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Pursuing Entrepreneurial University: Breakdown the Self-Assessment Model

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ABSTRACT

In this era of turbulence, the entrepreneurial university model is considered the most appropriate concept in responding to the challenges and demands of higher education in the future. Entrepreneurial universities emerged as a response to the interests of knowledge within the scope of innovation systems, both nationally and regionally. Transformation into an entrepreneurial university becomes a search for universities that want to ensure their sustainability. The purpose of this study is to help university in conducting self-assessment to get a clear understanding of the situation at hand. Pursuing an entrepreneurial university requires a long process and sufficient capabilities. From the breakdown of existing models, it is known that it is not enough for universities to achieve output only, but must lead to clearer outcomes so that the role in economic growth becomes more apparent.

Keywords: Breakdown, Entrepreneurial University, Self-Assessment, Transformation
JEL Classifications: I25, O15

1. INTRODUCTION

The future era is marked by the Fourth Industrial Revolution or Industrial Revolution 4.0, bringing the uncertainty in the technological aspects, including social economy aspects (Mkwanazi and Mbohwa, 2018). The industrial revolution can be defined as a change in industry, social systems, economy, and technology that is driven by rapid growth in a variety of smart, scientific and sophisticated solutions (Dombrowski and Wagner, 2014).

In Higher Education Institution (HEI), the rapid changes in the era of the Industrial Revolution 4.0 require to be able to adapt and respond to challenges with the right attitude. The existence of massive technological advances creates many demands and pressures from the outside environment, which then creates two things at once, the challenges and opportunities for universities. In 1997, Peter Drucker stated that universities would not survive facing the changing times. Higher education is in a very deep crisis (Shahroom and Hussin, 2018). Campus buildings are no longer suitable and are not needed.

In accordance with the current conditions, there will be many changes in the way of teaching and learning, teaching materials, and the role of lecturers and students. Through technology, teaching logic is reversed so that the system adapts to the needs of students, or closer to personalization. The emergence of Massive Open Online Courses (MOOCs) as an impact of the utilization of opportunities due to technological development has become a phenomenon that triggers universities to operate entrepreneurially, which has a high public value orientation (Wood et al., 2008).

Universities are designated as an engine of development, as agents who play a role in the nation's development process (OECD, 2009). This is in line with the concept of knowledge-based economy, where knowledge can be a major source of excellence

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or the ability to compete and economic growth in a country (Etzkowitz, 2004); (Sporn, 2001).

In several empirical studies it has been proven that entrepreneurial university take an important role in economic and social development in terms of independence and reducing the burden on government (Yokoyama, 2006). According to Hannon (2013), the entrepreneurial university model is believed to be the main driver for independent development and innovation, as well as an appropriate response to the conditions of environmental turbulence and rapid market changes. Entrepreneurial university in this case is defined as an academic organization that builds a conducive environment for the academic community to show enterprise attitudes, innovation and creativity, which are expected to generate public value and create partners that are local, regional, national and international scale, which are effectively able operate in a dynamic environment (Gibb et al., 2013).

Therefore, in order to clearly lead to an entrepreneurial university, a model that is appropriate to the characteristics and goals of the university is needed. The following study will provide an overview of how the synthesis model can be applied through a breakdown of factors that make it easy for universities to conduct an assessment of the transformation process that is being carried out at this time.

2. LITERATURE REVIEW

2.1. Entrepreneurial University

The concept of entrepreneurial university has many meanings and implications. Clark (1998) and Van Vught (1999) gave the meaning of "Innovative University," while Leslie and Slaughter (1997) called it "Market Universities" and "Academic Capitalism." Dill (1995) refer to "University Technology Transfer," and Röpke (1998) see entrepreneurial university as "an Entrepreneur Organization" and divide into three classifications, named: (1) a university as an organization adopts an entrepreneurial management style; (2) the members in it act entrepreneurially; (3) follow entrepreneurial patterns to interact with their environment.

Some definitions of entrepreneurial university as shown in the following Table 1.

Table 1: Definitions of entrepreneurial university

Authors	Definitions
(Clark, 1998)	Able to cope with societal challenges by innovation in research, knowledge exchange, teaching and learning, governance and external relations
(Etzkowitz, 2004)	Focus on the role of universities in innovation and regional economic development through translating research into commercial outcomes
(Gibb and Hannon, 2006)	An organisational response to external challenges and pressures
(Zhou, 2008)	An entrepreneurial university must have three missions: teaching, research and service the economy through entrepreneurship activity and continually participating in society's technological innovation
(Shattock, 2009)	Entrepreneurialism is a reflection both of institutional adaptiveness to a changing environment and of the capacity of universities to produce innovation through research and new ideas.
(Moroz et al., 2010)	The combination of education, research and commercialization
(Salamzadeh et al., 2011)	As a dynamic system which includes special inputs (resources, regulation, rule, mission, entrepreneurial capabilities, expectation society), process (teaching, research, managerial process, networking, interaction, and innovation, R and D activities), outputs (innovation and invention, entrepreneurial network, entrepreneur human resources, effective researches in line with the market needs, entrepreneurial centres)
(OECD and EC, 2012)	A multifaceted process of continuous improvement; therefore, it is also difficult to define strict guidelines for its implementations
(Guerrero et al., 2014)	An exhaustive knowledge milieu and a source of entrepreneurial opportunities by the university community where academician and students could commence new venture with an amalgamation of intellectuality and commercialisation
(ACEEU, 2016)	Put emphasis on the economic impact of societal contributions, entrepreneurship development in education, commercialization of research, and entrepreneurship as priority in third mission activities

Entrepreneurial university develop the concept of a university that initially focused on two things, the teaching and research activities, reaching a broader scope that is contributing to technological innovation (Etzkowitz et al., 2000). Previously, Readings (1996) had mentioned the existence of a "third mission" for economic development in addition to the role of universities in research and teaching, although with various forms of various scenarios, which led to the emergence of entrepreneurial universities. In relation to the role of the university more to be able to help economic development and innovation in the Knowledge Society, Henry Etzkowitz in the 1990s developed a concept known as the "Triple Helix," which is a model of the relationship between universities - industry - government (triplehelixstanford.edu).

2.2. Entrepreneurial University Model

The entrepreneurial university model was first proposed by Michael H. Morris (Morris et al., 1994), which is called the entrepreneurial integrative model input and outcome. There is the concept of entrepreneurial intensity which combines the effects of the number of entrepreneurial events and the level of entrepreneurial behaviour, which consists of three important dimensions: innovation, proactivity, and risk taking. Both of these are outcomes that can be: value creation, new products or services, profits or benefits, and so on.

In Europe, the European Commission in collaboration with the OECD (Organizational for Economic Cooperation and Development) developed an entrepreneurial university framework as an online assessment tool, or called HEInnovate, which aims to provide opportunities for higher education institutions to reflect their perceptions of strengths and weaknesses in each area to identify institutional development needs. Initially, there are 7 (seven) identification pillars that describe the characteristics of entrepreneurial universities (OECD and EC, 2012). Later the eighth dimension were added in June 2018 (OECD and European Union, 2019).

1. Leadership and Governance
Including: institutional mission, vision and strategy, the role of top management, institutional coordination, the level at which innovative activities are stimulated, and the strategic role of institutions in regional development.

2. Organizational Capacity Funding, People and Incentives
The indicators include the resources of both money and people needed to fulfil the entrepreneurial strategy and mission. An important aspect is the degree to which entrepreneurial treatment of the staff involved is given incentives.

3. Entrepreneurial Teaching and Learning
There is a set of variables related to the degree to which the entrepreneurial mindset is stimulated in education, both in terms of content and approach.

4. Knowledge Exchange and Collaboration
The indicators here look at how institutions organize and stimulate the creation of knowledge with and to provide social, cultural and economic development for the community.

5. Internationalization
For entrepreneurial institutions seeking innovation and improvement, internationalization is very important. The indicators in this regard relate to staff and student mobility, international research and collaboration.

6. Preparing and Supporting Entrepreneurs
This aspect is related to the institution's programs and facilities that are ready to support students, staff and alumni who will run a start-up business, including providing access to financial, networking and incubation aspects.

7. Digital Transformation and Capability
How the digital infrastructure supports the vision, mission, strategy and learning process.

8. Measuring the Impact
This aspect is about whether the institution is ready to measure the results of its entrepreneurial strategies and activities.

In 2013, a framework to explore the entrepreneurial capacity of a university was developed by NCEE or the National Center for Entrepreneurship in Education in Coventry, United Kingdom. There are six measurement categories in the University Entrepreneurial Scorecard (Mudde et al., 2017), as follow:

1. Concept, vision, mission and strategy
2. Governance
3. Organizational design
4. Public value and Stakeholder engagement
5. Knowledge exchange and incubation
6. Internationalization.

Another approach from the entrepreneurial university model is introduced by Salamzadeh et al., (2011), where four elements are applied, consist of: Input - Process - Output - Outcomes (IPOO) (Figures 1 and 2). Input is defined as the elements and factors that lead to "the black box" of an entrepreneurial university. The process as a logical interrelation transaction that transforms input into output from an entrepreneurial university. Output as a result of input transformation in the process black box. Whereas outcomes are the consequence of the results of the overall model input-process-output.

3. METHODS

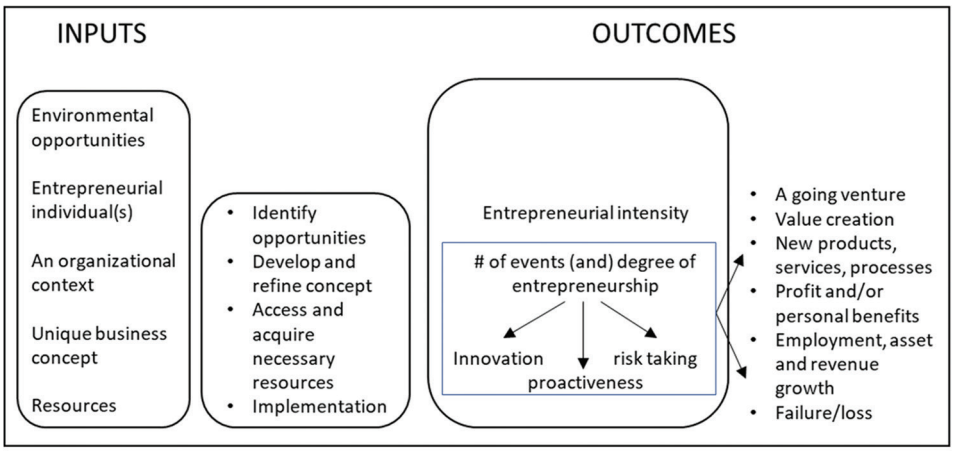
This research uses a method that combines literature study, which is data collection derived from scientific journals, articles, books, documents, as secondary data that supports analysis. The technique analysis is by synthesizing several various literature studies, which are supported by several empirical findings from studies that have been conducted.

Research synthesis is an approach used in combining, aggregating, integrating and synthesizing primary research findings. Each synthesis method describes different types of findings depend on the purpose and product of the selected synthesis (Schick-Makaroff et al., 2016).

4. RESULTS AND DISCUSSION

The framework developed by the European Commission or OECD which consists of seven characteristics of entrepreneurial

Figure 1: Inputs outcomes model



Source: Morris, et al. (1994)

Figure 2: IPOO model

Context					Context
	Inputs	**Processes**	**Outputs**	**Outcomes**	
	• Resources (Human, Financial, Informational, Physical) • Rules and regulations • Structure • Mission • Entrepreneurial capabilities • Expectations of the society, industry, government and market	• Teaching • Research • Managerial • Logistical • Commercialization • Selection (for students, university professors and staff) • Funding and financial • Networking • Multilateral interaction processes (between students, university professors, staff, industries, policy makers and society) • Innovation, research and development activities (IR&D)	• Entrepreneur human resources (including university professors, graduates, researchers, and staff) • Effective researches in line with the market needs • Innovations and inventions • Entrepreneurial networks • Entrepreneurial centers (e.g. incubators, science and technology parks, spin-offs, etc)	• Third mission	
	Context				

Source: Salamzadeh, et al. (2011)

universities, is believed to be the most comprehensive concept (Mudde et al., 2017). The concept of NCEE or the National Center for Entrepreneurship, which consists of 6 characteristics to describe entrepreneurial capacity, has similarities and includes in the 8 elements of OECD model. The elements are very helpful for universities. They are not as a tool for benchmarking but to conduct self-assessments.

However, Sperrer et al., (2016) uses this framework that also called HEInnovate to do mapping of several Universities of Technology in Austria. The seven existing areas were adopted into the questionnaire compiled in the questionnaire, with a rating system using measures from 0 to 10, where 0 indicates very weak or very bad, and 10 is very strong or very good.

In Indonesia, this framework is used by IPB University to measure the extent to which the transformation process towards an entrepreneurial university has been achieved. For a time range from 2000 to 2016, IPB University established itself as an entrepreneurial university from the perspective of research-based technology transfer and innovation (Mudde et al., 2017). Recently, the Rector of IPB University stated that the type of entrepreneurial university IPB University was a techno-social entrepreneurial university, which combines the concepts of research, innovation, business enterprise and social enterprise (Satria, 2020).

Mapping the position of entrepreneurial university implementation using a framework consisting of seven elements is not enough to describe how the process of a university is transforming. These elements are not enough to answer the following questions: at what stage is the university currently located? In which part are the university should fulfil the need? In this case the OECD framework alone is not enough to identify the needs that should be met by the university and the achievements that have been achieved so far. The needs that become input must go through a process before finally producing output that can be a benchmark of success in achieving entrepreneurial university.

As expressed by Clark (1998), that becoming an entrepreneurial university is a long-term process, which even takes approximately 15 years to achieve. In addition, in several previous studies it has been suggested that there are stages and phases before heading to an entrepreneurial university (Yokoyama, 2006) (Etzkowitz, 2016). Therefore, we need a clearer mapping regarding the stages and classification of the stages, which are taken from the 8 elements of the OECD model.

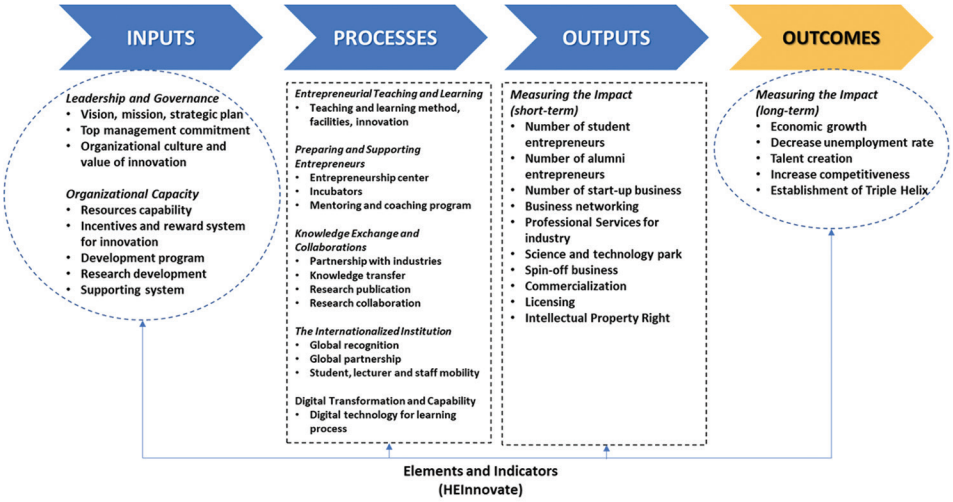
Of the several models described above, there is one model that is closest to the process of transformation of inputs that pass a process that produces outputs and outcomes, namely the IPOO Model (Salamzadeh et al., 2011). By placing the 8 self-assessment elements into each stage, it will make it easier for the university to know the extent of its capacity and what is still needed, as well as how output is measured through appropriate indicators. Figure 3 as the synthesis model is illustrating the distribution of elements which are then broken-down into a number of indicators that are appropriate and can be used by the university to fulfil the requirements.

From the Figure 3, it can be seen that each element of the OECD framework can be distributed into each stage in the IPOO model. By using the process approach, the process part is the part that requires the most elements in the form of teaching and learning activities, preparing and supporting, exchange and collaboration, and internationalization. The process activities cannot run well without supporting inputs, that is the leadership and commitment from top management level, and supported by adequate capabilities.

The measurement of the impact becomes a rather difficult thing to do and requires clear boundaries. According to the results of a survey conducted by NIRAS (NIRAS Consultant, 2008), there are three quantitative indicators as an output of entrepreneurial university transformation: (1) number of student start-ups over three years scaled to the total number of students; (2) percentage of funding generated by the university through spinoffs, business development services and joint ventures; (3) the percentage of externally sponsored research (of the total research budget).

Meanwhile, from the model by Sakapurnama et al. (2020), the impact of entrepreneurial university is divided into two. They are EU impact in the short-term and EU impact in the long term. In

Figure 3: Framework model of self-assessment



the synthesis model, the output produced by the entrepreneurial process classified as an indicator of the achievement of the entrepreneurial university in the short term. While the outcomes - which in the original model is the third mission - is the further impact in the long run, from the output that has been generated from the transformation process.

So far, there is no exact measurement of the "third mission." How the form of the role of universities on economic growth or society development, cannot be measured significantly. One study from universities in Italy revealed that the activities of knowledge transfer (KT) might become indicator for university to fully undertake the implementation of the third mission. From the empirical study, universities with strongly involved in scientific/technological research and show the highest values of KT activities with longer experience, are expected to reach out the third mission (Cesaroni and Piccaluga, 2016).

According to Budyldina (2018), there are still doubts about the direct economic impact of higher education institutions stemming from commercialization and technology transfer. Based on the study, to create a market for academic research and innovation and a fruitful milieu of entrepreneurial universities, will need a national and regional program of initiation that aims at stimulating the establishment of university-industry links with the support of government by co-financing of research projects, cutting cost, tax benefit, etc. In this case, the establishment of Triple Helix which has a direct impact on society as the next output or outcomes of entrepreneurial university transformation process.

5. CONCLUSION

Entrepreneurial university is a concept of a future university which is the next stage for the university in addition to carrying out its role as a teaching and research university, in order to play a more significant role in community development and economic growth. In the process of transformation to an entrepreneurial university, it is necessary to be able to assess the extent of the output produced with the capabilities of a university.

Breaking down the measurement elements of entrepreneurial capacity and implementation into a synthesis model that is more comprehensive and easily understood, will greatly help university to know the extent to which the entrepreneurial position has been reached, and take steps to meet the required requirements. From the breakdown elements, it is known that to determine whether a university has become an entrepreneurial university through a third mission, is not enough to get into the output stage only, but it must reach the outcomes, where there must be a good role collaboration between university, industry and government (Triple Helix).

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