



Research Article

© 2022 Kusmintarti et al.
This is an open access article licensed under the Creative Commons
Attribution-NonCommercial 4.0 International License
(<https://creativecommons.org/licenses/by-nc/4.0/>)

Received: 12 January 2022 / Accepted: 18 April 2022 / Published: 5 May 2022

Management of Research Results and Intellectual Property Commercialization

Anik Kusmintarti^{1*}

Sidik Ismanu¹

Erfan Rohadi²

Moh. Abdullah Anshori³

Ratna Ika Putri³

¹Lecturer, Department of Accounting,
State Polytechnic of Malang, Indonesia

²Lecturer, Department of Information Technology,
State Polytechnic of Malang, Indonesia

³Lecturer, Department of Electrical engineering,
State Polytechnic of Malang, Indonesia

*Corresponding Author

DOI: <https://doi.org/10.36941/ajis-2022-0091>

Abstract

The purpose of this research is to develop a model for the management of innovation products and intellectual property commercialization on Vocational Higher Education. This research and development study is conducted at the State Polytechnic of Malang. The research composed of a certain steps include: (1) identification of potential problems; (2) collecting information; (3) designing a model for the management of innovation products and intellectual property commercialization; (4) validation of the model; and (5) model design improvement. The results show the number of the research result products produced by lecturers and students tend to increase every year. Majority of the invention products are classified to the pre-commercialization stage, proposal of a model of the management of innovation products and intellectual property commercialization through the following steps: (i) Collecting research results in the form of prototypes or models; (ii) Protecting IPR; (iii) Exploring cooperation with partners, and (iv) Commercialization. Collaboration between universities, government, communities and industry is very important to conduct before and after research for the purpose of the results match community needs.

Keywords: Innovation products, Intellectual Property, Commercialization

1. Introduction

An invention will become an innovation product if it provides benefits to the community and can be commercialized. There are several definitions of invention written in a number of innovation literatures. Roisah, Setiyono, and Widhari (2020) define an invention as an inventor's idea to solve a

specific problem by using technology. It can be in the form of a product or process, or improvement and development of a product or process. Inventors have to register patents for their inventions in order to get legal protection, and to publish them. Innovation is a process of creating ideas, developing a novelty, and introducing a new product, process or service to the community (Mohamad and Sidek, 2013). This means that research results that cater to the needs of the community will produce inventions that are valued and beneficial to the community.

Generally, the main motivation for conducting research at the national and international level is to design/develop a product that contributes to the economic development of the community (Kireyeva, Turdalina, Mussabalina, Turlybekova, Akhmetova, 2020). Furthermore, the invention has the potential to become an innovative product that can be commercialized. Universities should be centers where colleges and businesses co-locate and work together on projects addressing real-world problems (Muhibbulah, Mamun, and Afroz, 2021). Therefore, Focus Group Discussions from universities, represented by Assistant Director IV for Cooperation and Center for Research and Community Service, researchers, industry, and the Government, are important in order to generate problem-solving ideas in the community to be followed up by research.

Works that are produced on the basis of human intellectual abilities, through the outpourings of energy, thought and creativity, taste and intention, are secured by developing a system of legal protection for such assets. Intellectual Property Rights are private rights for someone who produces an intellectual work. Waspiah, Rodiyah, Latifiani, and Setiaji (2020) stated that the right of human intellectual abilities in the form of works, initiatives, and creativity are beneficial to society and have economic value. Intellectual property is grouped under two categories, namely copyrights and patent. The law of the Republic of Indonesia, which was number 13 of 2016 on patent stated that patent are exclusive right granted by the state to inventors for their inventions in the field of technology for a definite period of time. Furthermore, the law of the Republic of Indonesia, which was number 28 of 2014 on copyright mentioned Copyright are exclusive right of the author vested automatically on the basis of declaratory principle after Works are embodied in a tangible form. The development of the nation and enhancement of the general welfare is strongly supported by Intellectual property. Wealth in the form of works produced through human imagination or intelligence that has economic value or benefit to human life, can also be considered a commercial asset (Setyowati, Lubis, Anggraeni, and Wibowo, 2005).

The number of research finding from intellectual work conducted by lecturers and students at the Vocational Higher Education, especially at the State Polytechnic of Malang, are quite significant. Most of the research result are in the form of prototype and model, but only few are used by the community or commercialized. The lack of use or commercialization is due to management inefficiency. Andrianto (2016) stated that invention product are product driven. The product require innovation to be accepted by the market. As such, the results of these studies require effective management, so they can benefit the community and can be commercialized. The inventor's intellectual work must have IPR in order to get legal protection against infringement of intellectual property. The next step is the commercialization of IPR, which is the process of bringing Copyright Technology and turning it into commercial goods or services based on market demand. In this respect, the result from research can become innovative products that are beneficial to the community and become solutions to problems faced by the community.

Business incubator is an intermediary institution that carries out the incubation process for the incubating participant. According to Bayhan (2006) business incubator is an institution that helps startups, where entrepreneurs receive pro-active assistance for their business to grow. Besides that, they also get access to information, education, contacts, resources and capital that cannot be obtained on their own. Business incubator plays a role in processing an innovation product and help the innovators to turn them into commercial products. In this case, business incubators help technology-based startup tenants to explore the technology market, develop prototypes, establish new businesses to start the commercialization process. Chung (2014) stated that customer demand should concentrate on solving customer problems, design optimal problem solving, create

differences between competitors, and formulate optimal marketing strategies.

Research ideas originating from problems in society tend to produce innovative products that are valued and beneficial to the society. Cooperation between industry and academia is needed so that innovative products can be mass-produced. The purpose of this study is to build a model for managing innovation product and commercialization of IP at Vocational Higher Education. This is a Research and Development study, which is carried out at the Vocational Higher Education, Malang State Polytechnic. The results of the research are in the form of a model for managing innovation products and commercialization of IP, which consists of 4 stages, namely: Accommodating research results, providing IP protection, exploring the degree of cooperation with partners, and commercialization of IP.

2. Literature Review

2.1 Overview of innovation and product innovation

Innovation begins with an idea that is turned into a concept. Several authors of the innovation literature define innovation to be a new development of a product that already exists and can be implemented to realize several purposes (Gaynor, 2002). Furthermore, Rogers (2003) defines innovation as an idea, practice, or object that is considered new or has not existed before by an individual or another unit. OECD (2005) stated that innovation is the implementation of new products, a significant product or process development, new marketing methods, new organizational methods within business organizations or public organizations. Innovation consist of: (a) product innovation, (b) process innovation, (c) marketing innovation, and (d) organizational innovation. Product and process innovation are closely related to technological innovation, while the scope of innovation in marketing and organization, related to various innovations that are not technology-based. Furthermore, Kotler, Wong, Saunders & Armstrong (2005) stated that innovation is defined as the development of an idea, service, product or technology that did not exist before, and which customers perceive as new. It is the process of identifying, creating, and delivering value for a new product or service that was not previously available in the market. Product innovation is product development that is different from and complements previous findings with different qualities (Atalay, Anafarta & Sarvan, 2013). On the other hand, Oslo Manual OECD (2005) stated that product innovation is the introduction of new or significantly improved services or goods compared to existing services or goods in the organization. These innovations include significant improvements in several things, namely: characteristics of goods or services, customer access or how these goods or services are used. Furthermore, Rayi and Aras (2021) stated that product innovation has a significant influence on the purchasing decisions of consumers.

2.2 Intellectual property rights

Intellectual work is produced from human intellectual ability through the outpouring of time, energy, thought, creativity, taste and intention. Subroto and Suprapedi (2008) stated that Intellectual Property Rights (IPR) are rights related to property created through human intellectual abilities. These abilities can be in the form of works in the fields of technology, science, art and literature. Intellectual works deserve legal protection, which is called Intellectual Property Rights (IPR). Figure 2.1. explain the relationship between IP and IPR.

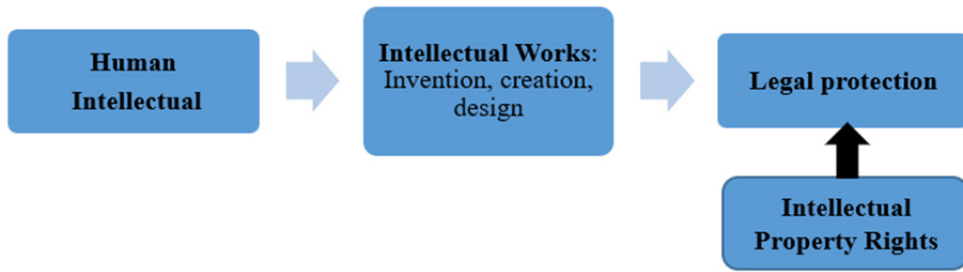


Figure 2.1: Relationship between IP and IPR

Intellectual Property Rights is a private right of someone who produces an intellectual work. Countries give special rights to individuals as inventors, creators, designers and so on, intended as an appreciation of their work. This motivates them to develop further research work. Furthermore, the existence of IPR supports a good documentation system for human intellectual works so that the possibility of others copying their work can be avoided.

2.3 Commercialization of Intellectual Property Rights

Technology commercialization is defined as moving technology to a profitable position. This can be interpreted as technology being developed based on consumer needs, so that it can be mass produced and can benefit the inventor (Siegal, Hansen and Pellas, 1995). Intellectual works that have been registered with IPR have advantages, namely promoting product inventions and stimulating the creation of information transfer efforts through intellectual property and technology transfer through patents, all at the same time. Parker and Mainelli (2001) Stated that big mistakes that are often found in the commercialization of technology, namely: assuming features will be useful; using 'top-down' approach for market analysis; avoiding the 'chicken gun' test; not placing someone in charge; not fully adapting to the new technology.

An exhibition of intellectual works at the Vocational Higher Education for the public, government, and industry, is useful for publishing the works of lecturers and students. It is hoped that after the exhibition, there will be a demand for intellectual works from external parties, including: Industry, City Government, Regency Government, and various other agencies. In this way, the commercialization of IP can be carried out.

Can get feedback on their product improvements, both in terms of operations and maintenance, when they interact with the community, who are the product researchers. This is at the application of science and technology through the diffusion of innovative products and efforts to increase public confidence in the innovative products of intellectual work from Vocational Higher Education, especially research-based innovation products. Figure 2.2. explain the stages of the transformation of knowledge/ technology/ invention into a commercial form, namely: research base, pre-commercialization, and commercialization.

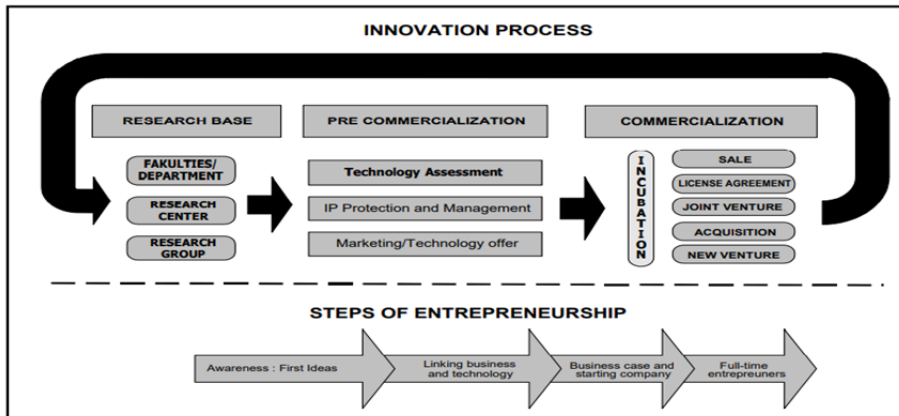


Figure 2.2: Stages of the Transformation of Knowledge/Technology/Invention into a Commercial Form (Setyowati, Lubis, Anggraeni, and Wibowo, 2005)

2.3.1 Research Base

The research was carried out by researchers through the Research and Community Service Institution which has collaborated with the government and industry. The research implementation is both IPR-oriented and business-oriented, referring to market needs, so that research products can have commercial value.

2.3.2 Pre-Commercialization

The intellectual works of vocational higher education, both the works of lecturers and students, cannot all be directly commercialized. These works are in the form of a prototype, so it requires an assessment of their intellectual property in order to evaluate the commercial potential of the product.

The stages of activities included in the Pre-commercialization are:

- a. **Technology Assessment**
Technology assessment is based on the potential legal protection feasibility (IPR), commercial feasibility and technical feasibility.
- b. **IP Protection and Management**
Legal protection of its technology and management, e.g. maintenance and subsequent management.
- c. **Marketing/Technology Offer**
Technology offerings to potential users—A technical and financial feasibility assessment is carried out first, so that potential users get a clearer and objective picture of the advantages and disadvantages of the technology offered.

2.3.3 Commercialization

Base on technology assessment results, commercialization efforts can be carried out immediately. The form of commercialization that can be taken into consideration include: licensing, sales, new venture, joint venture, acquisition and strategic alliance. A preparation of a business plan or incubation stage needs to be carried out, especially in the commercialization of a new venture, joint venture, acquisition and strategic alliance.

3. Methodology

This is a Research and Development Study, which is conducted at the State Polytechnic of Malang. Research respondents are the Director, Head of Research and Community Service and the Secretary of Research and Community Service. Types of primary data are obtained through structured interviews. Gall and Borg (2003) stated that there are ten stages in conducting research and development. This study used five stages, include: Identification of potential problems, data collection, Model design, design validation, and design improvement. Specifically for the design validation stage, inviting manager of business inkubator.

4. Results

4.1 Identification of Potential Problems

The support of the State Polytechnic of Malang for the development of innovation is reflected in the Strategic Plan for the Research of The State Polytechnic of Malang 2021 – 2025. This is unified in the flagship research theme of The State Polytechnic of Malang, namely: "Accelerating the Implementation of Applied Research and Technological Innovation is One of the Efforts to Increase the Competitiveness of the Nation." This shows the characteristic of the State Polytechnic of Malang as a Vocational Higher Education that will produce applied research, and innovation product that can be useful for the society and the development of science and technology.

The intellectual works of lecturers and students are in the form of prototypes and models. Registration of Intellectual Property Rights (IPR) for the intellectual works of lecturers and students needs to be done, so that they are documented and protected from being copied by others. As of 2021, The State Polytechnic of Malang has 31 granted patents, 307 copyrights, and 45 patent titles that are currently under review. However, this intellectual work cannot yet be commercialized because it has not been tested and demonstrated in an actual environment. So, it is not possible to know the success of its operation. Therefore cannot be commercialized.

4.2 Data collection

The respondents of this research are the Assistant Director I for Academic Affairs, Research and Community Service, Head of Research and Community Service and Secretary of Research and Community Service. Data collection is through structured interviews. Here are the respondents' questions and answers.

Question: Does the State Polytechnic of Malang provide support for the development of innovation?

Respondent explained that supporting to the development of innovation at the State Polytechnic of Malang is provided through the implementation of research schemes, specifically aimed at producing innovative products. This is stated in the master plan for the development of The State Polytechnic of Malang, especially in the 2020-2024 development plan. Research schemes at State Polytechnic of Malang are grouped into basic research, applied research and developmental research. The grouping is determined based on the Technology Readiness Level (TRL) of the research. Some of the studies included in the applied research scheme are innovative research, industrial collaboration research and applied research. industrial collaboration research and innovative research have a development research scheme, characterized by TKT 9 with the outputs of Feasibility study and business plan. However, until 2020 no one has reached TRL 8-9.

Efforts to produce research outputs in the form of innovation products have been carried out by The State Polytechnic of Malang through the Research and Community Service Unit. In 2020 and 2021, the State Polytechnic of Malang through the Research and Community Service Unit will hold a Focus Group Discussion by inviting the Development Planning Agency of Malang Regency,

Community and the Head of the Department/Study Program Coordinator to discuss problems in partner villages that can be resolved through lecturer research and application of the results. Furthermore, funding is provided for the research are based on the needs of the community or by solving the problems of the user community.

Question: Researchers have produced an invention. How is The State Polytechnic of Malang's efforts protect the invention from being copied by others and whether the researchers have registered for copyright or patents on their inventions?

Respondent explained that the State Polytechnic of Malang has an Intellectual Work Center which is managed under the Research and Community Service Unit. Support for strengthening innovation is also provided by The State Polytechnic of Malang in the form of acquisition of Intellectual Property. Acquisition of IP is very much needed before research results are commercialized. Until 2021, The State Polytechnic of Malang has had 31 patents granted and 307 copyrights granted. 45 patent titles are under examination.

Question (Q): Are there any intellectual works that are used by the community?

Respondent explained that quite a number of invention products have been provided and utilized by the user community. The innovation product is the result of research and is provided to the community through community service programs.

Question (Q): Are there any research results that are of interest to the industry?

Respondent explained that In 2020 PT Sampoerna needed equipment, and it has been followed up through collaborative research between industry and researchers at the The State Polytechnic of Malang to produce products ordered by the industry. However, until now there has been no commercialized research products available.

Question (Q): Is there a collaboration between inventors and business incubators to commercialize innovative products?

Respondent explained the Malang State Polytechnic Business Incubator is still new. In 2019 two innovation products participated in the Prospective Beginner Company Based on Technology (CPPBT), but did not pass the selection. In 2020 and 2021, a number of student innovation products have received funding from the Ministry of Education and Culture.

Question (Q): How is the management of product innovation and commercialization of IP at the State Polytechnic of Malang?

Respondent explained that the research results in the form of prototypes and models are collected in the Research and Community Service Unit. Until 2021 The State Polytechnic of Malang had owned 31 intellectual works that were granted patents and 307 intellectual works that were granted copyrights. 45 patent titles are under examination.

4.3 Model Design

Referring to the results from data collection, the State Polytechnic of Malang had produced research products that have patents and copyrights, and a number of research products have been developed and utilized by the community through community service programs. Malang State Polytechnic had also conducted collaborative research with industry, however until now there has been no commercialized This shows that research products that have patents have not been offered to potential users. Figure 4.1 illustrates the management of innovation products and the commercialization of Intellectual Property at the State Polytechnic of Malang.

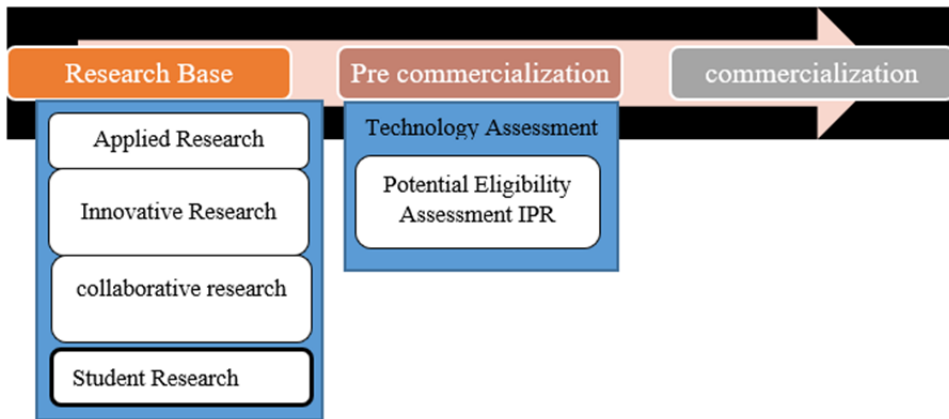


Figure 4.1: The management of innovation products and the commercialization of Intellectual Property at the State Polytechnic of Malang

4.4 Design Validation

The thought of managing innovation product and commercialization of IP in order to contribute to the Malang State Polytechnic and the economy, is important. For this purpose, the researchers held Focus Group Discussion with resource person Chairman of the East Java business incubator, Ary Bachtiar Krishna Putra ST.,MT.,PhD. The following summarizes the results of the Focus Group Discussion.

Question (Q): State Polytechnic of Malang as a Vocational Higher Education. The research results are in the form of prototypes and models, which are likely to be in demand by the industry. The State Polytechnic of Malang also has a Intellectual Property Center which is managed under the Research and Community Service Unit. In the last 2 years the number of patents is quite significant. However, not all researchers have the capability to analyze the market and have any relationship with the industry. According to Mr. Ary, how are the research results managed effectively?

Respondent explained that State Polytechnic of Malang has a Intellectual Property Center. It is good. Reality not all research results meet the IP (Intellectual Property) requirements. Assistant Director IV for Cooperation will assess if the research results have reached the Intellectual Property stage, whether they can make a contribution to university, and are worthy of commercialization. Besides, not everything that goes through the Intellectual Property stage can be commercialized. Research results will first undergo screening by the campus, to determine which products are eligible to become innovative products. It takes time to assess the researcher's prototype. It cannot depend just on the perception of the researchers themselves. Regarding commercialization, the university must have someone who understands business. Universities want to get income from the commercialization of research results. If there is a company that needs assistance, the request will be submitted to the university and then to the researcher who have the appropriate expertise and competence. Furthermore, the researcher will proceed with the research work in collaboration with the company.

Question (Q): At your university, who is in charge of managing research results?

Respondent explained that TTO or Technology Transfer Office is an institution that manages research outcomes in universities. The position of TTO is under the University Chancellor. TTO management is under a person specifically assigned to manage TTO for daily affairs. Managers should not be lecturers, but human resource management from outside the university who understand TTO and are dedicated to managing TTO. In addition, there is also a need for legal experts. If universities

have legal experts and legal practitioners, they can be empowered.

Question (Q): How is the management of research products at the State Polytechnic of Malang?

Assistant Director I's answer: Business Incubator Unit, Entrepreneurship Training Unit, Research and Community Service Unit, Teaching Factory and Assistant Director IV for Cooperation work together to manage research products that can potentially be innovative products. If the number of research products that are ready for commercialization is still limited, the management will be handled by one of the existing units, namely the Malang State Polytechnic ETU business incubator. The process of managing the innovation products and commercialization of IPR begins with Research and Community Service Unit collecting research products and then assessing the potential feasibility of technology. If the product is considered to meet the IP requirements, Assistant Director IV for Cooperation will explore ways to cooperate with partners. If the research results will be used as a startup, then it is incubated at business incubator, and mass production is carried out at the relevant TEFA. So, the units, namely, the Research and Community Service Unit, the Malang State Polytechnic ETU Business Incubator, Teaching Factory, and Assistant Director IV for Cooperation are involved in the management of research results converting into innovative products and ready to be commercialized. If it is already running, the burden and the responsibilities are increasing, then a Technology Transfer Office (TTO) unit can be formed.

4.5 Design improvement

Based on the data of the management of innovation products and the commercialization of IP at the State Polytechnic of Malang, literature review, and input from resource person, researchers proposed the model for the management of innovation products and the commercialization of IP at the Polytechnic (Figure 4.2).

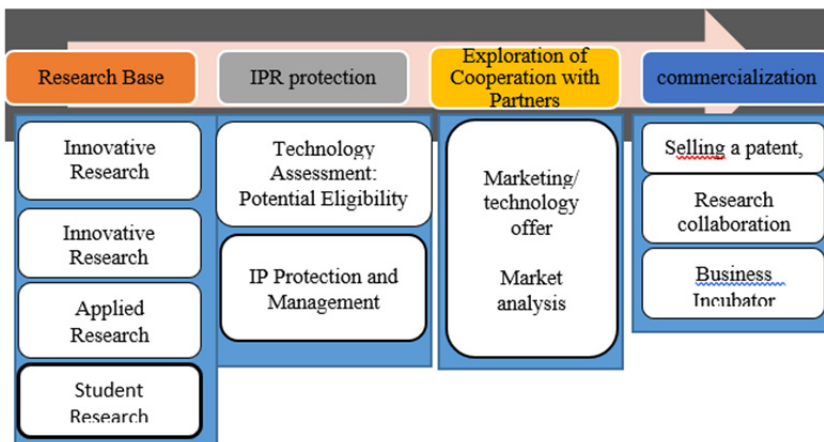


Figure 4.2: The proposed model for the management of innovation products and the commercialization of IP at the State Polytechnic of Malang

Management of innovation products and commercialization of IPR at the State Polytechnic of Malang involves 4 stages:

- Stage 1: Research Results
Research results in the form of prototypes or models are generated from applied research, innovative research, and industrial collaboration, as well as student research results collected by the Research and Community Service Unit.

- Stage 2: IPR Protection
The prototype or model enters the technology assessment stage to determine the potential feasibility of legal protection (IPR) as well as IP Protection and Management.
- Stage 3: Cooperation with Partners
Technology offerings to potential users. A technical and financial feasibility assessment is carried out first so that potential users get a clearer and objective picture of the advantages and disadvantages of the technology offered.
- Stage 4: Commercialization
Commercialization is carried out along 3 channels, namely: selling a patent, research collaboration, and business incubator.
The flow of management of innovation products and the commercialization of IP at the State Polytechnic of Malang is presented in Figure 4.3.

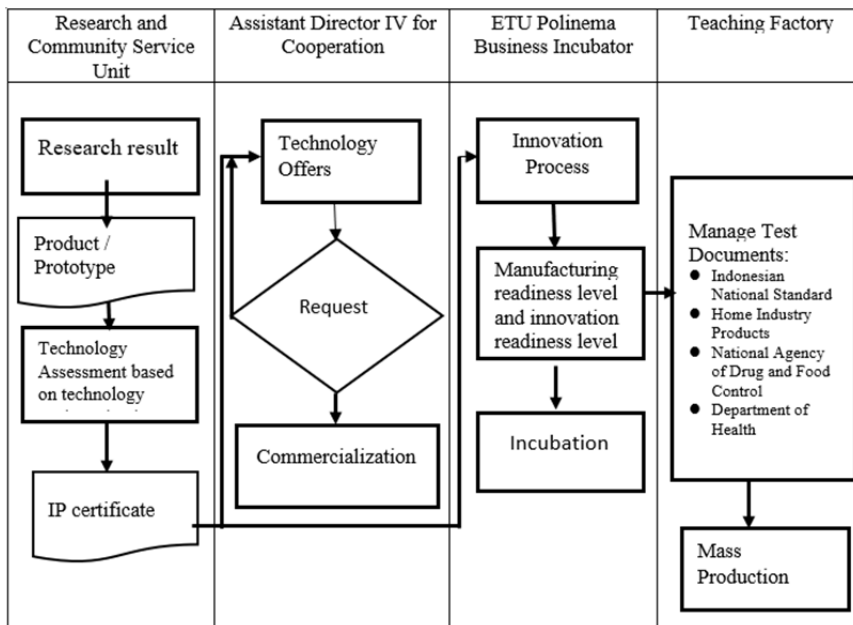


Figure 4.3: The flow of management of innovation products and the commercialization of IP at the State Polytechnic of Malang

5. Discussion

Findings of study suggest that the State Polytechnic of Malang supports the development of innovation. Several research schemes to generate innovative product outputs have been held, namely: innovative research, industrial cooperation research and applied research. Likewise, support for strengthening innovation is also provided in the form of acquisition of Intellectual Property. The number of innovative products produced by lecturers and students is the tendency to increase every year. Until 2021, the number of research results at the State Polytechnic of Malang that have been granted patents and copyrights is quite significant. A number of 31 intellectual works have been granted patents and a number of intellectual works have 307 granted copyrights. A number of 45 patent titles are currently under review. Furthermore, the products provided and utilized in the form of the community service program are also significant. However, until now, no research results have

been commercialized or mass-produced. This means there is a paradigm difference between researchers from Vocational Higher Education and use communities about innovation products.

The stages of the process of transforming knowledge/technology/invention into a commercial form include: (1) research base, (2) pre commercialization, and (3) commercialization (Setyowati, Lubis, Anggraeni, and Wibowo, 2005). Based on Setyowati, et al's concept (2005) that the product of research at the State Polytechnic of Malang is classified to the pre-commercialization stage, especially IP management and marketing/ technology offer. This findings supporting previous studies. Magdalena, Sutjiredjeki, and Nuryati (2020) argued that only a several universities and polytechnics commercialize research products, but continue to effort to improve their ability to commercialize them. The reason why research products have not been commercialized is the research products are not in accordance with the needs of the user communities, so they cannot become innovation products. This is due to the difference in paradigm between researchers from Vocational Higher Education and industry regarding product innovation. The findings are in line with previous studies. the Suryahartati (2019) suggested that the paradigm difference between universities and industry causes the IPR system in Indonesia to not significantly support and boost revenue and royalties; Parker and Mainelli (2001) suggested that big mistakes that are often found in the commercialization of technology, namely assuming the invention products will be useful.

Research result also explained that not all of the products of higher education research can be innovation products. This results corresponds to Subroto and Suprapedi's resuts (2008) that the product of the research must go through an assessment in terms of the potential of technology to see the feasibility of owning IPR, namely rights related to property, arising from human intellectual abilities.

6. Conclusion

Supporting to the development of innovation at the State Polytechnic of Malang is provided in form the development of research schemes specifically at producing innovative products and also strengthening of these innovative products. However, until now there has been no commercialized and not all researchers have the capability to analyze the market and have any relationship with the industry. Intellectual work from research results cannot always be commercialized due to the difference in paradigm between researchers and the user community. Therefore there needs to be a meeting between universities, government, user communities and industry to discuss community needs which can be resolved through research. Next, the products are analyzed to determine whether the research product is in accordance with the needs and desires of users or customers. Commercialization can be carried out through 3 channels, namely: selling off, industrial cooperation, and business incubators.

7. Acknowledgments

Financial and teaching factory facilities support from the university were obtained by researchers to carry out study. The researcher would like to thank the Director for his support.

References

- Andrianto, M. S. 2016. Sosialisasi Komersialisasi Inovasi Perguruan Tinggi. *Risalah Kebijakan Pertanian dan Lingkungan*. Vol. 3. No. 3. 216-227.
- Atalay, M., Anafarta, N., & Sarvan, F. 2013. The relationship between innovation and firm performance: An empirical evidence from Turkish automotive supplier industry. *Procedia-Social and Behavioral Sciences* 75 (2). 226-235
- Bayhan, A., 2006. Business Incubator Process: A Policy Tool for Entrepreneurship and Enterprise Development in a Knowledge-based Economy', *Competitiveness Support Fund*.

- Gall, M. D., Gall, P. J., & Borg, W. R. 2007. *Educational research: An Introduction*, Eighth edition. Pearson Education, Inc.
- Chung Liao, S. 2014. Using the MCDM of the Innovative Product Value Chain to Promote New Product Design. *East Asian Journal of Business Management*. Vol. 4. No. 3. 27-37
- Gaynor, G.H. 2002. *Innovation by design*. New York, American Management Association.
- Kireyeva, A.A., Turdalina, S. , Mussabalina, D. , Turlybekova, NM., Akhmetova, Z. 2020. Analysis of the Efficiency Technology Transfer Offices in Management: The Case of Spain and Kazakhstan. *Journal of Asian Finance, Economics and Business* Vol. 7. No 8. 735-746
- Kotler, P., Wong, V., Saunders, J. & Armstrong, G. 2005. *Principles of Marketing*. Pearson Education Limited. England
- Law of the Republic of Indonesia No. 28 of 2014 on Copyright
- Law of the Republic of Indonesia No. 13 of 2016 on Patent
- Magdalena, Sutjiredjeki & Nuryati. 2020. Overcoming the Challenges of Commercializing Research's Products of Higher Education in Indonesia: A Qualitative Approach. *Journal of Social Sciences and Humanities*. Vol. 10. No. 3
- Mohamad, M.R. & Sidek, S. 2013. The impact of Innovation on the Performance of Small and Medium Manufacturing Enterprises: Evidence from Malaysia. *Journal of Innovation Management in Small & Medium Enterprise*., 794-809.
- Muhibbulah, Md. Mamun, A.A. & Afroz, R. 2021. Quality of Higher Education: Improving the Well-being through Humanizing Digital Entrepreneurship Program. *Journal of Asian Finance, Economics and Business* Vol 8 No. 2. 1201-1213
- OECD Oslo Manual. 2005. *Guidelines for Collecting and Interpreting Technological Innovation Data*. Third Edition. Paris.
- Parker, K. & Mainelli, M. 2001. Great Mistake in Technology Commercialization. *Strategic Change* . Vol. 10. No. 7. 383-390
- Rayi, G. & Aras, M. 2021. How Product Innovation and Motivation Drive Purchase Decision as Consumer Buying Behavior. *Journal of Distribution Science* Vol. 19 No.1. 49-60
- Roger, E. M. 2003. *Diffusion of Innovations*. Free Press. New York
- Roisah, K., Setiyono, J., & Widhari, Y. 2020. The Protection of Employee Inventions on Private Employment Relationship in Pharmaceutical Industry in Indonesia. *Systematic Reviews in Pharmacy*. Vol. 11. Issue 12.
- Setyowati, K., Lubis, E., Anggraeni, E., & Wibowo, M., H, 2005. *Hak Kekayaan Intelektual dan Tantangan Implementasinya di Perguruan Tinggi*. Kantor Hak Kekayaan Intelektual. Institut Pertanian Bogor
- Siegal, R. A., Hansen, S.O., & Pellas, L.H. 1995. Accelerating The Commercialization of Technology Commercialization through co-operation. *Industrial Management + Data Systems*. Vol. 95. No.1. 18-26
- Subroto, M. A, & Suprapedi, 2008, *Pengenalan HKI (Hak Kekayaan Intelektual) Konsep Dasar Kekayaan Intelektual untuk Penumbuhan Inovasi*, Jakarta: PT Indeks.
- Suryahartati, D. 2019. Commercialization and Management of Higher Education Research Results in The Industrial Age 4.0: Intellectual Property Rights Perspective. *Intellectual Property Rights Review*. Vol. 2. No. 02. 127-136
- Waspiah, Rodiyah, Latifiani, D., & Setiaji, D.A. 2020. Advanced Training of Intellectual Property Documents of Industrial Designs for Goyor Sarong Craftsman in Pemalang. *Indonesian Journal of Advocacy and Legal Services*. Vol. 1. No. 2. 169-192