



Open Innovation Strategy: exploring challenges and opportunities

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Abstract

Innovation strategy has been playing an important role on innovation development in industrial firms. Extant studies have investigated in particular open innovation strategy. By using a qualitative case study, I have conducted a research in an Indonesian R&D firm that has implemented an open innovation strategy. The purpose of this research is to add more information and confirm existing knowledge by exploring challenges and opportunities during the implementation of an open innovation strategy. I identify many challenges which are found in several aspects of innovation development such as collaboration management, assets protection and accessing external knowledge. Furthermore, the opportunities that I found are related with enhancement of license strategy, nurture of employee's loyalty and establishment of various collaboration forms. These challenges and opportunities occurred due to the influence of the openness paradigm. The results of this study also confirm previous research result on the adoption of the partly open innovation scheme and the layered collaboration scheme.

RQ: what are the firm-level challenges and opportunities with using an open innovation strategy?

Keywords: open innovation strategy, challenge, opportunity, research and development firm, qualitative

1. Introduction

The definition of innovation according to Rogers (1998) is about an introduction of ideas for the firms which can improve the performance of the firms. Innovation is so important in business, it makes the business actors create a strategy as an attempt to use innovation to execute their business tactic and improve their business performance (Gilbert, 1994). Furthermore, an innovation strategy contains a tactic in the execution and combination of technical, market or business model to deliver the product to the market in the best method (Branscomb & Aueswald, 2002).

There are many different types of strategies depend on the necessity and the profile of a firm (Adner, 2006). However, there are two overarching strategies which called open innovation and closed innovation (Chersbrough, 2003). The difference between both of these innovations is on the utilization of resource approach. Moreover, because of this difference approach, it also influences the approach of several aspects, for example on the decision making, leading a team and other aspects. Furthermore, it also affects the form of challenge and opportunity which a firm encountered. Therefore, to choose which strategy the best for a firm, it needs a good understanding of the firm's profile and objective as the strategy will affect the innovation result.

History has shown that the evolution of the industry changes the way of innovation development. Closed innovation reached its peak during the world war period. At that time, many big firms monopolized the knowledge and internal research and development (R&D) became their strongest asset to expand innovation. However, as times changing, there was a

shifting knowledge landscape which changed the way knowledge can be accessed. This was affecting other factors which lead to major shifting in innovation environment, from closed to open environment. The erosion factors which ranged from the mobility of skilled worker to capability of external suppliers (Chersbrough, 2003) contributed to improve the open environment. The result was more firms adopted the open innovation strategy.

To respond the rise of open innovation, there have been many investigations in open strategy to dig valuable knowledge by the researchers. They are intrigued by the dynamic environment which creates new term or modifies the existing method of open innovation (Lichtenthaler, 2011). One of the areas of investigation which has been aimed by the researchers is the challenges for implementing an open innovation strategy. The consequence of engaging external environment force the firm to adjust their business models, for example enabling collaboration possibility or allowing external knowledge to come. The range of area in these challenges which has identified by the researcher are creating collaboration forms (Felin & Zenger, 2014), intellectual property issue (Van de Vrande, De Jong, Vanhaverbeke, De Rochemont, 2009, Lichtenthaler, 2010), communication challenge (Felin et al, 2014) and accessing external ponds (Chersbrough, 2003). There are still many opportunities to dig more information regarding the challenge in an open innovation. Within the modern case of IT firms, one could still investigate the challenge to confirm the existing challenge from previous findings.

The focus of this study is to investigate the challenge and opportunity by exploring the implementation an open innovation strategy. This study aims at exploring various phenomenon with a case study using qualitative method that focus on an Indonesian research and development firm(In this thesis given a fictional name : Inotech) which is a subordinate of a big Asian firm. As a subordinate firm, Inotech has to follow policies and work on mandatory task given by its headquarter/parent's firm. Inotech used to run closed innovation strategy. However, in recent years, Inotech was given an autonomy to conduct and develop their own research and product. They are allowed to seek ideas from outside the firm and conduct collaboration with external parties by using open strategy. Furthermore, they combine external resources that they got from outside the firm with internal research development to create more innovative product or service. Therefore, my research question in this study is: what are the firm-level challenges and opportunities with using an open innovation strategy?

The research question is an effort to understand important issues in open innovation. Moreover, for practice implication, the result can be studied for a firm who wants to do same approach, to start adapting open strategy as their core innovation development. The examples of these implications are an investment for human resource improves the quality of innovation and strategy for asset protection. On the other hand, for research implication, this study is intended to get better knowledge and confirm existing findings in the open innovation area.

2. Innovation Strategy

An innovation strategy is referred as a functional strategy to “determine what degree and in what way a firm attempts to use innovation to execute its business strategy and improve its performance” (Gilbert, 1994). A successful innovation process itself contains a tactic for implementing and combining technical, market or business models to create new or improved products or services for the market to use (Branscomb & Aueswald, 2002). Furthermore, innovation strategy helps firms to decide the utilization of resource and how to maximize its usability and performance to achieve a specific goal. Moreover, adopting and implementing an innovation strategy may help firms to anticipate any kind of uncertainty which is common to be found in project development. This strategy highlights the importance of innovation as it is considered as a process to understand on how to organize and control the innovation (Tidd et al, 2001).

Even though the types of innovation strategies are varied depending on the needs and profile of a firm (Gilbert, 1994), it is mainly divided into two approaches respecting to resource utilization in innovation planning: whether they want to use their own resources or try to open for broader ideas outside the firm by collaborating with other firms, exchanging resources (Chesbrough, 2003). Resource utilization approach becomes a fundamental aspect to be considered. Therefore, it is recommended for the firms to begin their innovation strategy selection process by identifying their approach in resource utilization.

The two approaches, which previously mentioned, lead to a concept of Open and Closed Innovation which was introduced by Chesbrough in his book and research (2003 & 2004). In his study, Chesbrough analyzed successful examples of big companies that implement a certain innovation strategy and the evolution in industry which trigger the modification of the strategy itself. Then, more studies were introduced for comparing certain factors, for instance how firm’s problem solving is executed based on the choice of strategy (Felin et al, 2014) and the culture in an open innovation strategy (Herzog & Leker, 2010).

However, firms who used to rely on closed innovation strategy need to evaluate their strategy because the industry has gone through various changes that have happened because of four factors (Chesbrough, 2003). The four factors are the increasing availability and mobility of skilled workers, development of the venture capital market, the opportunities for gaining ideas outside the organization and the improvement of external supplier’s capability. Furthermore, these factors are mainly related to the improvement of IT industry environment. As argued by Chesbrough (2003), these changes force the firms to think and consider about their strategy because it might not be relevant anymore in consequence of the change of industry ecosystem. This condition is mostly impacting on firms who rely on the closed environment for developing and implementing innovation.

Because of these changes in the industry, some firms which used to rely on their closed and tightly controlled environment are forced to modify their strategy. The approach of the firm is to

be more open for accepting possibilities from outside organization which lead them to implement an open innovation strategy.

2.1 Open Innovation Strategy

The open Innovation term was introduced as a paradigm to open for opportunities and ideas from outside organization in favor to generate a better innovation (Chesbrough, 2003). This innovation assumes that firms should exploit their internal and external ideas, path to market as they look to advance their technology (Chesbrough, 2004). Furthermore, this paradigm treats a project or research as an open system which assume that knowledge is distributed broadly and organization must find a way to connect it as a core process in innovation development (Chesbrough, Vanhaverbeke & West, 2006). Moreover, the example of elements in open innovation is relationship with all actors (including actors outside the firm), acceptance of external resources (ideas, people, technology etc) and open communication (Chesbrough, 2004). Therefore, it can be seen that firms which see potential benefit from embracing the idea to welcome any kind of possibilities from inside and outside the firm should adopt the open innovation strategy.

As previously mentioned above, the open innovation strategy opens various possibilities to gain access to knowledge from outside the firm. Therefore the core point of developing innovation with an open innovation strategy is to develop business network and make collaboration in order to generate pools of ideas (Chesbrough, 2004). By collaborating with other co-partner in the various fields, it creates opportunity to enhance innovation by exploiting the benefits which the firm obtains. Tidd and Bessant (2013,304) explain that the new and combination of different knowledge is always expected by the firm. Furthermore, they also claim that knowledge which only from closed environment such as individual firm will not fill the bowl enough in twenty first century. The more knowledge the firm has, the wider perspective to enhance their innovation.

2.2 Challenges in Open Innovation Strategy

By opening themselves to the outside environment and engaging in collaboration form, firms are expected to engage in various kinds of challenges. There have been many researches in this particular area, exploring challenges which occur in the dynamic world of open innovation. As previously mentioned, networking and collaboration is one of the keys in open innovation.

This collaboration provides ways to access external knowledge and external path to market. The endless pools of ideas are waiting to be explored as the monopolies of knowledge by centralized R&D organizations of the twentieth century have ended (Chesbrough, 2003). Moreover, collaboration urges the firms to create creative ways for exploiting internal innovation, combine external innovation with internal development and encourage partners to support an ongoing stream of external innovations (West and Gallagher, 2006). Prior research also has introduced various forms of collaboration to access external knowledge such as contracts, alliances, partnerships, contests and communities in a particular area (Felin et al,

2014). Furthermore, on the effort to access of external knowledge, firms also face issues when combining internal and external knowledge resources and intellectual property (Van de Vrande et al, 2009). Moreover, because of the pride of developing innovation on their own, firms often get infected by Not-invented-here (NIH) Syndrome (Herzog et al, 2010) which described as “a negatively biased, invalid, generalizing and rigid attitude of individuals or groups to externally developed technology, which may lead to an economically detrimental neglect or suboptimal use of external technology” (Mehrwald, 1999). NIH happens because often firms adopt false pride in order to save their dignity. This means they prefer to only use their own knowledge and ignore, boycott or refuse to use knowledge from outside.

From the internal view of the management itself, collaboration and networking as part of openness spirit opens numerous challenges in capturing abundance knowledge in nearly every field (Chesbrough, 2003). Collaboration forces the firm to explore the area they never touched before, people they never worked with before and problems they never faced before. Managing professional relationship is a beginning in a collaboration form where it can start by engaging new partner and maintaining relationship with the partner’s management and team member (Wenzlaff & Singh, 2015). This has become sort of challenge since different firm has different organizational and cultural issues, especially when the firms start to collaborate with external partners (Van de Vrande et al, 2009). Therefore, the management needs to motivate people continuously to innovate despite any circumstances that they are going through (Boudreau, 1998). Then, effective communication on multi organizations and cultures is essential, especially in generating solution (Felin et al, 2014) for solving cross organization problem (Allen et al, 1980).

The open innovation scheme also brings an important issue in assets protection. Collaboration between two or more firms, which has ability to access each other assets, triggers an idea to create a knowledge sharing strategy as an effort to protect the assets. In his study. Bogers (2011) proposed two methods of knowledge sharing strategies: Open exchange strategy and Layered collaboration scheme. He explained the former that foreground and side ground knowledge are exchanged in a more open manner. It is essential to very openly share the knowledge which is needed in technology development (Bogers, 2011). This means that there is almost no limitation to access other firm knowledge because of the high potential of the collaboration. The latter strategy is more restricting for accessing knowledge. Based on the premise not all partner need to know every detail of other partner’s knowledge, the approach knowledge sharing with each of the partner could be different where one might very open while the other is very limited (Bogers,2011).

Intellectual Property (IP) plays an important role in shaping the innovation industry. Managing IP for open innovation firms could create and expand their market for gaining economic advantages. Using openness paradigm, firms now not only they can use their IP as a commodity to sell, but also motivated buyers of IP as well (Chesbrough, 2003). The reasons they started doing this is because they realize that controlling an important technology for an extended period become rare and the mindset in regarding IP changes greatly (Chesbrough,

2003). This means that saving IP to its owner without utilizing it could inflict a financial loss when they may prove valuable. However, a prior study shows that most firms only open their innovation process partly, especially regarding the utilization of their IP (Lichtenthaler, 2010). The reason for this is because they are still in the transition process from closed to open innovation strategy (Chesbrough, 2003). Another factor is the ability of developing their research alone. Most of the big firms who have a superior patent portfolio rely more on their internal development and the level of external reception are lower (Lichtenthaler, 2010). Nevertheless, most of the firms already understand the relevance of open innovation (Gassman, 2006).

As previously mentioned above, the open innovation strategy change firm's method and mindset to develop innovation. The strategy encourages firm to establish connection to the outside world for pursuing many opportunities and ideas. Collaboration and networking has become important since actors outside the firm might have some valuable assets and knowledge which the firm need. Furthermore, these two aspects are affecting the method to obtain external knowledge and merge it with internal knowledge, the way management handles innovation development in a collaboration project, managing assets protection and intellectual property. There are already numerous number of research related to these subjects. However, looking the profile of the firm I investigated which has produced valuable experiences in the process of generating innovation, it is intriguing to explore more the process of an open innovation strategy in affecting various aspects in innovation development. This study is also intended to confirm various challenges and opportunities from previous study regarding the open innovation strategy.

3. Research Methodology

This research focuses on a firm who relies on an open innovation strategy. The scope is the challenges and the opportunities that the firm has been encountered so far when implementing such strategy. The method used for this research is qualitative method which fit for capturing a phenomenon in certain period. The data which was analyzed was gathered using interview with open ended questions.

3.1 Case Description

Inotech (A fictional name for the firm I investigated) is a subsidiary firm which parent firm is one of the biggest firms in the world which has several business areas. One of the business areas of the parent firm is in information technology product which has a particular division in research and development mobile technology. This parent firm established many subsidiary firms in many countries. One of them is Inotech which was established in Indonesia and became my research subject. The core task of Inotech is to research a potential mobile technology and features and then develop it so it can be used for the future product which is produced by the parent's firm. For doing the research, Inotech used to run closed innovation strategy. They were

only allowed to use the assets, resources and ideas which were given by the parent's firm in executing the task from parent's firm. However, recently Inotech was given a privilege and autonomy to create and manage their own project, including cooperation with another firm outside the parent firm organization structure. This autonomy means that Inotech can decide whether they can develop their project alone or make collaboration with outside the firm. Inotech exploited this autonomy by creating several projects which ideas come from their own workers. In the execution of these projects, they established some relations with partners outside the firms to help Inotech develop their innovation. In brief, Inotech shifts their closed innovation to an open innovation strategy.

Typical R&D organization structure, Inotech has several divisions which aligned with the project organization structure. These divisions are Project Planner, Product Management, Project Developer, Project Management Officer (controlling the progress with the project timeline and as a link between developer and planner) and Quality Assurance (QA). During the planning phase, not only project planner division has to do the job, but also everyone from each division, stakeholder and partner have to arrange this planning phase of the project. This planning phase is affecting on how they execute their project development.

To gather the data for this research, I got in touch with some of the employees which have the capability and insight of the firm's business strategy and the process of project development. I considered this people have enough experience working with this firm to be respondents for this research. I divided into two categories: first one is the top management, which knows and decide vision and mission of the firm. They are also involved in the making business strategy, including innovation strategy. Then, there are project managers which lead the projects directly. They know the detail process of the project development from the beginning, which is valuable information for this research.

3.2 Research Approach

In order to get an understanding of this case, a qualitative case study approach and single case study design in an organization are applied for this study. The purpose of this design is to gather information for the investigator to acquire insights within the organization life (Berg, 2001). The single firm study allows the researcher to investigate several areas with deeper understanding of innovation strategy within the firm. Furthermore, using qualitative method in a firm emphasizes the important elements which surround the phenomenon, these elements could reflect the firm's behavioral routines, experiences and other various conditions (Berg, 2001). In addition, the objective of the study is to provide valuable information of potential challenges and opportunities within the context investigated. Mainly, this research is conducted to answer the "what" premise and it is closer to explanatory case studies (Berg, 2001). It should be answered by doing a case study or field experiment (Yin, 2013).

3.3 Data Collection

The method to gather the data for this research was using interview with semi structured open questions. This interview method is chosen to get a more direct answer and create possibilities to ask some respond questions. The list of questions can be seen in the Appendix. The table below is the exact data of the 6 respondents and the date of the interview:

Type of Respondents	Position	Date of Interview
Top Management	Vice CEO	7/24/2015
Project Development Leader	Product Management Leader	7/24/2015
	Service Operation Leader	7/27/2015
	Quality Assurance Leader	7/28/2015
	Project Leader A	7/28/2015
	Project Leader B	7/29/2015

Table 1 Respondents Data

The questions are mainly related with the process of an open innovation strategy and how it affects particular aspects which could trigger challenges and opportunities. To give a basic understanding regarding the theory and concept of open innovation strategy, we discussed the theory and concept of this strategy before the interview started. This is important due to the type of question is conceptual and practical. Moreover, a description of the concept in the beginning of the interview might give the respondents a better and clearer understanding compare with the description in the middle or the last part because there is a possibility that the respondents already influenced by the questions (Ritchie & Lewis, 2003)

3.4 Data Analysis

The data analysis processes are divided into two steps. The first step is the open coding part. Based on the transcript of the interview collected, I got information which needs to be reviewed. To do this I created brackets to sort the data and investigated it by categorizing and rearranging the data which is useful to get a better understanding of the problems and for identifying relevant themes and pattern which helps the analytical process. The last step is to look each of the brackets and interpret the result. The last step is the core part of analysis to investigate what is happening on the research subject and should be looked in many different perspectives as it would generate a critical judgment. The result of the analysis is presented based on aspects which represent the challenges.

3.5 Limitation

There are several limitations regarding the approach taken for this study. First, it needs to be clarified that this study is in particular subsidiary/division level, not the whole parent's firm level. Hence, there is some information which cannot be captured regarding to this such as the process in managing divisions and so forth. Then, even though the firm has collaborated with

other firm or partner in a certain project, it only captured perception from a single point of view regarding certain matters.

4. Results

From the data collected, i managed to identify various challenges and opportunities in open innovation. However, these challenges can be sorted into four categories because it has similar aspects in innovation development. Therefore, I explain these challenges in four categories. The purpose of this action is to have a better understanding of the problems and in identifying relevant themes and pattern which could help the analytical process. Collaboration with outside firm is identified play a big role on the occurrence of these challenges. The challenges are basically related with managing collaboration, managing people and resources in project development.

4.1 Managing Collaboration

By embracing the openness behavior of open innovation, Inotech are forced to build good networking with other IT firms. The different atmosphere, spirit and goal of partner could hinder the project development in collaboration. That is why the Vice CEO said that management plays critical role in open innovation.

It is challenging to work and collaborate with people who we don't know the capability, the different work rhythm and different passion and goal. We have to know them first. Our management has to address this – Vice CEO

As stated by the quote above, Vice CEO emphasis the importance of managing people since working with new people from different firm with unknown characteristic such as ability, culture and goals is challenging. Furthermore, Vice CEO also mentioned “*I believe if the management able to accommodate three factors: "people management", "culture" and "passion" in collaboration, it would be a key trigger to develop innovation in an open innovation strategy*”. It is clear that the management has to address the people, culture and passion as part of innovation development issues.

QA Leader also stated that “*In complex collaboration with partners, we don't have a lot of time in building a good teamwork with partner before the project starts*”. Building teamwork in such short time becomes a challenge because they have to do it simultaneously with delegating daily tasks which explained by the QA leader below:

We have to do it simultaneously with task delegation to project members. Some difficult challenges are to delegate the task which fit with the skill of the person involved, give opportunities to team member to handle the project that they like, collaborate with the entire project stakeholder and predicting duration to finish a

task. These would be easier tasks if we do not cooperate with outsiders. However, this is a side effect that we have to face and we could come up with a breakthrough innovation by doing this.
- Quality Assurance Leader

Furthermore, the QA leader's quote above stated that regular daily tasks in project management such as delegating a task to a person and predicting duration to finish a task become harder because of collaboration form. This becomes one of the consequences for using collaboration as part of the open strategy act.

Later the QA leader describes his strategy for addressing the collaboration challenge: "*My strategy to address these collaboration challenges is to have a good understanding first on how the innovation will be done*". He stated that knowing what both internal and external stakeholders want and communicate it with the team member is part of his strategy, as evidenced by the following quote:

This can be gained by doing meetings- a lot of them- with the stakeholders both from our firm and our partners. After knowing the goal and the targets of the project, I would gather my team – including partners, and socialize it, make them understand the project, the timeline or basically makes them understand and prepare for what we are about going through. So continuous communication and relationship is important here
- Quality Assurance Leader

Therefore, as stated by the QA leader above, it is clear that communication is one of the important essences for creating strategy to address the open innovation challenge.

Management of the firm also has heavy role to make collaboration works as stated by the Vice CEO below:

Our management has to be able to make some win-win proposition with partners' management. Brilliant innovation could not be made if only one side of party gain benefits while the others are aggrieved. This is the foundation of open innovation, to gain economic advantage using innovation with the help of mutual collaboration.
-Vice CEO

In summary, the open innovation strategy is centered on collaboration between managements of the firms to develop innovation. It can be seen from the data above that collaboration is about how the management creates a strategy which could address the challenges in collaboration with partners. Furthermore, as evidenced by the data above collaboration also has consequence for making some tasks harder to be executed. One could argue that open innovation makes the process more complicated and harder to be done. However, it depends on how the firm handles and turns it into advantages.

4.2 Capturing pools of external ideas

As part of the openness spirit of an open innovation strategy, Inotech is allowed to seek for ideas, knowledge or other resources which have potential to be developed as innovation. The limitation of working alone in a closed environment, where they used to work, makes them seek for external opportunities, as explained by the product management leader below:

We realize that our resources, ideas and knowledge are limited. That is why we change our strategy in innovating to be more open so we could extend the boundaries of our imagination in designing products. - Product Management Leader

To do this, they collaborate with various parties outside the firms. The Vice CEO described their collaborations with these parties:

There are plenty fishes in the sea, however, unlike sailor, we only want the best fish. We prefer quality to quantity. Our efforts in luring the best fish so far are by collaborating with universities to have joint research, held an Ideation Days competition, collaborating with the Indonesia government to develop systems in certain fields, collaborating with startups and also collaborating with other research and development division in our parent company but in different country. – Vice CEO

Moreover, the Vice CEO also mentioned “Now, we want to expand our reach to different kind of business area, but our creativity has limit and we are working on it”. It can be seen that creativity becomes a limitation, therefore Inotech has to be creative to find ways to lure potential people out so they can farm potential ideas.

However, sometimes their effort is clashing with the parent’s company policy. Often when they already found potential ideas, but has problems with the acquisition agreement, they had to turn it down. In result, they lost precious knowledge or innovation. They also have to compete with other competitors. Vice CEO explained about these points below:

The challenge in making business agreements with partners is we have to align the agreement with the goals and policies of 3 parties: partner, Inotech and our parent’s company. We often have to deal with some policies from HQ which does not match with the agreement. I often feel so angry if the agreement does not make it through, we lost too much. And to make it worse, 3 months later our competitor make agreement with that partner and come up with something brilliant. Competition in IT industry is very tough. - Vice CEO

Convincing the ideas owner to give the ideas to be developed by Inotech is also quite challenging, it is part of the negotiation as stated by Product Management Leader that “Negotiation is about how we convince our partner and how they convince us in bargaining

terms and policies". The agreement needs to satisfy both parties. This also raises intellectual property issue which needs to be solved in the beginning as stated by the Product Management leader below:

Sometimes what they have is not balanced with what they ask. That is why we need to be smarter than them in measuring the ideas and the potential of it. To do this, we often get help by Intellectual Property (IP) consultant. This could prevent future problems regarding IP.

- Product Management Leader

Furthermore, when they finally have an idea from outside the firm, they have to think carefully whether their ability is suitable enough to develop that idea. Moreover, knowledge transfer is important when acquiring ideas so the gap of knowledge between the owner of the ideas and developer can be minimized. The ability to develop and gap knowledge challenges are explained by Project Leader A below:

Once I led a team consists of our employees and some university students. We developed a system which idea comes from these students. At first, we thought that the idea was so brilliant and we decided to continue it as innovation. However, later in the development, we found out that it depended too much on other technology, the idea also was still too raw which took more time to develop. We learned something that day: that we cannot simply take an idea and develop it right away. There are more factors to think through, such as knowledge transfer and our ability to develop it

- Project Leader A

Therefore, in order to pick ideas which have potential, Inotech has been developing ability to measure values of certain idea. The Vice CEO called it as "Sensing" ability:

As a technology R&D, sensing will be one of the key factors to create innovation through technology that can be adapted and simplify human's life. Challenging milestones that being our continuous focus is creating "sensing" ability related to technology, market and industry. It is also part of the success factors in innovating.

- Vice CEO

To summarize, the data above explained Inotech's effort to seek ideas from outside the firm. Several ways have been done, from joint research with universities to collaborating with Indonesia government. Inotech found some obstacles to be addressed such as creating creative methods in luring potential ideas, creating mutual business agreements and adopting ideas. The act to open themselves to any possibilities beyond the firm proves that Inotech can extend their boundaries in capturing and gaining potential ideas.

4.3 Protecting assets

In openness spirit where sharing knowledge is the core essence, protecting assets as part of that innovation development is very important. Inotech, which used to adopt closed environment, now face some challenges in assets protection after they open themselves to outsiders which can be seen from the following explanation by the Service Operation Leader:

I always know when we invite people from different firm to come and work with us will also invite security problems of our resources and assets. Sharing assets are both useful and risky. However, this becomes an opportunity for us to improve it. We finally have a trigger to learn and update our security scheme.
- Service Operation Leader

In their research collaboration, Inotech shares their resources, allowing partner to access their assets in favor to make a good progress on their research. A challenge for protecting their assets is they have to find and create a scheme where they allow their partner to access the amount of resources they needed easily but still lock the door to other restricted resources. They did these using 3 layers of assets protection. Service Operation Leader described their effort in creating this scheme and 3 layers of protection:

When we agree to collaborate in a research or product development, we sign contracts. In this contract, we clearly state which assets they can and can't access, what they are allowed to do and don't with our assets and manage the right of intellectual property once the product is finished, this is the first layer in the contract agreement phase. Next layer is when we use a real time system which checks and protect our resources, we know every user who access our codes, files and other resources. Of course, every user is given their own privilege to access valuable assets. This real time user is run during the development process. The last layer is in the post development phase where we check once again every source which is used to develop that innovation.
- Service Operation Leader

Based on the explanation of service operation leader above, I create a chart to get a clearer perspective at the 3 layers assets protection which can be seen in the next figure:

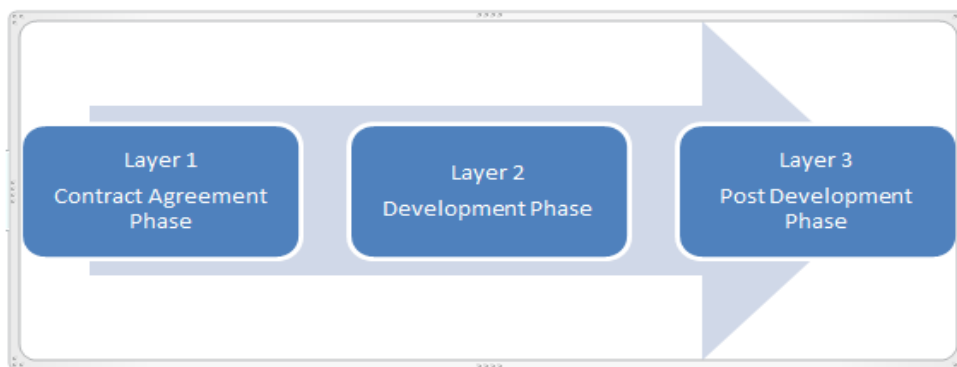


Figure 1 Layers of Assets Protection

The first layer is the contract agreement phase. In this phase, Inotech and the partner discuss the rights to access particular assets and set the boundaries to forbidden assets. They also discuss the intellectual property or patent agreement. Second layer is development phase where they monitor every asset, both assets which are used and not used in the development, in the firm using real time system. The third layer is post development phase where they re-check every asset used in the development to identify whether there is an access violation.

However, as stated by the Service operation leader below, they realize this system has flaws and needs to be improved again:

The system has flaw in detecting whether the real owner of an account is using their account or not, the account could be borrowed or used by another person. Even when the real owner using their account, an inside job which could steal our data can also happen. This fear triggered because the frequency of our employee to work and meet our client is high. It increases the opportunity to betray.

- Service Operation Leader

Therefore, Service Operation Leader explained that Inotech face another challenge which is to create trust and sense of belonging among the employees:

Our employees are our most valuable assets. We have to protect them and make them happy and satisfy so they could give their best effort in doing their job and develop their sense of belonging to this company. However, it takes time to do it and quite hard, especially people come and go which is natural in a young R&D firm. But we believe if we invest enough in maintaining human resources, having adequate support from our parent's company to make the workplace more comfortable, it would not hard to achieve it. This will prevent raising a betrayal who could do serious damage like misuse authority to steal assets, especially now when we have to work with people outside the firm which we don't know their real intention

- Service Operation Leader

Another method to improve the employee's loyalty, trust and sense of belonging is to train them in a short class. To do this, the parent's company sends some expert trainer to teach Inotech's employee lessons in loving the job, creating best work practice and work ethics in working with partners. This short class is explained by the Vice CEO:

We have to maintain our employee's loyalty periodically. Every three months, HQ(headquarter) held some trainings in our office to do this. This training has to be attended by all the employees including me. This is important since we are new in doing business collaboration and we need to be properly trained

- Vice CEO

To summarize, in the implementation of an open innovation strategy, Inotech has to work with people outside the firms. They share their resources and assets, giving them privilege to use it for the necessity of the innovation development. Therefore, they face a challenge to protect important and forbidden assets from the outsider. To do this, they create 3 layers of assets protection. However, they also realize this protection has a flaw in ensuring the real user of certain account and this is related with the loyalty of their employees. So protecting and maintaining their employees become continuously challenges in order to prevent turn them into a betrayal.

4.4 Intellectual Property Issue

Even though it is part of assets protection, I create specific subchapter for Intellectual Property (IP) since it has a quite extensive explanation in managing this particular term. The open innovation strategy pushes the utilization of intellectual property to gain greater benefits in developing technology. Fortunately, Vice CEO stated that, *“Our HQ has produced a lot of patents in many different fields. They have been encouraging us to exploit some of the patents for developing more innovations and more patents.”* This becomes a strong point for Inotech to exploit.

However, the process becomes more complicated when they need a certain patent to be used in a collaboration research.

Our internal research has been exploiting those patents. But when it comes to collaboration project with other firm, we cannot simply use all those patents. Only selected patents can be used and there is a set of protocol made by HQ that Inotech and our partner need to obey
- Vice CEO

Then, Vice CEO explained that the protocols were made to protect the patents and to ensure that the patents can be used without any fear to violate patent regulation. Furthermore, the protocols makes the owner of the patent, in this case the Inotech's parent company, has a full control ownership of whatever the result of the collaboration, whether in the form of product, service or new patent. The explanation on how the protocols protect the patents can be seen from the description by the Vice CEO below:

Because of confidential reasons, I can't give you the details of the protocols. But basically it is protecting the owner of the patents. The protocols make a clear statement that the result of the project, which uses the patent will be owned by the owner of the patent. It can be in a form of products, service, knowledge or new patent. It is logical since patent gives a big contribution in innovation development
- Vice CEO

In the case when Inotech uses patent which belong to another firm or combination of patents from both firms, the protocols usually are not used. They create new agreement which favors both firms' policies

In using the external patent in our collaboration research, we create new agreement. The negotiation might take time as we strive to put most of the points in our protocols in that new contract and align it with what they ask - Vice CEO

Vice CEO also mentioned that “Some of our patents have been attracting both major and minor player in IT industry to use it as their innovation resources”. Therefore, the business of licensing patents could bring great economic benefits for Inotech since they develop their own patent. However, they still need more times to be ready to license it. Project Leader B explained this matter:

Patents are everything in innovation and by licensing the patent, it could be a money maker. Our researches have produced many valuable knowledge and patents. However, Inotech is not ready yet to license our own patent since we need to learn first the strategy in licensing from our HQ - Project Leader B

Inotech also realize that licensing is a risky business. There have been many cases of patent violation around the world. Their parent company also a victim of this case and cost them a lot. Obviously Inotech does not want the same mistake happened to them. Therefore, they learn from their parent's mistake and develop a strategy from it.

Yes in recent years our HQ has been involved in several IP violation cases with other major IT corporation and cost them billions of dollars, you can read it in the news. Of course we don't want the same thing happen to us. By the support of our HQ, we have been studying the case and make some notes. We also develop a strategy from it so we can license our own patent in the future - Vice CEO

Vice CEO explained that the license strategy that has been developed by Inotech is about how to exploit the patent in gaining maximum economic advantage. Furthermore, he also explained that they also learn to measure which patent is the most valuable by predicting the direction of IT development in the future.

In simple words, our license strategy is basically calculating numbers for the price tag to each of the patent, which patent is the most worthy of value and how it could attract IT industry by looking the trend of future IT. You can see it is more like marketing job. However, I can assure you that it is a challenging job since it is also involved with international patent law - Vice CEO

In summary, intellectual property challenges, which Inotech has been addressing, are mainly related with the use their parent's company patent in a collaboration project with Inotech's partner. There are protocols that need to be followed before they can access the patent. However, as explained from the data above, these protocols are only applied when they work with partners outside the parent's company organization, they do not need these protocols for their internal project. Inotech also has been developing licensing strategy with their parent company in order to exploit their patent to obtain economic benefits. It is clear that these protocols and licensing strategy proves that collaboration as part of innovation strategy affects the management of intellectual property and raise challenges in protecting it.

5. Discussions

This study aims to answer a research question: *what are the firm-level challenges and opportunities with using an open innovation strategy?* By interviewing several people who work in Inotech, I got insights on the kind of challenge they face so far. In this section, I compare the results from this study with the existing literature.

5.1 Overview and implication of findings

Inotech who runs an open innovation strategy in their projects faced various challenges and opportunities. From the findings above, the challenges mainly occur because of the effort in embracing the possibilities outside the firm by making network and collaboration with external actors as the essence of open strategy. Collaboration with external actor put them in difficult situations where often they do not know the character of their partner which leads them to do extra efforts for building a good teamwork. An advantage for embracing openness paradigm is it creates paths to capture ponds of external ideas. However, firms have to face a challenge which is to be more creative to create these paths in order to lure potential ideas for their innovation. Then, engaging the external environment also put them in a scheme of sharing knowledge and assets. Therefore, they need to improve their assets protection scheme in order to protect their valuable assets from the misuse of authority in accessing their assets. This is also affecting their intellectual property. In the following paragraphs, I explain the challenges in each aspect and its relations with previous studies.

5.1.1 Firm's Management

As an action to embrace openness, Inotech has been developing their network and engaging in many collaboration schemes with their partners. Each partner serves with different purpose and goal depends on the innovation that they want to create. Therefore, as stated by Vice CEO, Inotech's management has to uncover the characteristic of the partner they work with. The characteristics are about the culture, people and passion. Furthermore, because of each partner has different characteristics, it increases the burden for the management to deal with every one of them. This challenge in managing collaboration with different characteristic is aligned with the finding of organizational and cultural issues in collaboration form with external partner (Van de Vrande et al, 2009). This finding emphasizes the big effort to address these issues in order to

accelerate the innovation development. Then, the data above also describes the effort of Inotech to address this cultural challenge by creating good relationship and constant communication with new partners. This also aligned with previous study, which emphasizes the importance of maintaining a relationship with partner's management and team member from early stage of collaboration (Wenzlaff & Singh, 2015). The constant communication of Inotech helps them in preventing multi organizations issues or solving multi organizations problems, which already occurred. This communication has the same spirit with prior study which explained that effective communication on multi organizations and cultures is essential, especially in generating solution (Felin et al, 2014) for solving cross organization problem (Allen et al, 1980).

5.1.2 External Ideas

Most of previous studies have shown that there are many possibilities for open innovation firms to access external ideas outside their firms. The previous researcher stated that working with the open innovation strategy means the firm has to actively develop their business network and make collaboration to generate pools of ideas (Chesbrough, 2004). Inotech knows their resources are limited, even with the backup from their parent's company. Therefore, as stated by vice CEO, Inotech has been engaging in many different forms of collaboration with various different parties as they effort to build a business network. So far, they already have collaborated in the forms contracts, partnership and competition. This finding also confirms the result of previous research that stated firm who implements an open innovation strategy can use various forms of collaboration (Felin et al, 2014).

In spite of being in many collaboration forms, Inotech realize that they need to be more creative in order to uncover hidden knowledge. As mentioned by the product management leader, by gaining more knowledge, they can extend their imagination in designing products. Therefore, Inotech has been working on their creativity skill to create more path to reach different area of business as stated by vice CEO. This effort has a similar spirit with the previous finding which stated that because knowledge is distributed broadly, organization have to figure a way to connect knowledge as a core process in innovation development (Chesbrough, Vanhaverbeke & West, 2006). This indicates that Inotech put big attention in discovering more knowledge outside the firm.

Previous research stated that many firms have a tendency to adopt NIH syndrome, which might hinder the success of the open innovation strategy (Mehrwald, 1999). However, the finding above confirms that the willingness of Inotech to pursue and utilize external knowledge from various external collaborations for their innovation development prove that they do not have such syndrome. This also support the result of previous research which stated open innovation firms are less infected than closed innovation firms (Herzog et al, 2010).

5.1.3 Assets Protection

As part of collaboration scheme, assets protection in knowledge sharing has been one of the concerns by both researcher and professionals. As stated by the service operation leader, Inotech is addressing this challenge by creating 3 layers of assets protection. Furthermore, the first layer scheme of Inotech's protection scheme which manage the distribution and accessibility of the

assets is similar to the layered collaboration scheme: one of the two methods on knowledge sharing strategy which introduced in previous study (Bogers, 2011). This indicates that Inotech take a very careful action regarding their assets protection. Furthermore, I could argue that the similar strict protective action also has been done by others firms in IT industry. Another implication which can be taken from this Inotech's action is even though the trust is playing a significant role in collaboration, firms still take preemptive action regarding their assets. It also gives another lesson to other firms who just start doing collaboration: not to fully trust partner especially when it comes to assets sharing.

5.1.4 Intellectual Property

Inotech has not started to license their own patent. However, they still can access and utilize their parent company's patent in their innovation development, including in collaboration. This indicates that they realize the potency of patent development in creating a valuable innovation and also open another possibility to extend the utilization of patent through licensing business. Furthermore, as Vice CEO stated above, they have taken this aspect into serious matter by developing a strategy to maximize the potency of patent licensing business. They forecast that licensing could become a major profit in IT business. What Inotech did could be a picture of most of IT firms do as they see an opportunity in the IP exploitation. This indicates that in future we can expect a bigger market in license, which populated by both big and small IT firms. The growth of licensing market is aligned with the mindset changed by most of the IT industry actors: the more they realize the potency of their IP in an open environment, the more their willingness in to engage in their IP to global market. The same idea also stated from previous research which suggested that the act to control and monopoly an important technology for an extended period are not favored anymore because of the mindset regarding IP utilization changes greatly (Chesbrough, 2003).

Previous studies indicated that some of IT firms still open their innovation process partly (Lichtenthaler, 2010) including opening their IP access. The reasons are firms might still in shifting phase from close to open strategy (Chesbrough, 2003) and big firms who have a superior patent portfolio rely more on internal development (Lichtenthaler, 2010). In relation with Inotech, it could be argued that Inotech follow the premise of partly open innovation based on 2 evidences. First, Inotech only allows some of their patents to be used in collaboration project. This can be seen from the statement of Vice CEO which explained that only selected patents can be accessed by partner. Second, Inotech has been developing their own research by exploiting their parent company patent. It proves that the parent company still relies their research development internally which also can be gained because the superior patent portfolio owned by the parent company. However, this partly open behavior of Inotech is still presumption which needs to be investigated more and requires more data.

6. Conclusions

This paper has found the potential challenges and opportunities associated with the open innovation strategy in a research and development firm in Indonesia, Inotech. The openness scheme is one of the major factors for the challenges to occur. The challenges are identified and categorized into four categories. The first category is managing collaboration. The challenges in this category revolve around how the firm struggles to build a good relationship and collaboration with partner who has different characteristics. The second category is about how to capture external ideas. It is identified that the firm should be more creative to create collaboration method with partners outside the firm, convince them to allow the firm uses the idea and create a mutual agreement with them. The third category is asset protection which becomes harder because there is an involvement from partner to access the assets. The last category is Intellectual Property issue. The challenges revolve around how to exploit IP in collaboration project and at the same time how to protect it so IP violation can be prevented. The challenges also includes on how to create a good strategy for selling patent.

This study also has managed to identify the partly open innovation scheme as an opportunity that the firm chooses to implement. This indicates that the firm still aware their own potential ability to develop the innovation and does not give 100% trust to their partner. Another opportunity is the implementation of the layered collaboration scheme as their knowledge sharing strategy. It suggests that the firm takes a very careful action regarding their assets protection

I argued that I have contributed valuable information about challenges and opportunities from the findings of this study. Furthermore, I also argued that this study has contributed in adding more information in an open innovation strategy area. This paper also has presented the concept of an open innovation strategy with supporting theory and concept. This research was executed by using a case study with a qualitative method. Furthermore, to gather the data, interviews with open questions were used. Moreover, by doing such method, the research found several limitations which already explained well in this paper. Despite the limitation and future research opportunities, I believe with this paper I have contributed a new piece of puzzle by adding knowledge on innovation strategy topic.

6.1 Suggestions for future research

Based on this research, i found several opportunities to conduct further research towards the implementation of an open innovation strategy. First, it is clear that this study does not investigate the detail process of how the firm adopts the open innovation strategy, especially the shifting process from closed to open paradigm. This research aims on the challenge which encountered by the firm while already run an open innovation strategy. Therefore, there is a gap of knowledge on how the firm executes the shifting process of their mindset and innovation development from closed to open environment. This could be an interesting point to investigate for further research, especially not many studies investigating this particular topic.

Another opportunity for future research is related with the limitation of this study. This study investigates a single firm which makes the case very subjective and very specific context. There might be some conditions or situations which are not relevant in other firms. These conditions will affect the type of challenge which might occur. Therefore, I suggest to conduct a research which investigates more than one firm in order to get more variation of challenges, conduct a comparison between the firms and investigate the factors which contribute to the difference. Hopefully, by doing this approach one can get a better perspective in understanding the process in running an open innovation strategy.

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Appendix

Interview Guide

- Can you tell me a about yourself, your position and your responsibility in the company?
- Can you tell us a about the company's profile and company's vision and mission?
- If you don't mind, please explain the previous strategy of firm where Inotech still used closed innovation?
- What are the reasons for Inotech to turn into an open innovation strategy?
- After turning into open strategy, what sort of collaboration type does Inotech engage in? Who are the partners?
- How Inotech convince the parent company that those collaborations will enhance the process of innovation development?
- What sort of problems that Inotech has been addressing so far while working with partners? What is the strategy to address those problems? Is there any precautions act in order to prevent those problems or new problem to occur?
- How is the process for Inotech to create a business agreement with partners? Why do you think those agreements will give benefits to both parties?
- Is there any problem in creating the business agreement? How does the firm handle it?
- What is the firm strategy to protect the firm's assets in collaboration project?
- In your opinion, what are the most valuable assets which the firm needs to protect?
- How the Inotech's parent company protects the assets which used in collaboration form? Is there any specific strategy that they made regarding to this?
- Can you explain the process of acquiring external knowledge that Inotech has been doing so far? Is there any particular or specific knowledge that Inotech aims to?
- How is the strategy for licensing patent in your firm/parent company?
- Up until now, Inotech's parent company is involved in several Intellectual property violation cases. How do these cases affect Inotech?
- What sort of lesson that Inotech could learn from those IP violation cases?