

THE ROLE OF COLLABORATION ON COMPANY INNOVATION PERFORMANCE IN INDONESIA

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ABSTRACT

This study aims to determine the effect of cooperation with internal parties, suppliers, competitors, universities, government, consultants, R&D companies on the innovation performance of companies in Indonesia. This study used data of 927 respondents which were filtered into 136 data. The data used is the 2014 Indonesia Innovation Survey (IIS) for the period 2011-2013. The research data were processed using the Tobit regression method. The data is processed using STATA. The results of this study found that collaboration activities with internal parties, suppliers, and the government has a positive effect on company performance. Meanwhile, cooperation with competitors, universities, consultants and R&D companies does not significantly influence the innovation performance of companies in Indonesia.

Keyword: Collaboration; Innovation; Company; Performance

INTRODUCTION

Currently, competition in the business world is getting tougher, therefore a strategy is needed to compete in the business world. The development of the company is influenced by the development of the business world. Companies are required to improve the quality of management. The world of work is a place to carry out work activities both in companies and organizations. Company activities must always be in line with the goals that have been set. Every company must have a clear vision and mission so that employees have goals at work.

Companies must be able to innovate to expand market segmentation and maintain existing markets. Innovations are divided into four types, namely product, process, marketing, and organizational innovations. One of the ways that companies can

do is by collaborating with other parties. The decision of companies to cooperate on innovation is driven by the fact that collaboration is an efficient way to increase the likelihood of successful innovation performance. Collaboration with several partners is important because companies can get sources of knowledge from other organizations and take advantage of resources owned by other companies.

The decision of companies to cooperate on innovation is driven by the fact that collaboration is an efficient way to increase the likelihood of successful innovation performance. Collaboration with multiple partners in corporate innovation is important because companies can pool complementary resources with other organizations and utilize resources owned by others. Innovation collaboration is not a tool to reduce uncertainty, but the opposite may be the case. When working with several partners, there will be many different types of experiences joining together in improving innovation performance.

Each company certainly has its own business goals. Goals must be clearly explained in order to be a measure of success or failure in the achievement process. Therefore, performance management is the responsibility of the company leader. Performance is the level of implementation of an activity, plan and policy to achieve the goals, objectives, mission and vision of the organization.

Internal cooperation is a cooperation between business functions that aim at product development, which consists of the marketing and R&D divisions. Both play an important role in the process of developing new products. Meanwhile, external cooperation is a collaboration with several other parties such as customers, suppliers, competitors, universities, consultants, government and private R&D. The benefits of cooperation are to improve economic performance and improve company existence, gain access to complementary resources, learn new skills, absorb technology, have control over relationships with other companies, keep up with competitors' developments and increase efficiency (Ahuja, 2000).

In the context of developed countries, there has been a lot of collaborative research that is subsidized by public policy programs that provide resources for collaborative projects

involving universities and companies. For example European Commission framework programs, US federally funded schemes such as the Advanced Technology Program, funding instruments provided by research councils, government departments in the UK, university industrial projects within federal programs in Germany (Almus and Czarnitzki, 2003; Czarnitzki et al., 2007; Caloghirou et al., 2001; Hall et al., 2001; Howells et al., 2003).

In the context of developing countries, several previous studies on collaborative activities in innovation have been carried out. Tian et al., (2019) examined the transitional economy in China and showed that the business relationship with the government has a significant positive effect on corporate innovation because the stronger the business relationship with the government, the higher the company's innovation.

Although the research theme of collaborative activities and their effect on corporate innovation performance has been widely practiced in other developed and developing countries. However, in the Indonesian context, the research theme related to cooperation between companies is still limited. Therefore, the main objective of this study is to narrow the research gap. Cooperation with several partners to improve innovation performance is very important for companies in Indonesia not only to do work with their own subsidiaries but need to expand in order to increase revenue, open new markets or at least reduce company costs.

Literature Review

Internal Collaboration and Innovation Performance

Internal cooperation is cooperation carried out with its subsidiaries. The role of internal cooperation in the company's innovation performance is to improve product quality and develop products where the development process is carried out starting from the product produced, new products, to the decision to produce innovation. The benefit of implementing internal cooperation on the company's innovation performance is to increase the company's ability to adjust the characteristics of new products.

According to Troy et al., (2008); Jansen et al., (2009); De Luca and Atuahene-Gima (2007) stated that internal cooperation is

cooperation between companies within a group or between departments that aims to support R&D marketing and innovation performance. So that the first hypothesis of this study is:

H1: Internal cooperation has a positive effect on innovation performance

Company-Suppliers Collaboration on Innovation Performance

Internal cooperation is cooperation carried out with its subsidiaries. The role of internal cooperation in the company's innovation performance is to improve product quality and develop products where the development process is carried out starting from the product produced, new products, to the decision to produce innovation. The benefit of implementing internal cooperation on the company's innovation performance is to increase the company's ability to adjust the characteristics of new products.

Research by Carvalgo et al., (2016) found that collaboration with close partners such as suppliers is more effective for the development of innovation performance. In addition, cooperation with customers and public sector institutions can positively enhance the success of product innovation. However, collaboration with suppliers and universities has a more significant effect on the success of innovation, thereby increasing performance (Freel and Harrison, 2006).

H2: Cooperation with suppliers has a positive effect on innovation performance

Collaboration with Competitors on Innovation Performance

Cooperation with competitors improves company performance by reducing the negative effects of competition and increasing information exchange. Thus, the benefits received by consumers can be more (Ingram & Roberts, 2000). Cooperation with competitors can improve the quality of innovation and awareness of the importance of development (Gnyawali & Srivastava, 2013). It can be concluded that the purpose of cooperation with competitors on the company's innovation performance is to assist the company in determining the agreed price and make it easier for the company to monitor the activities of its partners. The benefits of working with competitors are

creating synergies and increasing company productivity.

According to Belderbos et al (2004), an increase in labour productivity is related to cooperative activities with suppliers and competitors. Meanwhile, the increase in sales of new products to the market is related to cooperation with universities, research institutes and competitors.

H3: Collaboration with competitor has positive effect on innovation performance

Collaboration with University on Innovation Performance

Cooperation with universities and companies includes a variety of different organizational structures and various factors, such as good relations between stakeholders and the goals of the cooperation itself. (Giuliani et al., 2009). It can be concluded that the purpose of cooperation activities with universities on the company's innovation performance is to increase the company's performance in a probability manner. The benefit of implementing collaboration with universities according to (Aghion et al. 2008; Carlsson et al., 2007; Bagchi-Sen et al., 2001) is that companies can use exclusive and up to date R&D infrastructure from universities with preferential access to public resources. from funding Institution.

Loof and Brostrom (2008) found that collaboration with universities positively affects the innovation performance of manufacturing companies in Sweden. The same result was also found by Aschhoff and Schmidt (2006), where they found that evidence of the positive impact of collaboration with universities is the possibility of developing new products in German companies.

H4: Collaboration with University has positive effect on innovation performance

Collaboration with Government on Innovation Performance

The government allocates resources through industrial and fiscal policies to support corporate innovation (Kang and Park, 2012). The company's decision to collaborate with the government is to obtain financial support from other organizations to introduce new products. Government funds are a source of finance for innovation that are commonly used by small and medium enterprises. The purpose of working with the government on the

company's innovation performance is to help corporate capital problems. The benefits of implementing this collaboration are that companies can get full support from the government when introducing new products.

Guerrero et al., (2016) found that company cooperation with the government and universities has a positive impact on innovation performance. Another study conducted by Temel et al., (2013) provides statistically significant results obtained exclusively for domestic cooperation which are proven to positively affect the tendency to innovate, thus describing cooperation with various types of partners such as government and customers as well as research institutions. the public has a positive and significant effect. So that the hypothesis is:

H 5: Collaboration with government has positive effect on innovation performance

Collaboration with consultant company on innovation performance

Consultants and private research organizations also have a role to play in shaping the innovation model. Information from consultants is very important for the company to fulfil its needs and for the success of its innovation plans. It can be concluded that the purpose of working with consultants on the company's innovation performance is to build a sustainable company system. The benefits of implementing this collaboration with consultants are to explain the manufacture and commercialization of products, services, and meet the company's needs to achieve a successful implementation result.

Gil Ko and Dong (2014) found that company and consultant collaboration has a positive influence on company performance. Furthermore, Teo & Bhattacharjee (2014) explained that a good working relationship between the company and the consulting company plays an important role, especially in the implementation of a sustainable company system.

H6: Collaboration with consultant has positive effect on innovation performance

Collaboration with R&D Company on Innovation Performance

Cooperation with an R&D company is an agreement that aims to start a business that brings broader benefits to the company. In this collaboration, R&D companies can provide new instruments and strategies for companies to scan, access, and integrate knowledge that is outside the company's origin (Eng and Ozdemir, 2014; Rodríguez et al., 2018; Santoro et al., 2018). It can be concluded that the purpose of cooperation activities with R&D companies on the company's innovation performance is to increase the possibility of forming partnerships with other companies or institutions in terms of making innovations in the market. According to Bengtsson et al., (2010), R&D collaboration can be seen in the case of Nokia, Sony Ericsson, Samsung and other cell phone companies that join together to create operating systems to compete with traditional computer companies in the competition in integrating the internet with mobile devices.

According to Belderbos et al., (2004), a collaboration between companies and R&D companies has a positive effect on the company's innovation performance. Research by Eng and Ozdemir (2014); Baum et al (2000); Lavie (2007) found that collaboration with R&D companies can help companies in developing new products.

H7: Collaboration with R&D company has positive effect on innovation performance

Company Size

The behavior of big company is largely determined by market expansion strategies. Meanwhile, small companies apply a patent strategy for every new product and flexibility in the production process. Large companies perform better than small companies, both as a result of product and process innovation. However, recent evidence finds that innovation performance does not depend on firm size (Hervas-Oliver et al., 2014).

Stam (2009); Cheng and Huizing (2014); Ritala et al (2015) found that firm size can be considered as a control variable in improving the company's innovation performance. There are many assumptions that state that small companies need to do innovation (Teirlinck and Spithoven, 2013).

The model framework is as follow:

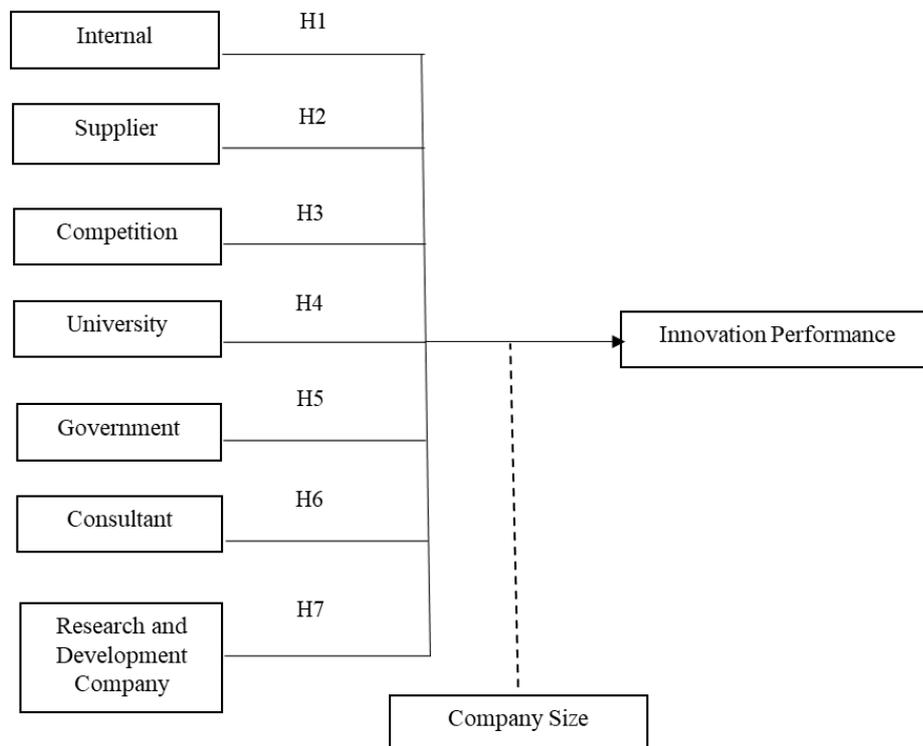


Figure 1. Model Framework
 Source: Adapted from Temel *et al.*, (2013)

Method

Research design

This study aims to examine the effect of cooperative activities on innovation performance in Indonesian companies. The independent variables are internal parties, suppliers, competitors, universities, governments, consultants and R&D companies. The dependent variable is innovation performance. In addition, firm size is used as a control variable. The indicator in this study uses a binary scale (yes or no) (OECD & EUROSTAT, 2005).

Table 1. Measurement Scale

| No | Variable | Scale |
|----|---------------------|---|
| 1 | Company Performance | (%) sales of new product innovations that were not previously available in the Indonesian market (radical innovation). (%) sales of new products produced by the |

| | | |
|---|--------------|--|
| | | company for the first time (incremental innovation). |
| 2 | Internal | Yes (1) = The company carries out cooperation activities internally. No (0) = The company does not cooperate internally. |
| 3 | Suppliers | Yes (1) = The company carries out cooperative activities with suppliers. No (0) = The company does not cooperate with suppliers. |
| 4 | Competitors | Yes (1) = The company carries out cooperative activities with competitors. No (0) = The company does not cooperate with competitors. |
| 5 | University | Yes (1) = The company carries out cooperative activities with universities. No (0) = The company does not collaborate with the university. |
| 6 | Governments | Yes (1) = The company carries out cooperative activities with the government. No (0) = The company does not cooperate with the government. |
| 7 | Consultants | Yes (1) = The company carries out cooperative activities with consultants. No (0) = The company does not cooperate with consultants. |
| 8 | R&D company | Yes (1) = The company carries out collaborative activities with an R&D company. No (0) = The company does not collaborate with the R&D company. |
| 9 | Company Size | (1) Small (under 20 employees) (2) Moderate (20-99 employees) (3) Large (more than 99 employees) |

Population and Sample

The research population is Indonesian companies in the manufacturing, mining, electricity, gas and water, construction, trade, hotel and restaurant sectors, transportation, storage and communication, and financial services. Meanwhile, 927 samples of this study are taken from data that match the criteria of companies that collaborate to improve the company's innovation performance.

Secondary data were obtained from the 2014 Indonesian Innovation Survey Data. The survey was conducted by the Research Center for the Development of Science and Technology (PAPPIPTEK) LIPI. The data collection technique used is a questionnaire. In this study, the questionnaire was distributed to small, medium, and large companies as respondents and filled in

by managers or leaders in the company. The questionnaire in the Indonesian innovation survey refers to the Oslo Manual developed by the OECD/ Eurostat in 2005. The Oslo Manual is a guide for conducting surveys and translating the results of innovation surveys used by developed countries in Europe (OECD & EUROSTAT, 2005).

Result and Discussion

Reliability Test

Reliability test result is as follow:

Table. 2 Reliability Test

| Variable | Cronbach alpha | Meaning |
|-----------------|-----------------------|----------------|
| Internal | 0.7781 | Reliable |
| Supplier | 0.7786 | Reliable |
| Competitor | 0.7760 | Reliable |
| University | 0.7754 | Reliable |
| Government | 0.7758 | Reliable |
| Consultant | 0.7760 | Reliable |
| R&D Company | 0.7748 | Reliable |

Based on the results of the reliability test in Table 2, the value displayed by each variable exceeds 0.7. It can be concluded that all variables can be used as a measuring tool in this study.

Descriptive Analysis

The results of descriptive analysis can be seen in the table below:

Table 3. Descriptive Statistic

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|------------------------------------|------------|--------------|--------------|----------|------------|
| Radical Innovation Performance | 136 | 24.29 | 31.19 | 0 | 100 |
| Incremental Innovation Performance | 136 | 34.30 | 32.61 | 0 | 100 |
| Internal | 136 | .2205 | .4161 | 0 | 1 |
| Supplier | 136 | .6029 | .4911 | 0 | 1 |
| Competitor | 136 | .0441 | .2061 | 0 | 1 |
| University | 136 | .0441 | .2061 | 0 | 1 |
| Government | 136 | .0367 | .1888 | 0 | 1 |
| Consultant | 136 | .0294 | .1695 | 0 | 1 |
| R&D Company | 136 | .0367 | .1888 | 0 | 1 |
| Company Size | 136 | 1.77 | .7400 | 1 | 3 |

Of the 927 data, only 136 companies carried out collaborative activities. This means that companies in Indonesia tend not to carry out cooperative activities. Furthermore, table 2 shows that out of 136 companies, 22.06% of companies engaged in cooperation activities with internal parties and 60.29% of companies engaged in collaboration with suppliers. It can be concluded that cooperation with suppliers is the most common collaboration. While 4.41% of other companies carry out cooperative activities with competitors and universities, 3.67% of companies carry out collaborative activities with the government and R&D companies. Meanwhile, the least amount is cooperation with consultants, which is 2.94%.

Table 4. Correlation between Dependent and Independent Variable

| Variable | Radical | Incremental | Internal | Supplier | Competitor | Univ | Gov. | Consultant | R&D Company |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| Radical Innovation | 1 | | | | | | | | |
| Incremental Innovation | 0.18 | 1 | | | | | | | |
| Internal | 0.34 | 0.35 | 1 | | | | | | |
| Supplier | 0.34 | 0.28 | -0.03 | 1 | | | | | |
| Competitor | -0.09 | -0.10 | -0.11 | 0.10 | 1 | | | | |
| University | 0.08 | 0.02 | 0.05 | -0.11 | -0.04 | 1 | | | |
| Government | 0.39 | 0.21 | 0.17 | 0.07 | -0.04 | -0.04 | 1 | | |
| Consultant | 0.004 | 0.05 | 0.01 | 0.05 | -0.03 | -0.03 | -0.03 | 1 | |
| R&D Company | 0.02 | -0.03 | -0.10 | 0.07 | -0.04 | -0.04 | -0.03 | -0.03 | 1 |
| Company Size | -0.05 | -0.10 | -0.07 | 0.05 | 0.01 | -0.03 | -0.04 | 0.05 | 0.06 |

The correlation coefficient shows a very low and moderate relationship. The interpretation of this correlation coefficient uses the guidelines of Sugiyono (2013), where the interval coefficient from 0.00 to 0.999 has a very low level of relationship, 0.20-0.399 has a very low level of relationship, 0.40-0.599 has a moderate level of relationship, and 0,60-0,799 has a high level of relationship and 0.80-1,000 has a very strong level of relationship.

Hypothesis Testing

This study uses Tobit regression which is used to test seven hypotheses from 7 different Tobit regression models. The results are as follows:

Table 5. Hypothesis Testing Result

| Variable | Radical | Incremental | Radical | Incremental | Radical | Incremental | Radical | Incremental | Radical | Incremental |
|----------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|------------------|-------------------|------------------|--------------|-----------------------------------|----------------------------------|
| Internal | 26.06*** (9.41) | 37.52*** (9.38) | | | | | | | | |
| Suppliers | | | 28.26** * (7.88) | 37.61*** (8.53) | | | | | | |
| Competitors | | | | | 8.342 (6.816) | 10.258 (6.463) | | | | |
| University | | | | | | | 16.18 (19.40) | 3.14 (19.85) | | |
| Government | | | | | | | | | 64.23*** (20.78) | 46.80** (21.29) |
| Company size | -0.22 (5.21) | -5.67 (5.26) | -2.39 (5.08) | -8.94 (5.37) | -0.87 (5.46) | -7.31 (5.58) | -1.05 (5.47) | -7.31 (5.58) | -0.59 (5.22) | -6.61 (5.48) |
| Observation | 136 | 136 | 136 | 136 | 136 | 136 | 136 | 136 | 136 | 136 |
| Log Likelihood | -448.87 | - 508.91 | -446.34 | -506.58 | -451.43 | -515.99 | -452.17 | -516.69 | -447.78 | -514.30 |
| Consultant | 5.89 (23.55) | 16.02 (23.63) | | | | | | | | |
| R&D company | | | 18.10 (20.45) | -0.29 (21.27) | | | | | | |
| Company size | -1.29 (5.49) | -7.51 (5.61) | -1.55 (5.50) | -7.30 (5.62) | | | | | | |
| Observation | 136 | 136 | 136 | 136 | | | | | | |
| Log Likelihood | -452.48 | - 516.47 | -452.12 | -516.70 | | | | | | |

- H1: Based on hypothesis testing, internal collaboration activities have a positive influence on the company's innovation performance, both new products to the market with 26.08 and new products to companies with 37.52. Both have p-value <0.01. It can be concluded that this first hypothesis is accepted.
- H2: Based on hypothesis testing, collaboration with suppliers has a positive influence on the company's innovation performance, both radically with 28.28 and p-value <0.01 and incrementally with 37.61 and p-value <0.01. Both have a significance level of below 1%. It can be concluded that the second hypothesis of this study is accepted.
- H3: Based on hypothesis testing, collaboration with competitors has an insignificant effect on innovation performance, either radically with -31.82 or incrementally with -24.38. This third hypothesis has an insignificant effect because the significance level is above 1%, 5%, and 10%. It can be concluded that the third hypothesis of this study is rejected.
- H4: Based on hypothesis testing, cooperation with universities has no significant effect on innovation performance, either radically with 16.18 or incrementally 19.40. This fourth hypothesis has an insignificant effect because the significance level is above 1%, 5%, and 10%. It can be concluded that the fourth hypothesis of this study is rejected.
- H5: Based on hypothesis testing, cooperation with the government has a positive influence on the company's innovation performance radically with 64.23 and p-value <0.01. Meanwhile, the influence on incremental innovation is 46.80 and the p-value is <0.05. Both have a significance level of below 5%. It can be concluded that the fifth hypothesis of this study is accepted.
- H6: The result of hypothesis testing shows that collaboration activity with consultants has an insignificant effect, both radically with 5.8 and incrementally with 16.02. This sixth hypothesis has an insignificant effect because the significance level is above 1%, 5%, and 10%. It can be concluded that the sixth hypothesis of this study is rejected.
- H7: Hypothesis testing shows that cooperation with R&D companies has an insignificant effect either radically with

18.10 or incrementally with -0.29. This seventh hypothesis has an insignificant effect because the significance level is above 1%, 5%, and 10%. It can be concluded that the seventh hypothesis of this study is rejected.

DISCUSSION

The results of the first hypothesis test found that internal cooperation activities have a positive influence on the company's innovation performance. This study is in line with Troy et al., (2008), Jansen et al., (2009), De Luca and Atuahene-Gima (2007) that found internal cooperation between companies in one group can support the company's innovation performance.

The second hypothesis finds that collaboration with suppliers has a positive influence on the company's innovation performance. This study is in line with Gyampah et al., (2019) which found that operational flexibility capabilities can mediate supplier relationships and company management performance. In addition, the mediation analysis shows that the effect of collaboration with suppliers on the company's innovation performance is stronger for domestic companies than foreign companies. So that domestic companies will get more investment.

Hypothesis testing shows insignificant results. This study contrasts with Belderbos et al (2004) which found that cooperation with competitors can increase labour productivity so that it can maintain the company's innovation performance. In Indonesia, collaboration with competitors is still rarely done unless there is a threat of high costs.

The results of the fourth hypothesis show insignificant results. This research is supported by Temel et al., (2013) which shows that collaboration with universities does not bring the expected benefits immediately. It takes a certain threshold of the intensity of cooperation with universities to achieve better innovation performance. The research results of Temel et al., (2013) indicate that working with universities worsens the innovation performance of the company and does not improve innovation performance.

The results of the fifth hypothesis find that cooperation with the government has a positive effect on the company's innovation performance. This research is in line with Guerrero et al., (2016)

which shows that cooperation between companies and the government has a positive impact on improving innovation performance. This collaboration can provide benefits where companies can get full support from the government in introducing new products.

The results of the sixth hypothesis show insignificant results. It can be concluded that the cooperation relationship with consultants does not have a significant effect on the company's innovation performance. This study contrasts with Gil Ko and Dong (2014) which found that company collaboration with consultants has a positive effect on company performance.

The seventh hypothesis testing showed insignificant results. It can be concluded that cooperation with R&D companies does not have a significant effect on the company's innovation performance. This study contrasts with Belderbos et al., (2004) which stated that companies tend to collaborate with R&D to improve innovation performance.

CONCLUSION

This research concludes that there are variables that have a positive effect and there are variables that do not significantly influence the innovation performance of companies in Indonesia. The results of the research can be summarized as follows:

1. Internal collaboration activities have a positive influence on the innovation performance of companies in Indonesia.
2. Collaboration with suppliers have a positive influence on the innovation performance of companies in Indonesia.
3. Collaboration with the government have a positive influence on the innovation performance of companies in Indonesia.
4. Collaboration with competitors have an insignificant influence on the innovation performance of companies in Indonesia.
5. Collaboration with universities have no significant effect on the innovation performance of companies in Indonesia.
6. Collaboration with consultants have an insignificant influence on the innovation performance of companies in Indonesia.
7. Collaboration with R&D companies have an insignificant effect on the innovation performance of companies in Indonesia.

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