 21). There are 3 type of industries out of total 7 type of industries in the high-tech industry which are the main focus of Making Indonesia 4.0 roadmap as Indonesia's strategy towards the Industrial Revolution 4.0 (Chemicals and Chemical Products, Computer, electronic and optical products, Motor vehicles, trailers, and semi-trailers).

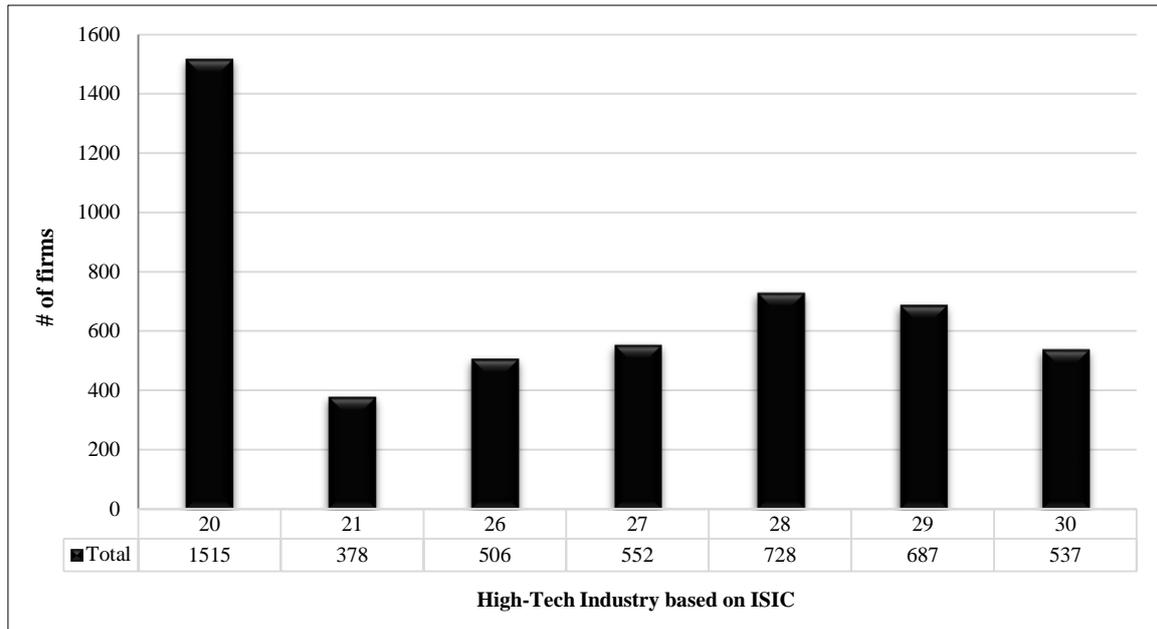


Figure 4. Indonesia's High-tech industry 2017

4. Results

Table 1 below shows a summary of statistics and correlation matrix. The correlation between variables displays the results according to research expectations. Table 2 presents the summary of the hypothesis testing path model to answer hypotheses 1, 2(a, b, c), and 3(a, b, c).

Table 1. Descriptive Statistics and Correlations

	1	2	3	4
Firm Performance	1.0000			
Interfirm Network	0.6603	1.0000		
Innovation Capability	0.5995	0.4115	1.0000	
Export	0.4344	0.4107	0.5844	1.0000
<i>M</i>	17.7029	15.1719	0.6190	0.1241
<i>SD</i>	1.6265	2.2856	1.1832	0.3297
Min	12.5148	7.4759	0	0
Max	23.8772	22.1304	4	1

Note: N = 2578. All control variables are included.

Table 2. Summary of Hypothesis Testing Path Model

Hypothesis	Relationship	Coef.	Std. Error	z-values	95% Conf. Interval
H1	IFN → FP	0.3530	0.0091	38.73	0.3351 0.3709
H2a	IFN → IN	0.1639	0.0107	15.23	0.1428 0.1850
H2b	IN → FP	0.2237	0.0169	13.20	0.1905 0.2569
H2c	IFN → IN → FP	0.0366	0.0036	9.98	0.0294 0.0438
H3a	IFN → EX	0.0402	0.0032	12.45	0.0338 0.0465
H3b	EX → FP	-0.5148	0.0564	-9.12	-0.6254 -0.4041
H3c	IFN → EX → FP	-0.0207	0.0028	-7.36	-0.0262 -0.0151

Note(s): FP = Firm Performance; IFN = Interfirm Network; IN = Innovation Capability; EX = Export.

All hypotheses are significant at the 1% level. All control variables are included.

The results show a positive and significant effect of the interfirm network on firm performance (0.3530, $p < 0.01$), where there is a very strong influence of the firm network; therefore, hypothesis 1 of the study is supported. The relationship between interfirm networks on innovation capability shows a positive and significant effect (0.1639, $p < 0.01$), which also supports hypothesis 2a of the study. The same result is also shown by the relationship between innovation capabilities on firm performance, supporting hypothesis 2b. Indirect effects of innovation capability mediate the relationship between interfirm network and firm performance show a positive and significant effect (0.0366, $p < 0.01$), so hypothesis 2c is also accepted. From the comparison between direct and indirect effects, the direct effect has a greater impact than the indirect effect in testing hypothesis 1 (0.3530) compared to hypothesis 2c (0.0366).

The relationship between the interfirm networks on the export shows a positive and significant effect (0.0402 $p < 0.01$), so hypothesis 3a is accepted. The next hypothesis was built by looking at the direct effect of export on firm performance, with the result negative and significant (-0.5148, $p < 0.01$), which means there is a unidirectional effect between export on firm performance. Because the hypotheses are two-tailed tests, so hypothesis 3b is still accepted. And the final hypothesis is the effect of the interfirm network on firm performance and mediated by export, showing that there is a negative and significant effect of -0.0207 (0.0402 \times -0.5148) with $p < 0.01$, so this supports hypothesis 3c with two-tailed tests approach.

The total indirect effect of hypotheses 2c and 3c is 0.0159 (0.0366 - 0.0207) with $p < 0.01$ significant level. The results above suggest that from two of the separate indirect effects and the total indirect effect are significant. We found that the roles of these two mediators (innovation capability and export) are different. The innovation capability variable directly influences firm performance that is greater than when this variable is placed as a mediator. Meanwhile, export as an independent variable and a mediator has a negative and significant influence. It turns out that exports have a negative greater influence on firm performance when placed as an independent variable.

5. Discussion

The statistical testing from the high technology industry sample shown above proves that this research is in line with previous research related to the influence of the Interfirm Network on Firm Performance. One of the previous studies stated that companies involved in interfirm networks in the form of value chains have performance that outperforms other companies [32]. The relationship between the Interfirm Network and Firm Performance also gives positive results if the network coverage is both domestic and global, where external involvement provides learning and adaptation opportunities to the new environment for the company, including increasing the company's management capacity [65]. Several other studies also suggest a positive impact on the firm's involvement in the value chain, such as the capacity building of the company, because there are opportunities to access knowledge from external markets and opportunities for company expansion [66, 67].

The role of the Interfirm Network on Innovation Capability, which in this study shows that the effect is positive, proves that involvement in interfirm networks can increase innovation by learning from other firms in the network. Innovation capability also supports the improvement of firm performance. In the relationship between the role of the interfirm network and firm performance, innovation also plays a positive role as a mediator. Previous research related to innovation stated that company innovation in terms of management innovation and technological innovation contributed positively and significantly to sustainability and firm performance [68], whereas if the company had an effective Innovation Capability management, it would produce better outcomes so that will lead to the result in better performance as well [69]. Other studies have also proven a direct and positive relationship between innovation in broader dimensions such as product, marketing, and organizational dimensions and firm performance [70].

From the export aspect of the firm, this research proves that involvement in the interfirm network encourages an increase in exports by the firm. Regarding the relationship between the interfirm network and firm performance, it turns out that exports have a negative mediating role, as well as a direct influence from exports on firm performance. The results of this study are contrary to previous research. Previous findings state that export activities encourage the growth of firm performance [8]. Firms that carry out high export activities will also get high profits so that they can improve firm performance on an ongoing basis [71]. Research conducted by Munch and Schaur (2018) [72] states the findings that export activities increase company sales, add value, and labor. The positive influence of exports on firm performance is also reinforced by the findings of Debicki et al. (2020) [73]. Thus, further research is needed to find out why it is getting bigger involvement in exports reduces firm performance. The costs that need to be paid by the firm when exporting need to be considered with the transaction cost theory approach [74].

Put Indonesia's high-tech manufacturing industries into context, and there are worth discussing. The involvement of Indonesian firms in the interfirm networks increases export activity and innovation capabilities while reducing the impact of losses on firm performance when they decide to export directly. This has three strategic meanings. First, Indonesian high-tech firms must be encouraged to engage in interfirm networks to increase innovation and export capabilities. However, the mediating effect of innovation capabilities and export activities on interfirm networks and firms' performance is much smaller than the direct effect of interfirm networks on firms' performance. This shows that

Indonesian high-tech firms have not been able to compete in the international market, so if they decide to export directly, the company will lose out. This is in line with previous studies that found the costs of internationalization in the form of exports have a negative effect on firm performance [46].

Second, involvement in the interfirm networks by providing industrial services has succeeded in reducing the impact of losses if the firm decides to export. However, export mediation is still negative compared to the direct effect of a firm's involvement in the interfirm network to increase firms' performance. Overall, these findings show the significance of the characteristics of Indonesian high-tech companies, namely the focus on increasing involvement in the interfirm networks or being part of the value chain of other domestic and global firms and focusing on innovation activities to improve firm performance. The firm's strategic approach can also be carried out in stages, from domestic to global network involvement [37], so that in the end, exports can encourage the internationalization of the firm, and the firm's performance will increase [75].

Third, Indonesian firms in the high-tech industry already have good performance by being involved in interfirm networks. They already have a sufficient base of innovation capabilities to meet the needs of industrial services in other firms in the network, most of which are domestic firms. This innovation capability base needs to be improved, while the orientation of Indonesian high-tech firms, in general, is still to meet the domestic market's needs or provide manufacturing services to other companies that export. This finding is very important for the government, firms, and foreign investors in relation to the strategy for developing the high-tech industry in Indonesia and the overall structure of the industry. In addition, for firms, these findings can be used to determine the right and most profitable firm strategy to strengthen firms' networks, develop innovation capabilities, and decide on exports. For foreign investors, they can consider the priority of making Indonesian firms in the high-tech industry a production base to meet the needs of the global production network and the vast Indonesian domestic market [76, 77].

6. Conclusion

This study has successfully investigated how the concept of the interfirm network affects firms' performance in developing countries in the form of multi-media mediation through innovation capability and export. This study has shed light on the advancement of the role of the interfirm network as a key corporate strategy to obtain tangible and intangible benefits for firms in developing country contexts, especially in Indonesia's high-tech industries with all 7 ISIC industries. The involvement of Indonesian firms in the interfirm networks increases export activity and innovation capabilities while reducing the impact of losses on firm performance when they decide to export directly. The firm's involvement in the interfirm network carried out in value chain activities is evidence of the importance of network resources that strengthen the Resource-based Theory and Relational View. The rationale behind interfirm networking is that firms involved in interfirm networking will benefit from knowledge from outside, both domestically and internationally, for instance, in the form of knowledge and technology transfer. The results of this study are in line with previous research related to the positive and significant influence of the interfirm network on firm performance.

Meanwhile, this research also contributed to knowledge by clarifying that the important role of innovation capability can be seen from the positive influence shown when mediating the relationship between the interfirm network and firm performance. However, regarding the role of exports for firms, it needs to be studied further, especially in developing countries. Some limitations of this research are as follows: First, the sample only comes from one year, so it would further improve the quality of research if the sample could be increased to panel data with the latest data from 2021. This fact has conditioned the depth of the analysis. Second, the data comes from secondary data, so it needs to be complemented by interviews with business actors in related industries so that the research can provide a more comprehensive picture.

7. Declarations

7.1. Author Contributions

Conceptualization, N., T.N.M., B.S. and A.B.; methodology, N., T.N.M. and A.B.; writing—original draft preparation, N.; writing—review and editing, N. and T.N.M.; supervision, T.N.M., B.S. and A.B. All authors have read and agreed to the published version of the manuscript.

7.2. Data Availability Statement

The data presented in this study are available in the article.

7.3. Funding

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7.4. Institutional Review Board Statement

Due to the agreement of use with Indonesia's official institution of statistics, the dataset used in this study, which consists of the royalty value, the local and international services value, and the total value added, is limited for research purposes only.

7.5. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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