

How Internal Capability Matters in Increasing Firm Performance? An Empirical Analysis of Interfirm Network in Indonesia's High-Tech Industry using Multi-Mediation Model

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Abstract: - This study aims to determine the different effects of the multi-mediating role of innovation capability, foreign ownership, export, and royalty expense in the firm's network on the performance of Indonesia's high-tech firms. This study uses data from the high-tech industry with a total sample of 2,578 firms from the Indonesian Central Statistics Agency. The study results prove that there is a positive and significant effect of the Interfirm network on firm performance. The interfirm network also positively and significantly influences Innovation Capability, Export Participation, Foreign Ownership, and Royalty Expense. Innovation capability and foreign ownership as part of internal capability also positively and significantly influence firm performance both directly and as a mediator. However, external capability has a negative influence as shown by exports and royalty expenses on firm performance, either directly or indirectly, as a mediator. Internal capability has an important influence on firm performance compared to external capability. Firms should have internal knowledge transfer rather than depending on the market. Innovation capability has the best mediating role compared to other mediating variables and the best strategy that the firm can do is to implement an interfirm network strategy in maximizing the firm's performance. Thus, the study results provide input to firms in the high-tech industry to optimally utilize their interfirm network to optimize firm performance. Further research is needed to see the effect of each type of industry in the high-tech industry and outside this industry.

Keywords: - Interfirm network, firm performance, innovation capability, foreign ownership, export, royalty expense, High-tech industry.

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1 Introduction

The importance of networking both within the firm's internal and inter-firm networks is an interesting concern for research. The presence of this network is expected to open opportunities to improve firm performance in the form of opportunities for access to external resources and knowledge. Increased involvement in the interfirm network is expected to drive the firm's innovation by utilizing the resources and knowledge of the network where the firm is

located, [1]. The presence of the network also increases the capabilities of the participating firms that the firm obtains through learning, [2], [3], [4]. The firm's network opens opportunities for firms to increase their learning abilities and absorptive capacity, [5]. This capacity is obtained by firms participating in the network through knowledge dissemination and collective learning, which can accumulate knowledge from various sources, thereby increasing the absorptive capacity of the

firms involved. Given the various advantages that interfirm networks have brought to the attention of firms, there is increasing interest in the formation, structure, and performance of interfirm networks, [6], [7].

Research in strategic management has a long history of using the resource-based view of the firm (RBV) to explain differences in firm performance, [8], [9]. Previous research related to this topic includes studies that discuss about firm resources such as the international capability of firm, technological capability, marketing resources, group affiliations, foreign investor, firm size, royalty expenditures, R&D spending, advertising spending, innovation capability, business strategy, networking, knowledge and expertise, firm status, export commitments, type of industry, assets, international experience, IT investment, [10], [11], [14], [15], [16].

From research focusing on firm resources in optimizing the achievement of firm performance [12],[13], study with a focus on firms in Indonesia is still very limited, especially in the high-tech industry. According to US statistical agencies 2004, High-tech industry is an industry with a classification of economic activities based on the use of high-tech inputs such as labor on a Science, Technology, Engineering, Mathematics basis, R&D activities, and the use of high-tech production methods or producing high-tech products as output, [17]. The high-tech industry in Indonesia is one of the industries that are the mainstay of economic growth and is the focus of development as stated in the 2020-2024 National Medium-Term Development Plan, [18].

This study aims to determine the condition of the high-tech industry in Indonesia by conducting an empirical analysis of the effect of firm involvement in the network on firm performance by looking at the multi-mediating role of innovation capability, foreign ownership, export, and royalty expense. This study uses a dataset in the large and medium scale manufacturing industry, which is the result of a survey by the Indonesian Central Statistics Agency, a statistical agency that carries out the duties of the Indonesian government in the field of statistics in accordance with applicable laws and regulations. To our knowledge, there is still very little research focusing on the high-tech industry in Indonesia, including the limited research evidence that addresses the role of corporate involvement in business networks. This condition opens opportunities for research on this topic and enriches existing theories.

2 Theory and Hypothesis Development

This study conceptualizes how firms have better performance by engaging in interfirm networks. The firm's participation in the Interfirm network will also encourage firm innovation, attract foreign investment, enter international markets through exports, and transfer technology through royalty spending. This is in line with the resource-based theory, which states the importance of firm resources in supporting firm performance. The main source of firm competence is firm capability, while the source of the firm's capabilities are the resources owned by the firm. Utilization of firm resources in improving firm capabilities can be divided into 2 parts, consisting of internal capability and external capability. Internal capability is a capability that is built based on the firm's resources such as the ability to innovate, and foreign ownership that affects corporate governance and the newest technology is brought into the firm. Meanwhile, external capability is a capability that is built based on the availability of technology in the market, which can be obtained through royalty payments and strategic activities such as exporting.

In encouraging the improvement of the firm's capabilities, both internally and externally, the firm can cooperate with other firms to create added value known as the interfirm network. The concept of interfirm network focuses on the process of creating shared value in the network between the firm and external firm. So, firms need to participate in interfirm networks to encourage innovation capability, foreign ownership, export, and royalty expense, which will optimize the firm's performance achievement in winning the business competition. Figure 1 shows the theoretical framework research model. This study proposes a research hypothesis to seek empirical justification based on the literature review.

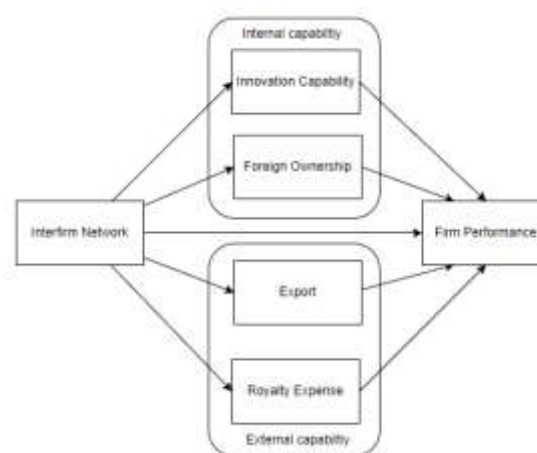


Fig. 1: Theoretical framework

Firms that collaborate on networks have a great opportunity to benefit from utilizing the network in various ways. They not only share the costs and risks of their activities but also gain access to new markets and technologies, complement each other's skills, and share knowledge, [19], [20], [21], in their research findings, it is stated 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 firm. This study investigates how the concept of an Interfirm Network affects local firms in developing countries. Business groups as strength due to the presence of networks were also stated in previous research, [16], which explained that business groups as a form of the inter-organizational network had produced relational benefits between affiliated firms by creating technological and managerial capabilities. The presence of business groups as a network between organizations depends on the firm's internal capabilities, unique and specific capabilities. The same thing was also expressed by J. Liu et al., [22], who stated that the strength of the network in encouraging the improvement of firm performance is comparable and as important as increasing the firm's competitiveness from the firm's R&D activities. Based on the literature above, a hypothesis is built in this study with a research context approach to the high-tech industry in Indonesia as a developing country.

H1. Interfirm Network has a positive and significant impact on Firm Performance.

The importance of interfirm networks to innovation, [23] requires more profound research on interfirm networks and their effects on knowledge formation processes and learning outcomes, [24]. Many studies investigating the relationship between knowledge transfer and interfirm networks, [23], [25] have focused on knowledge transfer mechanisms across interfirm, [26]. For firms involved in internationalization strategies such as export, the firm's relationship with other firms in a network becomes very important. It has excellent value for benefits, such as gaining access to additional resources and expanding markets, [27]. Multinational firms focus on creating solid networks with local firms and are oriented to a broader network that can expand the firm's export prospects, [28]. Thus, the opportunity to gain access to knowledge resources can facilitate knowledge transfer and therefore expand the firm's export opportunities, [21]. Research by looking at how the interfirm network will affect the firm's royalty

expenditures has also not been widely carried out. Previous research related to royalty expenditures only shows that royalty expenditures significantly affect a firm's export competitiveness, [29]. Previous research has also seen the importance of ownership and internationalization in the firm's sustainability, [30]. Thus, further research is needed to understand how networking between business partners can affect innovation capability, export, foreign ownership, and firm royalty expense.

H2a. Interfirm Network has a positive and significant impact on Innovation Capability.

H2b. Interfirm Network has a positive and significant impact on Export Participation.

H2c. Interfirm Network has a positive and significant impact on Foreign Ownership.

H2d. Interfirm Network has a positive and significant impact on Royalty Expense.

Regarding firm innovation, previous research stated that management innovation and technological innovation contributed positively and significantly to sustainability and Firm Performance, [31]. However, other empirical research related to innovation shows that the Innovation Capability of firms in developing countries has less role in supporting the internationalization performance of firms. The effect of innovation is positive but not significant, [32]. Yi, et al., in their research in the manufacturing industry, stated that this relationship could not be generalized but depends on the internal management of the firm itself, [33]. Innovation research is increasingly being investigated, especially in Asian countries, [34]. This hypothesis was built to determine the relationship between innovation capability and firm performance in developing countries.

H3. Innovation Capability has a positive and significant impact on Firm Performance.

In terms of export influence, the firm's export growth has a positive and significant impact on Firm Performance. This explains that firms that carry out high export activities will also get high profits so that they can improve Firm Performance on an ongoing basis, [35]. Research conducted by Munch and Schaur stated the findings that export activities increase firm sales, added value, and labor, [36]. For SMEs, the increase in value added is three times higher than the direct cost of exports. Based on research at the Spanish Manufacturing firm, Firms that carry out export activities are more productive, more developed and have more prosperous employees than firms that do not export. Export

activities drive Firm Performance growth, [37]. Thus, H4 is stated as follows.

H4. Export Participation has a positive and significant impact on Firm Performance.

Research related to firm ownership by Rashid (2020) suggests that Foreign Ownership in a firm has a significant positive influence on Firm Performance, both measured in terms of financial and market value. Zandi et al also strengthen this finding with their research which states a positive relationship between internal ownership structure and external ownership, including Foreign Ownership and Firm Performance, [39]. However, research focusing on high-tech industries has not been able to find references that discuss this matter. Thus, H5 is stated as follows.

H5. Foreign Ownership has a positive and significant impact on Firm Performance.

Regarding Royalty expense, F. J. Lin & Lai (2020) , in their research on the key factors influencing Technology Capability with the construct of knowledge sharing, enrichment of employee knowledge, cooperative relationships, innovation, and government support, proves that Technology Capability can improve Firm Performance. Research conducted by Y. Chen, Vanhaverbeke, & Du resulted in findings that internal research and development activities and external sources of knowledge have a positive influence on Firm Performance, [41]. The strength of this capability also increases influence in value chain engagement and corporate networks. With the incorporation of technological capability sources, both external and internal knowledge is fundamental in industry in developing countries. With the high cost of access to technology in developing countries, the expenditure of corporate royalties is a crucial thing to consider. Therefore, the following hypothesis was built.

H6. Royalty Expense has a positive and significant impact on Firm Performance.

The need for a deeper understanding of how firms search and combine various sources of knowledge has become a major concern today, [42]. Likewise, the recognition of the importance of the network as a source of obtaining the firm's competitive capabilities has received recognition in various studies, [43]. Referring to previous research where royalties are used as a basis for measuring the increase in firm knowledge and technology obtained from external sources, the study conducted by Mursitama (2006) stated that the effect of royalty expenditure as a form of technology transfer from external to Firm Performance is highly dependent

on firm's internal resources, [16]. In this study, royalty expenditure is used as a proxy for the firm's Technology Capability. Other research also states that the firm's Technology Capability is positively related to performance. Firms with high technology Capability tend to cooperate with external partners in firm development, while firms with lower Technology Capability tend to choose internal development, [44]. In addition, there are also findings that Technology Capability affects Firm Performance indirectly through the firm's innovation practices, [45]. The factors that mediate the relationship between the interfirm network and firm performance are interesting to study, especially in developing countries, because not much has been done, so the following hypothesis is built.

H7a. There is a mediating effect of Innovation Capability on the relationship between Interfirm Network and Firm Performance.

H7b. There is a mediating effect of Export Participation on the relationship between Interfirm Network and Firm Performance.

H7c. There is a mediating effect of Foreign Ownership on the relationship between Interfirm Network and Firm Performance.

H7d. There is a mediating effect of Royalty Expense on the relationship between Interfirm Network and Firm Performance.

3 Data and Variables

3.1 Study Context and Data

This research was conducted using data from the high-tech industry in Indonesia as a study context where the high-tech industry in Indonesia is one of the industries that are the mainstay of economic growth and is the focus of development as stated in the 2020-2024 National Medium-Term Development Plan, [18]. From the Making Indonesia 4.0 roadmap there are 3 (three) of five main sectors classified as high-tech industries, namely industry of automotive, chemical, and electronics. In line with the research by Tse, Yu and Zhu, [46] where firms in developing countries still need to learn from firms in developed countries, the high-tech industry in Indonesia needs to develop strategies to strengthen networks between firms to get better management and technology transfer. Liu, et al states that the strength of the network between firms plays an important role in improving firm performance and competitiveness, [22]. 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. The data in this study are secondary data taken from official government publications, namely the results of a survey from the Indonesian Central Statistics Agency (BPS). BPS publishes statistics for Medium Large Industries (IBS), a classification of the manufacturing industry based on the number of workers in the firm. The research data is in the form of cross-sectional data for the manufacturing industry in 2017, data released in 2020. The time of data collection (Time horizon) is a one-shot cross-sectional, i.e., data is only taken once in a certain period which is used to answer research questions, [47]. The number of firms in the high-tech industry in Indonesia is 4,903 firms, consisting of 7 industries with a two-digit International Standard Industrial Classification (ISIC) manufacturing industries approach, 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, the number of samples used in further analysis is 2,578 firms.

3.1.1 Dependent Variable

We use firm performance as the dependent variable in measuring performance in the form of firm productivity using firm value-added data, [37]. Adopting research, [48], in this study, the definition of Firm performance is the result of the firm's ability to achieve its goals by using its resources to increase its competitiveness. Performance measurement is obtained from the value-added of output minus input costs through the firm value-added.

3.1.2 Independent Variable

Interfirm Network. We measure the interfirm network using the firm's revenue from the service industry both domestically and abroad (log-transformed). In the context of the manufacturing industry, the interfirm network is defined as involvement in corporate networks or interfirm in national or international networks in the form of being part of the inter-firm production process or others process business, which has the effect of strengthening the firm with broader access to resources, [21].

3.1.3 Mediation Variables

Innovation Capability. We measure innovation capability using a dummy measurement by giving 1 for firms that innovate and 0 for the other way around, [49]. The innovations carried out can be product innovation, [50], process innovation, [51]

marketing innovation, and organizational innovation. In the context of the manufacturing industry, innovation is mainly related to new knowledge, technological improvement, and business development, [46].

Foreign Ownership. We measure foreign ownership in firms using a dummy measurement by giving 1 for firms with a foreign ownership percentage and 0 for the way around, [52]. Foreign ownership is defined as ownership of a firm by foreign investors, which makes the firm gain international knowledge, technological and managerial knowledge, a better commitment that can increase market share, thereby increasing Firm Performance, [38].

Export. Following research from Sala-Ríos, Farré-Perdiguer and Torres-Solé and Rachbini, [37], [52], we use a dummy measurement by assigning 1 for the firm that does the export activities and 0 for not export activities. Export strategy is defined as a strategy to expand the firm's market share by trading products across countries. Through exports, firms can increase their management knowledge, skill and technological capability and finally increase their competitiveness, [53].

Royalty Expense. Following the research from Mursitama, [16], we use the measurement of royalty expenditure in the form of the number of rupiah issued by the firm to obtain information and or gain knowledge of technology experts from outside the firm. Royalty expense as a form of technology capability measures the firm's ability to adapt, improve and carry out organizational changes with internal and external knowledge sources in the form of technology transfers that enable firms to generate competitive advantages, [40].

The test results on descriptive statistics can be seen in Table 1. Table 1 displays the average, standard deviation, and minimum and maximum values of the data used in the study. This descriptive statistic describes or provides an overview of the object under study through sample data (Sugiyono, 2007). Table 2 presents the correlation test between the variables used in this study. This table shows that all correlations are positive and significant, and the most considerable correlation is between firm performance and the interfirm network (0.658), which means that the more interfirm networks the firm does, the higher the firm performance achieved.

Table 1. Result of Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max
FP	17.702	1.626	12.514	23.877
INT	15.171	2.285	7.475	22.130
INO	.619	1.183	0	4
EX	.124	.329	0	1
FO	.148	.356	0	1
RE	10.453	3.304	1.386	20.756

Note(s): FP = Firm Performance, IN = Interfirm Network, INO = Innovation Capability, EX = Export Participation, FO = Foreign Ownership, RE = Royalty Expense.

Table 2. Correlation between Research variables

Variable	FP	INT	INO	EX	FO	RE
FP						
INT	0.658					
INO	0.598	0.412				
EX	0.434	0.408	0.581			
FO	0.128	0.183	0.023	0.182		
RE	0.505	0.567	0.336	0.318	0.091	

Note(s): FP = Firm Performance, IN = Interfirm Network, INO = Innovation Capability, EX = Export Participation, FO = Foreign Ownership, RE = Royalty Expense.

4 Result and Discussion

Calculation of R square using the command Seemingly unrelated regression in stata, as shown in Table 3, where it can be seen the magnitude of the contribution of the influence given by the independent variable to the dependent variable simultaneously. Interfirm network variables, innovation capability, foreign ownership, export, and royalty expense together affect the firm's performance by 80.7%. The magnitude of this influence belongs to the category of strong influence, [54]. Thus, it can be concluded that, together, all the independent variables in the research model significantly affect the firm's performance when the firm is involved in a network between firms, which is measured using industrial services produced by the firm from the network. On

the other hand, it will negatively impact if the firm does not collaborate with other firms. However, there is a weak influence of foreign ownership on firm performance. This means that the presence of foreign investors has not been able to make a maximum contribution to achieving firm performance in the high-tech industry in Indonesia.

Table 3. Value of Coefficient of Determination (R²)

Equation	R-sq	P	Category
FP	0.807	0.000	Strong
INO	0.430	0.000	Moderate
EX	0.343	0.000	Moderate
FO	0.058	0.000	Weak
RE	0.614	0.000	Moderate

The statistical analysis results for the research model are presented in Figure 1 and Table 4. The results in Table 4 show that for the measurement of the direct influence of the interfirm network as an independent variable on the mediating variable and the dependent variable, most of them show a positive and significant relationship. This positive and significant direct effect can be seen in the influence of the interfirm network on firm performance (H1, path coefficient = 0.358, $p < 0.05$), between the interfirm network and innovation capability (H2a, path coefficient = 0.163, $p < 0.05$), between the interfirm network with export participation (H2b, path coefficient = 0.040, $p < 0.05$), between interfirm networks and foreign ownership (H2c, path coefficient = 0.023, $p < 0.05$), and between interfirm networks and royalty expense (H2d, path coefficient = 0.386, $p < 0.05$). So, these hypotheses are supported. This indicates that firms in the high-tech industry need to increase involvement in inter-firm networks to obtain better firm performance, increase innovation, export opportunities, obtain foreign investment, and increase firm royalties.

Table 4. Summary of hypothesis testing path model

Hypot thesis	Relationsh ip	Coefficie nt	Std.Er r.	z- value s	p>[z]
H1	INT → FP	.358	.009	38.20	0.000
H2a	INT → INO	.163	.010	15.23	0.000
H2b	INT → EX	.040	.003	12.45	0.000
H2c	INT → FO	.023	.004	5.65	0.000
H2d	INT → RE	.386	.024	15.58	0.000
H3	INO → FP	.241	.017	13.89	0.000
H4	EX → FP	-.525	.056	-9.23	0.000
H5	FO → FP	.099	.041	2.39	0.017
H6	RE → FP	-.025	.007	-3.67	0.000
H7a	INT → INO → FP	.039	.003	10.26	0.000
H7b	INT → EX → FP	-.021	.002	-7.41	0.000
H7c	INT → FO → FP	.002	.001	2.20	0.028
H7d	INT → RE → FP	-.009	.002	-3.58	0.000

Note(s): $p < 0.05$

A positive relationship was also found in the relationship between innovation capability and firm performance (H3, path coefficient = 0.241, $p < 0.05$), between foreign ownership and firm performance (H5, path coefficient = 0.099, $p < 0.05$). So, these hypotheses are supported. This indicates that to achieve good corporate performance, firms in the high-tech industry need to increase their innovation capabilities and the presence of foreign ownership in the firm. However, negative, and significant relationships were also found in several hypotheses, such as between export participation and firm performance (H4, path coefficient = -0.525, $p < 0.05$) and between royalty expense and firm performance (H6, path coefficient = -0.025, $p < 0.05$). Thus, both hypotheses are

rejected. This indicates that firms in the high-tech industry need to review the firm's export strategy and the royalties incurred because it reduces firm performance.

Meanwhile, the results of the indirect influence hypothesis where innovation capability and foreign ownership are proven to be significant in mediating the relationship between the interfirm network and firm performance (H7a, path coefficient = 0.039, $p < 0.05$, H7c, path coefficient = 0.002, $p < 0.05$). Thus, the two hypotheses of indirect influence are supported, while the mediating role of export participation and royalty expense is negative and significant (H7b, path coefficient = -0.021, $p < 0.05$, H7d, path coefficient = -0.009, $p < 0.05$), thus this hypothesis is not supported.

5 Discussion

The interfirm network greatly influences firm performance in this research model. The interfirm network also positively and significantly affects Innovation Capability, Export Participation, Foreign Ownership, and Royalty Expense. This result provides knowledge that firm involvement in interfirm networks is a critical factor in improving firm performance and increasing innovation, involvement of foreign parties, encouraging firm exports, and increasing firm royalties. The positive relationship between interfirm networks and firm performance supports previous research from Rajaguru and Matanda in 2019, [55]. This result is consistent with Liu, Henley and Mousavi in 2021, [21], who stated that the relationship with external networks positively affects firm performance, especially firm internationalization. Therefore, firm management in the high-tech industry needs to understand the concept of an interfirm network in the sense that the existence of this network opens opportunities for firms to transfer knowledge, learn from firm partners, share facilities and infrastructure so that firms can set strategies optimally to focus on developing the main functions of the firm's business processes.

Firm performance is positively and significantly influenced by innovation capability and foreign ownership. This means that the firm's management needs to focus on developing the firm's ability to innovate, both product innovation, process innovation, marketing innovation, and organizational innovation. Likewise, firms need to develop firm attractiveness to attract foreign investors to increase foreign ownership, which positively and significantly affects firm

performance. The importance of this ability to innovate while still paying attention to market conditions faced by the firm is in line with previous research [56], which stated that innovation increases the competitiveness of firms, where innovation itself is influenced by external factors, both factors with micro and macro-orientation levels. Meanwhile, in terms of foreign ownership, this study supports previous research conducted by Douma, George and Kabir, [57], which stated that Foreign Ownership is a positive and significant influence on Firm Performance in various forms of Firm Performance measurement proxies.

Innovation capability and foreign ownership also impact mediating the relationship between the interfirm network and firm performance. Although the effect of this mediation is smaller than the direct effect of the interfirm network on firm performance, the role of this mediation still needs to be considered by firm management in optimizing all existing opportunities. Innovation and exports as one of the factors that support the firm's growth from national to international competition can be seen from previous research, which states that Firms need innovation Capability to be able to compete internationally, and in winning the competition, it needs to be supported by the strength of the firm's capital and high-tech products that exported, [32].

Innovation capability and foreign ownership as part of internal capability, have a positive role in mediating the influence of the interfirm network on firm performance, although this effect is not as large as the direct effect of the interfirm network on the firm's performance without mediation. This research shows that the firm's involvement in the interfirm network has a very important role in improving the firm's performance. Firms that have both national and global networks need to focus on innovating and increasing foreign investment in effort to get even better performance. Aspects of innovation capability need to be improved i.e. product innovation to meet market needs, process innovation to improve the firm's production process more efficiently, marketing innovation to reach a wider market, and organizational innovation to improve firm operations efficiently and effectively. Foreign ownership has a positive impact because foreign investors will bring their network into the firm, better corporate governance, more transparency and new technology from the home country where they come from. In other words, there will be an internal transfer of knowledge within the firm which can encourage better firm performance.

From external capability, export and royalty expenses have a negative impact in mediating the

influence of the interfirm network on firm performance. This negative effect comes from the internationalization costs that must be incurred by the firm. However, with the involvement of firms in interfirm networks, the negative impact of exports and royalty expenses can be minimized. In other words, the role of networking between firms helps firms improve their ability to compete globally in the form of exports, although they have not been able to increase firm profits. Likewise, the strategy of obtaining knowledge and technology from external or market in the form of royalty expense which indicates technology dependence from licensing turned out to be detrimental to the firm. Firms should have internal knowledge transfer rather than depending on the market. Innovation capability has the best mediating role compared to other mediating variables and the best strategy that the firm can do is to implement an interfirm network strategy in maximizing the firm's performance.

6 Conclusion

Firms that collaborate on networks have an excellent opportunity to benefit from utilizing the network in various ways. They not only share the costs and risks of their activities but also gain access to new markets and technologies, complement each other according to their respective skills, and share knowledge, which with access to resources and capabilities enhances performance, [19], [20]. From the tests carried out in this study, it can be seen that, in line with previous research, the Interfirm network has proven to have a significant influence on firm performance in the high-tech industry in Indonesia. Internal capability has an important influence on firm performance compared to external capability. However, if the firm is involved in the interfirm network, it will strengthen the role of external capability.

This study proves that the firm's involvement in interfirm networks is a critical factor in improving firm performance and increasing innovation, involvement of foreign parties, encouraging firm exports, and rising firm royalties. This is in line with several previous studies showing collaboration with external partners allows firms to increase their knowledge, resources and technology, [26], [58], which in turn will encourage higher innovation and learning capabilities, to improve firm performance, [24].

Some of the limitations in this study are (1) the data used in the study only uses one year of data, so it is recommended for further research to use data of more than one year or panel data so that the test

results can contribute more strongly to the firm's managerial practices and government policy, (2) Tests are carried out in high-tech industries without looking at the specific industries in them, so that in the future it is necessary to carry out statistical tests per industry, such as specifically for the chemical, computer, and other industries based on international industrial classification standards (ISIC). The importance of research by paying attention to the specific industries because it refers to previous research which states that the effect of technological capabilities on a firm's value chain depends on the characteristics of industries, [59].

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