

# **Development of Research and Community Service Roadmap of UNESA**

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## **ABSTRACT**

The Surabaya State University (UNESA) is required to be able to independently manage institutions and be ready to innovate and collaborate with other institutions. The institutional and academic orientation has also experienced a paradigm shift from a teaching-based university to an entrepreneurial-based university. In the process towards independence, UNESA has prepared itself by compiling various documents required to become a State University with a Legal Entity (PTNBH). Research and community service activities are carried out in order to seek and find the truth through scientific methods in the fields of science, technology, or art for the advancement of science, technology, or art itself and the welfare of society. This study aims to produce the development of a road map document for research and community service (PKM) UNESA PTNBH. The main methods used to achieve this goal are reviewing documents related to research and community service, focus group discussions and workshops, and finalizing them. The resulting research outputs are UNESA PTNBH research and PKM roadmap documents and articles. The Technology Readiness Level (TKT) to be achieved at the end of this study is 3. The roadmap describes research and PKM plans from 2022-2045. There are 5 periods of time where the achievements are described in stages. Research is entirely based on innovation and commercialization (mass commercialization of innovative products) and also supports smart industry research and joint research with the world's multi campuses. Whereas PKM in 2045 is described as achieving independence and partnerships that empower 3 UNESA flagships (Disabilities, Sports, Arts, and Culture).

**Keywords:** *Roadmap, Research, Community Service, Academic, University*

## **1. INTRODUCTION**

Higher education research policy aims to improve the quality of research governance and efforts to increase institutional competitiveness in supporting programs in tertiary institutions[1]. Institutional studies are urgently needed to integrate existing human resource strengths in each unit, strengthen institutions, achieve academic quality standards, and internationalize institutions[2]. In the era of industrial revolution 4.0 and society 5.0 as it is today, Surabaya State University (UNESA) is required to be able to innovate and collaborate and be independent in managing itself[3][4][5]. UNESA must have insight into the future, by changing the mindset and governance system from depending on government budgets and routines, to entrepreneurial universities[6] and running a good governance system. Therefore, UNESA's institutional and academic orientation in the future must also change from a teaching-based university[7][8] to an entrepreneurial-based university, which can play a role both at the national and international levels. To prepare

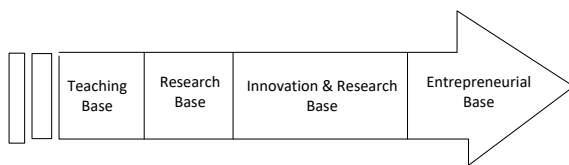
UNESA going forward toward the vision and mission, it is necessary to produce academic papers which provide an explanation of concepts, paradigms, policy directions, strategic goals, and milestones for each Strategic Plan (Renstra) in stages, continuously and holistically in the form of a Long Term Development Plan (RPJP) UNESA 2022-2045. This important document is intended as a reference for mapping the direction and basis for UNESA's future development strategy. UNESA as an academic industry[9] must immediately change the institutional orientation from a teaching-based university and a research-innovative-based university to an entrepreneurial-based university. This effort is used to change the academic process which has been consumptive to be productive[10][11].

This research aims to develop a research and community service roadmap at UNESA to improve the quality of governance and efforts to increase institutional competitiveness in supporting programs at UNESA. Institutional studies are urgently needed to integrate the

existing human resource strengths in each unit, strengthen institutions, achieve academic quality standards, and internationalize institutions.

## 2. LITERATURE STUDY

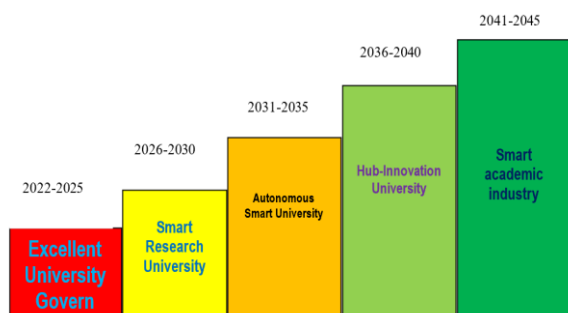
UNESA's research and community service roadmap does not stop at achievements, patents, intellectual property rights, and/or publications. Research and community service that moves from fundamental to development are directed downstream and commercialized to support UNESA academic activities based on entrepreneurship[12][13][8]. Even so, this still has to guarantee scientific autonomy in the implementation and development of the field of research and community service within UNESA. UNESA development stages can be seen in Figure 1.



**Figure 1.** Surabaya State University Development Base

In addition, the development of harmonious and synergistic research collaborations between UNESA researchers both with the industrial world (DUDI)/relevant agencies in the country as well as research collaborations with foreign countries through collaborative research which will result in joint publications between UNESA researchers and foreign researchers.[14][15].

The stages of achieving the five-year UNESA Vision-Mission target for 2022-2045 can be seen in Figure 2



**Figure 2.** Stages of Achievement Target Vision - Mission UNESA five years 2022-2045

Engaging research to improve the quality of innovation from an entrepreneurial standpoint may be accomplished in a variety of ways. [7]:

a. Increasing the quality and quantity of research to produce and improve the quality of innovation in educational and non-educational fields with entrepreneurial orientation.

b. Improving the quality and quantity of publications, as well as innovating entrepreneurial-oriented educational and non-educational works in reputable media and increasing the number of copyrights (PATEN/HAKI)

c. Strengthening downstream innovative products as an academic-based industrial development effort.

d. Increasing collaborative research (joint research and innovation), consortium research both domestically and abroad with joint production outputs of PATEN/HKI, and joint publications both at conferences and publications in international journals

e. Design and implement a comprehensive and integrated repository system to support research activities and support the achievement of UNESA internationalization

f. Institutional strengthening and management of the Center for Science and Technology Excellence (PUI) and Science Techno Park (STP) as media for transforming research results into innovative entrepreneurial-oriented products

g. Strengthening the management of business incubators and start-ups as a place to prepare young entrepreneurs for students.

Doing community service to disseminate innovations with an entrepreneurial perspective for the welfare of society

a. Strengthening the quality and quantity of community service that is oriented towards producing innovation in the educational and non-educational fields with an entrepreneurial perspective.

b. Increasing the quality and quantity of coaching in the context of developing innovation in educational and non-educational areas with entrepreneurial orientation.

c. Increasing the quality and quantity of productive collaboration with educational and non-educational stakeholders and entrepreneurship.

The current global trend is innovation as a driving force for the progress of the nation in the 4.0 era. Changes in the knowledge production process: namely creativity, collaboration, and co-creation. The complexity of the problem can encourage a multidisciplinary approach. UNESA was appointed by the ministry as an independent group of higher education institutions in research management. So UNESA should have a research policy direction. The research roadmap includes research activities that have been carried out by the proposer

several years earlier on this topic, research planned in this proposal, as well as research direction plans after the proposed activities are completed [8]

### 3. METHODOLOGY

This research is from a micro perspective using the 4D development research model. 4-D development model by Thiagarajan. The 4D development model consists of 4 main stages, namely: Define, Design, Develop and Disseminate as shown in Figure 3.



**Figure 3.** Four steps of the research stage

There are 4 steps to be applied in this research. The research started from the definition stage by compiling the instruments needed in the research, namely instruments to capture aspirations regarding UNESA's research direction to the Dean and Director of UNESA's environment. In the design phase, an analysis was made of the views of the deans and directors. The third stage is product development, namely developing a research roadmap and PKM. The next roadmap was tested early by 2 experts. Input from experts is used as input in making revisions. The final stage of dissemination is by holding a research results seminar.

The output of this research is in the form of a research roadmap blueprint and PKM UNESA. The product has been tested by experts and given seminars in the current year and is ready to be used as a guide for research and PKM at UNESA. Additional outputs are in the form of academic research papers and PKM which are recorded.

### 4. RESULT AND DISCUSSION

This research begins with the define stage, by conducting a needs analysis by looking at the roadmap or research strategic plan and PKM in the faculty. The search results for the roadmap or strategic plan for each faculty are as follows. Researchers also examined research roadmaps from other universities, in addition to faculty research roadmaps. Research in the last 5 years has experienced very significant developments. Many lecturers and students compete in carrying out research and community service, and there are even research results that have received appreciation from the Ministry of Research, Technology, and Higher Education. Based on the results of the 2016-2018 higher education research performance assessment as outlined in the Decree of the Inspector General for Strengthening Research and Development Number B/5678/EI.2/H.M.00.03/2019 dated 13 November 2019 concerning Clusters or groupings of research-based Higher Education Institutions for 2016-2020, UNESA rose to become an

"independent" cluster which was previously a "main" cluster. This achievement will continue to be improved by increasing the quantity and quality of research, research funding, and research outcomes.

LPPM UNESA has formulated UNESA's leading research fields to accommodate research by lecturers, students, and education staff. There are 6 fields, namely Sports and Health Sciences; disability; Art and culture; science and Technology (Saintec); social humanities, and Education. This flagship research will be able to accommodate all the competencies and research roadmaps of the UNESA academic community so that each academic community can develop its expertise and competence in the research field. In addition, UNESA has also established a science and technology center of excellence (PUI) which will become UNESA's trademark and trademark namely sports science; Arts, and Disabilities.

The research strategy in terms of quantity for basic research is to decline because this research is expected to rise to applied research, applied research to development research, and so on, while applied research, development research, and commercialization increase significantly. The movement of applied research to research development or commercialization cannot be as fast and as large as basic research because it is constrained by the obligation to have distribution permits and partners. In this case, the UNESA Business Incubator Center (PIBT) must take on the role of increasing cooperation between Researchers and DUDI (Business World and Industry), including MSMEs. With these efforts, it is hoped that in the future the acquisition of development research will continue to increase. Apart from collaborating with DUDI, cooperation is also carried out with various stakeholders nationally and internationally. Joint research with foreign countries also needs to be improved, especially to initiate the acceleration of UNESA to become a world-class university.

The implementation of the Tridharma of Higher Education at UNESA by the academic community which includes lecturers and students must adhere to the basic principles of scientific truth. These basic principles must also be put forward in conducting research activities to achieve high quality. In carrying out research activities, every academic community must pay attention to academic ethics and including bioethics, especially in carrying out research activities related to human, animal, plant, microorganism, and environmental health. In addition to the basic principles mentioned above, UNESA research activities must comply with operational principles in the field and can be immediately adopted by the community. Research activities are carried out, among others, to produce scientific publications, innovations, technology packages, systems, models, and

Intellectual Property Rights (IPR). The results of the research must be immediately disseminated to the public, both nationally and internationally. The results of research that are applicable and field-oriented must be immediately conveyed to the interests of the community which includes universities, government agencies, and partners from DUDI circles. The process of disseminating research results as community service activities can be carried out in various collaboration models with related partners. Collaborative models with related partners can provide positive feedback on improving research and education implementation processes. The operational principle of implementing UNESA research in the community is carried out in various forms of action activities. The collaboration model referred to can be in the form of professional cooperation or business partnerships that are mutually respectful and mutually beneficial for UNESA and UNESA partners

The second stage is to develop or develop a research roadmap and PKM. The roadmap was developed after examining roadmaps and research strategic plans and PKM faculties, as well as roadmaps for other universities, such as ITB and UGM. The roadmap is prepared over 25 years. It is hoped that this time will be able to provide adequate results. In 2021-2025 it is expected that UNESA's PUI along with 3 other UNESA leading research fields, namely science, technology, social humanities, and education, will conduct research that leads to development research, namely conducting research product legality so that it can be commercialized and can serve as a pilot for building a Science Techno Park (STP) or Science and Technology Park. STP is an integrated area that combines the world of industry, higher education, research and training centers, entrepreneurship, and central and local government, in one location that enables the flow of information and technology to be more effective and efficient. In STP, the research carried out will be developed and grown in the form of a technology-based start-up company (spin-off). Thus, an innovation ecosystem is formed consisting of academics, business people, government, and society.

In developing innovation, UNESA collaborates with various parties by providing real benefits to society both nationally and internationally. In the field of collaboration, UNESA opens wide the doors of strategic cooperation with the industrial world, both domestically and abroad, including also conducting joint multi-campus research within ASEAN. To realize this, it is targeted 80 lecturers will become research leaders who can produce patent articles and can implement their research results towards commercialization.

In 2026-2030 it is hoped that UNESA will become a reference for applied research and PUI development as well as 3 other leading research fields where UNESA's research leads to smart research (based on Artificial Intelligence) and develops teaching factors at UNESA so that it is hoped that the process of commercializing innovative products will continue to develop and collaborate on research with multiple campuses throughout Asia

In 2031-2035 UNESA has become a reference for applied research and development of PUI as well as 3 other leading research fields where UNESA's research leads to smart research (based on Artificial Intelligence) and develops the teaching industry at UNESA so that it is hoped that the process of commercializing innovative products will continue to develop and collaborate research with multi-campus in continental Europe. The teaching industry is an institutionalized research, development, and innovation activity with a collaborative business model between universities and the industry. The goal is to enhance learning and research. With this teaching industry, it is hoped that it can increase the capacity and capability of higher education institutions to be able to produce R&D products and innovations for the real business world industry. In addition, it is also expected to be able to increase the level of industry performance through the effective use of research expertise from academic resources.

In the context of UNESA's development as a PTNBH in 2036-2040, UNESA also conducts comparative study activities for entrepreneurship management and business incubation which were developed as a step towards establishing and developing a holding company that will later manage UNESA's assets. The initial steps taken for the development of business units were initiated from existing assets in tertiary faculties. With the pilot development of corporate and multi-holding companies, business activities, business incubation, and entrepreneurship in Higher Education can develop so that they can become business models and best practices so that they can become references, especially in the field of PUI and 6 leading fields of UNESA research. To develop this, it is hoped that UNESA will collaborate with various

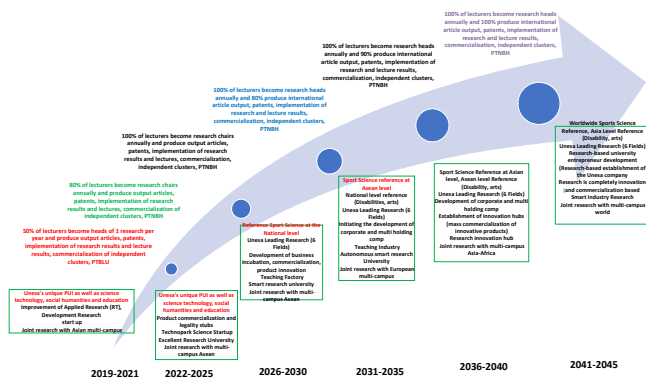
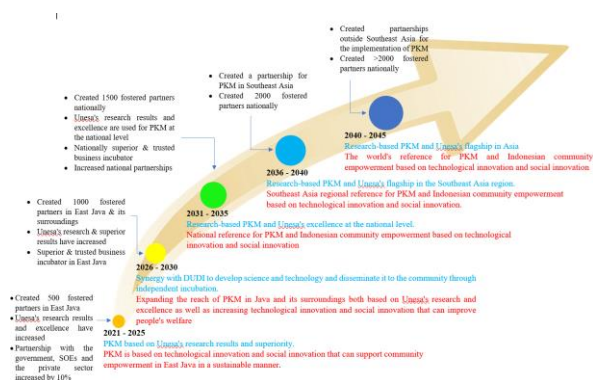


Figure 4 UNESA Research Roadmap Draft

parties from within and outside the country to cover the Asian region.

In 2041-2045 sports science is a world-class reference. Meanwhile, the leading research on disability and art is a reference for the Asian level. Supported by 6 national research excellence. To become a productive country, we must be able and independent in terms of mastering science and technology. This is where the role of research is needed and for this, our country must increase the quantity and quality of its research. Entrepreneurship is a mindset that uses creativity and innovation to boost the economic value of a product or the results of research or invention.

It is this research-based entrepreneurship that can change Indonesia from a consumer country with minimal added value to a productive country with high added value and ultimately have an impact on increasing people's welfare. Universities must change their vision and mission from just learning universities or research universities to becoming entrepreneurial universities, namely universities that apply the results of their research for the benefit of the business world or the wider community.



**Figure 1** UNESA Community Service Roadmap Draft

Community Service Activities at UNESA in 2021-2025, are downstream activities of research results and superior research carried out by UNESA lecturers. Downstream in the form of community service will further strengthen UNESA in the eyes of the community as a university that cares about and supports government development programs in community empowerment.

Community Service activities at UNESA do not only focus on research results but community service activities are also based on problems faced by society socially, economically, and culturally. Therefore, technological and social innovations are increasingly being enhanced to address existing problems in society.

Through Community Service activities based on excellent research and research as well as innovation in the technological and social fields, it is hoped that 500 fostered partners will be created such as villages,

communities, and UMKM / IKM who continuously collaborate with UNESA. In addition to these partners, it is hoped that there will be an increase in cooperation with BUMN and the private sector both in the implementation of community service and the use of UNESA research and innovation days.

In the 2026-2030 period, UNESA as a PTN BH will enter 5 years. It is hoped that this year's Community Service activities at UNESA will involve a lot of DUDI. DUDI wants to work with UNESA to develop science and technology and disseminate it to the community through UNESA's independent incubation. Optimizing this business incubation can develop well if it is supported by stakeholders such as DUDI. The more DUDI collaborates with UNESA incubators, the more superior and reliable UNESA incubators are.

It was also during this time that UNESA's community service activities expanded their reach. Community service activities are not only carried out in East Java but also reach out to partners around East Java. This activity remains based on UNESA's research and superiority as well as increasing technological innovation and social innovation that can improve people's welfare. It is hoped that community service activities in 2026-2030 will create 1000 fostered partners in East Java and its surroundings.

Community Service Activities in 2031-2035 based on UNESA research and excellence should also be carried out at the national level. If in 2026-2030 it is still in East Java and its surroundings, then in 2031-2035 Community Service activities will be carried out in areas in Indonesia.

The increasing number of UNESA Community Service activities carried out at the national level will make UNESA a national reference for PKM and Indonesian community empowerment based on research, excellence, technological innovation, and social innovation. The scope of this national Community Service activity will further emphasize UNESA's research results and excellence at the national level and receive national recognition, that UNESA is capable of being a solution to the problems faced by the people of Indonesia.

It is hoped that in the 2031-2035 period, 1,500 fostered partners will be created nationally. Along with community service activities nationally, it is hoped that business incubators will also receive national recognition. In addition, UNESA's cooperation with national institutions has increased sharply. superior & trusted nationally

In 2036-2040 UNESA began to think about its work in Southeast Asia in utilizing UNESA's research and excellence for community service activities in Southeast

Asia. If this activity is carried out more and more, it will have an impact on UNESA's name in the eyes of the people of Southeast Asia. Community service activities carried out by UNESA both at the local and national levels are expected to be a reference for universities or other institutions in Southeast Asia in community service.

In 2036-2040 it is hoped that 2,000 nationally fostered partners will be created who can become examples for the people of Southeast Asia. In addition, to support community service activities in Southeast Asia, a partner is needed who can help carry out these activities.

In 2040-2045 UNESA community service activities are not only carried out in Indonesia and Southeast Asia but have reached areas outside Southeast Asia. Of course, this activity would not have been realized if it had not collaborated with world institutions or multinational companies. Therefore, increased cooperation with related parties must be increased.

In 2040-2045 it is expected that there will be an increase in the number of fostered partners from 2000 partners to 2000 fostered partners. These fostered partners are expected to be examples of UNESA's success in managing community service activities in Indonesia. So that UNESA can be a reference in managing community service.

#### **4. CONCLUSIONS**

Priorities, themes, and research focus at UNESA cannot be separated from the 2017-2045 National Research Master Plan (RIRN) following Presidential Regulation of the Republic of Indonesia Number 38 of 2018, that there are 10 priority research areas, namely food, energy, health, transportation, product engineering, defense and security, maritime affairs, social humanities, advanced materials, and other research fields. Of the 10 focuses, UNESA determined 6 national leading research namely leading research in the fields of sports and health, arts and culture, disability; science and technology; social humanities, and education. Three of the six areas of focus, namely sports science, arts, and disability, are UNESA's mainstays.

In accordance with RIRN, UNESA's research and community service roadmap was also prepared from 2020-2045. At the end of the research roadmap, in 2041-2045 sports science will become a world-class reference. Meanwhile, the leading research on disability and art is a reference for the Asian level. Supported by 6 national research excellence. To become a productive country, we must be able and independent in terms of mastering science and technology. This is where the role of research is needed and for this, our country must increase the quantity and quality of its research. Entrepreneurship is a

mindset that uses creativity and innovation to boost the economic value of a product or the results of research or invention. It is this research-based entrepreneurship that can change Indonesia from a consumer country with minimal added value to a productive country with high added value and ultimately have an impact on increasing people's welfare. Universities must change their vision and mission from just learning universities or research universities to becoming entrepreneurial universities, namely universities that apply the results of their research for the benefit of the business world or the wider community. PKM in the 2040-2045 period is expected to increase the number of fostered partners, from 2000 partners to 2000 fostered partners. These fostered partners are expected to be examples of UNESA's success in managing community service activities in Indonesia. So that UNESA can be a reference in managing community service

#### **AUTHORS' CONTRIBUTIONS**

In this article, Darni contributes to writing, SEC as editor, LS and NN contributes to analyzing the data.

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