Typology Innovation Business Model For University As Centers Of Science Based On Biotechnology

Arnis Budi Susanto, Purnamie Titisari, Andriana

Abstract: The purpose of this study is to find out how the "key" typology of innovation business models of biotechnology products from the Center for Excellence. The research will focus on the typology of innovation business models of university. Descriptive research patterns will be used in this study with the aim of exploring the state of the subject or object of research based on existing facts. The results of this study are typology of innovation business model at the University as a center of excellence for technology-based science and technology already has and meets the requirements. The typologies that are formed based on academic nuances are supported by biotechnology-based resources and the results of biotechnology research that have exceeded the target. With the availability of adequate resources, it can be said that COE in the university in the botelnology sector has been feasible to be developed..

Index Terms: Typology innovation business, Center for Featured Science and Technology, Biotechnology.

1 INTRODUCTION

University of Jember establishes strength based on the identification of staff performance in research, publications. Biotechnology is an advantage shown by a research group that has introduced the world's first drought-resistant sugar cane (GM), and this time several other GM sugarcane varieties are also being prepared as GM sugarcane with antiviral and high yields. Integrated development of biotechnology requires a trans and multidisciplinary review, which involves other fields of science, such as agriculture, agricultural technology, engineering, pharmacy, health, nature, social sciences and law. Meanwhile, improving the quality of resources is carried out by increasing qualifications through degrees and non-degree training abroad. This activity is in line with the fulfillment of infrastructure and infrastructure, so that in the future all facilities can be fully utilized by existing staff. Superior Acceleration Center The development of biotechnology requires a comprehensive and holistic approach. The strength of internal resources cannot solve the problem thoroughly. Cooperation is an institution's effort to solve problems comprehensively. The scope of activities is generally in the form of affiliation or expert assistance, joint study and research, incentives or support for teaching and learning infrastructure and research. Within Foreign cooperation is also prepared mainly by institutions that have developed biotechnology at the agriculture and health. The implementation strategy is based on analysis of strengths, weaknesses in internal conditions and anticipating challenges and exploiting opportunities for the external environment.

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The Institute establishes four strategic policies that strengthen the related Study Program, enhances a conducive academic atmosphere, strengthens cooperation networks and produces and commercializes research products. This strategy is implemented in the implementation of two main programs: curriculum development and research consortium. Post-project, it is expected that the University of Jember can successfully improve quality, relevance and access, by implementing a standard curriculum so that graduate competencies are appropriate and anticipate to the global market. The University of Jember also shares tangible contributions to produce genetically modified organisms (GMOs) to improve food stock availability and health. Some of the products currently targeted include High Yield Sugar Cane, GMO Gum Resistant to SCMV, Synthetic Sugar Cane Seeds, Golden Rice (Oryza sativa indica var), antioxidant natural proteins and modified anti-hypertension and Malaria Vaccine. From several things that have been stated above, the effort to find out how the typology of the flagship centers of science and technology at the University of Jember in Biotechnology is needed to provide a business model and commercialization of biotechnology products that are right up to the consumers. The establishment of the PT-IPTEKSS-Center for Excellence in the University of Jember is aimed at increasing the competitiveness of the nation through three capacities, namely the capacity to access information, research capacity, and capacity for dissemination. In the process, the Center for Information Excellence requires an appropriate management and strategy model of the University of Jember as one of the Science and Technology Excellence Centers that focuses on biotechnology has specific strategies from the academic aspects, aspects of commercialization, and aspects of governance and infrastructure. For this reason, it is necessary to conduct an in-depth study of how typology of innovation business model and commercialization for the Center of Excellence.

2 LITERATURE REVIEW

2.1 Biotechnology

Biotechnology is an integrated use of biochemistry, microbiology and various sciences with microbial assistance and its technological and industrial application. Biotechnology

can also be said as a process that starts from input in the form of raw material which is then processed or decomposed biologically into an output in the form of goods or services. Biotechnology can be divided into two types. Conventional biotechnology is often referred to as traditional biotechnology.

2.2 Typology

Biotechnology develops in several forms such as bioclusters and bio -egions, namely groups of activities and networks of regional life sciences. The global economy is knowledge-based biotechnology and the main engine for regional economic growth with biotechnology companies. Regional sector biotechnology and innovation systems are characterized as international and dynamic network architectures that involve many players involved in drug discovery. The biotech industry usually develops in international networks involving universities, research institutions, incubators, new biotechnology companies, and global pharmaceutical companies. Pisano (2006; 2007) revealed that biotechnology requires various business models. Pisano (2006) distinguishes between "types of innovations that suggest vertical integration and outsourcing R & D". According to Fisken and Rutherford (2002), "for biotechnology companies, the business model serves to secure the value of company-owned technology and knowledge and now often depends heavily on customers of large (bio) biotechnology companies or established companies, collaborators and partners " Sabatier (2010) refers to the "business model portfolio".

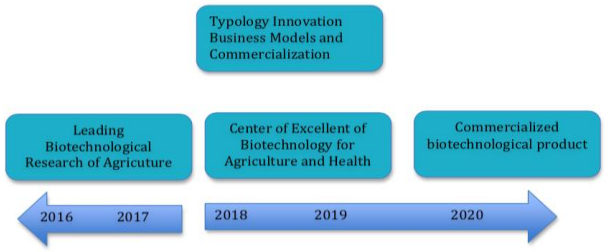
2.3 Innovation Management

Innovation Management is the process of managing innovation in a company so that it can be effective for the creation of sustainable competitive advantages for the company. Innovation Management is needed because to recognize that fresh ideas must continue to flow as quickly as possible and at all times in anticipation of the development of an increasingly fast, diverse, and dynamic world. Here is management. Innovation must play an important role.

3 Methods

The research will focus on the typology of innovation business models and also the commercialization of the leading centers of Jember university This study uses two types of data, namely primary data and secondary data. Primary data is data obtained directly in the field collected through questionnaires and interviews with respondents / resource persons. While secondary data is taken from reports or studies from agencies and literature relevant to research. This research was carried out in the Jember region, namely at the University of Jember for the Center for Featured Science and Technology. In addition, research is also carried out to the community and related institutions or industries to find out how successful the strategy or model of commercialization is.

Figure 1. *Reseach Road Map*



4 RESULT AND DISCUSSION

4.1 Center Of Excellence In Science And And Technology Of Biotechnology

Currently PU-BioTIn has 3 divisions that carry out namely (1) Division of Scientific and Product Development, (2) Incubator and Business Division (3) Service and Training Division. In addition, PU-BioTIn also has research laboratories and laboratories that are prepared as accredited testing laboratories in addition to accredited calibration laboratories and BioTin PUs that have limited testing land for GMO products. The Center for Leading Industrial Plant Biotechnology (COE) has an excess achievement on several parameters assessed by CoE, including: speakers at international conferences, international speakers, visits of international institutions to the Center for Excellence in Science and Technology, annual scientific publications in international scientific journals , registered patents or other IPRs, research-based S2 / S3 graduates, local resource-based innovation products utilized by users, research contracts with R & D / industry institutions at the national level, research contracts with R & D / industry institutions at international level and business contracts in order commercialization of innovation products with users. In addition, CoE also has sufficient achievements in the parameters of business units that service services / products in accordance with core competencies. However, PU-BioTIn has insufficient achievements in just one parameter, namely: annual scientific publications in accredited national scientific journals. With these conditions CoE has the potential to immediately become CoE because the parameters that are not enough are only 1, namely accredited national journal manuscripts, while the number of international journals is excessive. This is because the climate of writing in international journals has been quite developed in PUBioTIn compared to the interest in writing in accredited national journals. As COE, university wants to develop more and more sustainably by producing research products that can be commercialized, with experience that has succeeded in commercializing plant products such as PRG and MOCAF sugarcane. As an Institution, CoE also wants to develop more modern and standardized laboratories through the IsDB 4 in 1 program with more than one accredited laboratory status, namely ISO 17025 standard testing laboratory and ISO 9001 standard public services.

4.2 CoE Biotechnology programs and Activities

Enhancement (30%), and Acceleration of Diffusion of R & D results (40%). The details of the research plan are as follows:

High-yield PRG sugar cane in sub-optimal land.
In accordance with existing regulations, the Indonesian Biosafety and Food Safety Commission (KKHPK) states that before being released and entering the market, GMO products need to be researched which includes detailed analysis of biosafety assessment which includes environmental safety testing (environmental risk assessment). , food safety, and feed safety. The proposed study aims to carry out biosafety testing and high yielding PRG sugarcane certification, so that it can be used for the release and commercialization of PRG sugarcane.

Sugarcane mosaic virus (Sugarcane free and SCMV)
One of the sugarcane diseases that are currently attacking sugar cane is a disease caused by the Sugarcane mosaic virus (SCMV) attack. Therefore, appropriate prevention and prevention efforts are needed to minimize the spread and suppression of SCMV attacks including the use of free and virus resistant seeds. Some common techniques are breeding technology through the use of biotechnology such as chemotherapy to produce virus-free seeds and Pathogen-Derived Resistance (PDR) techniques or gene silencing (RNAi) techniques to produce virus-resistant seeds based on the Coat Protein virus. Although this technology has been widely applied to several species plants, but this technology has not been widely applied to produce superior sugarcane seeds. Therefore, through this study, we can find out information about the coat of SCMV protein that attacks sugarcane, obtained ScMV-free sugarcane seeds through chemotherapy ribavirin and acyclovir, obtained coat-protein coding SCMV plasmid-DNA, obtained polyclonal antibodies for detection of ScMV disease, and obtained seed prototype PRG sugarcane is free and resistant to SCMV through the transformation of the SCMV-coat protein gene.

Cane tolerant inundation / Transformation of inundation tolerant genes
The area of swamps in Indonesia is estimated to reach 33,393,570 hectares. The problem is that the local Indonesian specific sugar cane-resistant varieties are not yet available. The purpose of this study was to answer these problems, namely trying to find sugarcane-resistant varieties of sugarcane. The inundation-resistant sugar cane varieties of this study will be superior characters selected by 3 characters, namely morphological characters, physiological characters and molecular characters (Isolation of Sub1 genes or responsible genes produces character tolerant to inundation) (Septiningsih et al. 2009).

Artificial Seed Cane
The low productivity of cane sugar can be caused by the low quality and availability of sugarcane seeds. The quality and number of seeds is a determinant of success in the production process in gaining profits in agriculture. The technique of propagation through somatic embryogenesis has the potential to be developed because it can produce an unlimited amount of propagula in a short time. PU-BioTIn has succeeded in obtaining superior synthetic seed production methods free of SCMV virus. The success of this research is expected to ensure the availability of healthy sugar cane seeds in large quantities so that they can support the government's program for sugar self-sufficiency (Parawita Dewanti et al. 2016).

Commercialization of MOCAF (Modified Cassava Flour)
MOCAF flour has been produced by several manufacturers, including one of them is the partner industry of PT. Bangkit Cassava Mandiri (PT. BCM) with total production reaching 1000 tons / month. The industry is collaborating with a 15-member UKM-based MOCAF chips processing cluster in the Southern Java region. The MOCAF industry that uses raw materials and local technology has a very significant impact on the policy of the Triple Track Strategy run by the government, given the strategic importance and open development potential, industry optimization efforts are needed MOCAF in the region involving various partners. This proposal includes a variety of activities that comprehensively resolve the problems currently being faced and improve the prospects of the MOCAF industry in a broad sense, which includes pieces of raw material supply, processing chips, MOCAF production, marketing and related government policies.

Cassava tolerant to abiotic stress / Transformation of water stress tolerant genes
Lack of cassava in Indonesia should be overcome by extending the land. Extensification of land for cassava needs to be directed at utilizing marginal land such as land that is gripped by water. Because more fertile land is used for other food crops. The land that is gripped by water consists of land that lacks water and excess water. The area of less water in Indonesia reaches 140 million ha. Whereas the land area. excess water reaches 33 million ha. Thus the potential for marginal land is available for extensification of cassava is very large. The problem is that the leading Indonesian Cassava varieties are drought resistant and / or local specific wetness is not yet available. This study seeks to address this problem by trying to provide water stress-tolerant cassava varieties consisting of drought-tolerant cassava varieties and wet-tolerant cassava varieties. The water stress-resistant cassava variety of the results of this study will be superior varieties selected by several characters, namely morphological characters, physiological characters, physico-chemical roots and molecular characters (Imas and John 2013).

Increased Cassava Starch with SPS Genes
The increase in SPS enzyme activity can be done by transforming the SPS gene from sugar cane, namely SoSPS1. Therefore, it is necessary to overexpress the SoSPS1 gene on elephant varieties of cassava plants to increase starch content. This study aims to get cassava plant products as new stoves that have higher starch content. The method used was Genetic Transformation by inserting the SoSPS1 gene into the genome of cassava plants (Manihot escolenta Crantz var. Gajah) using a transformation vector in the form of gram-negative bacteria Agrobacterium tumifaciens. The work carried out included explant preparation in the form of callus from cassava bark using picloram 12 ppm and regenerating into plants using 0.3 ppm CuSO4 + 0.2 ppm IBA. Analysis of transgenic plants using PCR and western bloting. The target of this study is to assemble cassava plants which have good characteristics and high starch content as a support for food security and for the needs of bioethanol raw materials.

Artificial bioactive proteins and peptides (antioxidants and Antihypertensive) through expression in sub-optimal land rice plants
The discovery of the sequence of peptide Gg-7pAH from the

melinjo seed protein can be used as a basis for making artificial peptides. Technological advances in the field of molecular biology make it possible to develop artificial production techniques for antihypertensive peptides with the ability to inhibit the activity of angeotinsin-converting enzyme (ACE-inhibitory) enzymes through gene transformation in other organisms (rice plants) to obtain recombination of naturally expressed peptide Gg-7pAH genes rice plants quickly. In the future with this technology, the need for staple food in the form of rice for patients with hypertension can be fulfilled quickly and precisely.

Golden rice introgression (IR36 / PAC) and piramiding gene as an effort to produce superior rice that accumulates vitamin A in sub-optimal land

By combining gene transformation and plant initiation techniques, it is possible to move parts of provitamin A into new varieties that have superior properties, or assemble at the same time transferring transgenes along with superior properties carried by the main background. that is transgenic plants into new background forms that can accumulate transgenes and some superior traits that are carried into one single. IR36 is an indica rice cultivar, which has high potential yield characteristics with a character resistant to various pests and diseases. In addition, IR36 can be harvested in a fast time of 105 days. The selected PAC / IR36 crossing results then need to be resumed with important local varieties. This needs to be done by reasoning the transfer of important genetic traits inherited from the progenies and it is hoped that these progenies have inherited superior genetic traits from the donor parents used (Safitri et al., 2013).

Development of Aromatic Rice with High Productivity

The general characteristics of local varieties of rice cause the reluctance of farmers to do local aromatic rice cultivation even though the selling value of rice is relatively higher. Therefore, the effort to create new aromatic rice varieties with high productivity is a very interesting challenge to deal with considering that Indonesia has an abundant amount of rice germplasm to be developed into new rice varieties with superior properties (Ghareyazie et al., 1997)

Screening of plasmanutfah of black and red rice (high anthocyanin) as parental special varieties of sub-optimal land

The search and assembly of superior varieties of red and black rice is very important to do, especially local rice which contains high antioxidants and anthocyanins. By knowing molecular red and black rice germplasm, the assembly of superior varieties will be very easy to do, so that the assembly of the varieties we want can be done both conventionally and genetically.

5. Conclusion

Based on the results of the study, the typology of the innovation business model at the University of Jember as a center of excellence in technology-based science and technology already has and meets the requirements. The typologies that are formed based on academic nuances are supported by biotechnology-based resources and the results of biotechnology research that have exceeded the target. With the availability of adequate resources, it can be said that PUI in the university of jember in the botelnology sector has been feasible to be developed. The available resources come from lecturers and researchers at the University of Jember. In addition, it is hoped that it can also be a source of funds or business entities when the University of Jember becomes a public service agency planned for 2019. The commercialization aspect needs to be increased because the majority of the people do not understand the biotechnology products of the University of Jember. Even within the jember university, not all know what the products are, this shows a lack of recognition of the superiority of the university of jember as a biotechnical-based center for science and technology.

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