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The development of disruptive innovation at “Cihampelas Mandiri Waste Bank” in Bandung City, Indonesia: Why does it matter to ecopreneurship education in universities?

Ratna Lindawati Lubis
Telkom University, Indonesia

Introduction

Towards the disruptive innovation at waste bank services in Indonesia

The concept of “the triple drivers of ecopreneurship” (Nugroho, 2015) and “the pyramid of ecopreneurial action” (Lubis, 2015) is the necessary point of departure for this study. Both concepts are the author’s point of view to cover environmental topics in the scholarly research, in particular concerning Municipal Solid Waste (MSW) disposal systems around Bandung Metropolitan Area (BMA), West Java Province, Indonesia.

Decentralized waste banks, trash banks, garbage banks, or “bank sampah” as they are called in Indonesia are a new convincing concept for waste management. The Ministry of Environment and Forestry of Indonesia promotes waste banks as a strategic program to involve informal community-based efforts to collect sorted inorganic waste that has economic value. Waste banks are set up in neighbourhoods typically for about 1,000 residents and are usually run by the people at the grassroots level who wish to increase their household income. These waste banks are mainly women-owned and operated, as clients tend to be women who collect and sell household recyclables for the in-kind or cash benefits.

Meanwhile, there are signs that social sector organizations with an eye for disruptive trends have begun developing a waste bank mobile application in an attempt to gather comprehensive data about the quantity of waste that can be reduced and recycled (see e.g., Kalsel Antaranews, 2016; The Jakarta Post, 2018; DW, 2019; The Jakarta Post, 2020). Some examples of those organizations can be viewed at the following web sites:

Cita sugerida:
Lindawati Lubis, R. (2020). The development of disruptive innovation at “Cihampelas Mandiri Waste Bank” in Bandung City, Indonesia: Why does it matter to ecopreneurship education in universities? En I. Bakkali (Coord.), *Hacia una educación transformadora: propuestas, proyectos y experiencias.* (pp. 70-82). Eindhoven, NL: Adaya Press.

- https://banksampah.id/
- https://waste4change.com/official/
- https://zerowaste.id/

While those organizations may do a good and important job serving waste banks' customers around Indonesia, and while their services may steadily improve, it is considered necessary to note that waste bank management is often associated with the motivation and public participation in household waste management. In the context of Bandung City, previous research findings showed that the nature and the behaviour of waste banks' customers may change over time (see e.g., Lubis, 2015; Lubis, 2016; Lubis, 2017, Lubis, 2018-a, Lubis, 2018-b).

In short, a waste bank is a place where the individual or community response is not always the same or the given response depends on the stimulus received by the individual or by the community. Given the importance to understand the waste banks customers' perception of the ecology and environment involved in the waste bank mobile application, this present study investigates their outlook into the future as regards the disruptive innovation. Following this line of thought, the author takes the case study approach as a research strategy to illustrate the development of disruptive innovation in one of the waste banks in Bandung City, namely Cihampelas Mandiri Waste Bank (referred to as CM Waste Bank hereafter).

The development of ecopreneurship education and "The Innovative University"

Previous studies have contributed a considerable amount of effort in providing the examples of how the concepts of ecopreneurship are increasingly looked at as one of the answers to the establishment of new ventures which have an ecological origin and sustainable development (see e.g., Lubis, 2015; Lubis, 2016; Lubis, 2017; Lubis, 2018-a; Lubis, 2018-b). The findings show what it takes to apply the concept of *ecopreneur, ecopreneurship,* and *ecopreneurial* to a higher education environment and community development.

Meanwhile, in the context of the social sector, Christensen, *et al.* (2006) introduced the phrase *catalytic innovation* – as a subset of *disruptive innovation* – with a fundamentally different approach. This phrase distinguished by their primary focus on social change, often on a national scale. Christensen, *et al.* (2006) proposed that organizations addressing social problems may use *catalytic innovation* as a strategy to create scalable, sustainable, and systems-changing solutions. At its simple, *catalytic innovation* challenge organizations by offering simpler, good-enough solutions aimed at un-served groups. Furthermore, Christensen and Eyring (2011-a) explore the strategic choices and alternative ways, so-called *The Innovative University,* in which traditional universities can change to ensure their ongoing economic vitality. To avoid the pitfalls of disruption and turn the scenario into a positive and productive one, universities must re-engineer their institutional DNA from the inside out.

Given the importance to promote the strategic choices and alternative ways as a basis for conceptualizing the ecopreneurship education in universities, the author takes a comprehensive analysis of “Cihampelas Mandiri Waste Bank” in Bandung City, Indonesia. This study provides a unique way of understanding the process of “education – research – community services”, so-called “Tri Darma Perguruan Tinggi” or the three pillars of Higher Education Institutions (HEIs), in response to the concept of *The Innovative University.*

Theoretical Basis for the Study

The *Theory of Disruptive Innovation* was pioneered by Clayton Christensen (April 6, 1952 – January 23, 2020) and first came to public attention 25 years ago. Christensen’s original theory of disruption has held up very well in explaining the industries like automobiles, computers, and steel. In the context of the social sector, Christensen, *et al.* (2006) introduced the phrase *catalytic innovation* – as a subset of *disruptive innovation* – with a fundamentally different approach. This phrase distinguished by their primary focus on social change, often on a national scale. At its simple, *catalytic innovation* challenge organizations by offering simpler, good-enough solutions aimed at un-served groups. However, the phrase *disruptive innovation* has come to mean all manner of things to people. In connection to this, it is considered worth noting for the reader to understand the initial concept to avoid the inconsistencies for management scholars. Interviewed by Dillon (2020, p.6), Christensen has argued that:

> Disruption does not mean “breakthrough” or “new and shiny,” far too many people assume that disruption is an event. Rather, disruption is a process. It’s intertwined with the resource allocation process in the firm, in the changing needs of customers and potential customers, and in the constant evolution of technology.

Moreover, the phrase *disruptive innovation* is defined in more detail with the following explanation (Dillon, 2020, p.1):

> Disruptive innovation describes a process by which a product or service powered by a technology enabler initially takes root in simple applications at the low end of a market — typically by being less expensive and more accessible — and then relentlessly moves upmarket, eventually displacing established competitors. Disruptive innovations are not breakthrough innovations or “ambitious upstarts” that dramatically alter how business is done but, rather, consist of products and services that are simple, accessible, and affordable. These products and services often appear modest at their outset but over time have the potential to transform an industry.

To understand this argument in the context of CM Waste Bank, the author utilized the three dimensions of the *disruptive innovation* as a basis to determine the research questions in this study. Those three dimensions are shown in Table 1.

Table 1. The three dimensions of disruptive innovation

Dimension	Description
Enabling technology	An invention or innovation that makes a product more affordable and accessible to a wider population.
Innovative business model	A business model that targets non-consumers (new customers who previously did not buy products or services in a given market) or low-end consumers (the least profitable customers).
Coherent value network	A network in which suppliers, partners, distributors, and customers are each better off when the disruptive technology prospers.

Source: https://www.christenseninstitute.org/disruptive-innovations/ (Retrieved December 18, 2019)

Parallel to the theoretical construct of *disruptive innovation*, in *The Innovative University* (Christensen & Eyring, 2011-a) has served to convince the author that *innovation* is a lens to expose the critical challenges and to explore the grand possibilities for the traditional higher education system. Christensen and Eyring (2011-b, p.224) provide a model of change with several of the elements of the innovations, which is consist of (a) expanding offerings through different delivery systems and models by increasing the use of informational technology, (b) instituting changes in program and curriculum offerings, (c) eliminating athletic programs, and (d) ultimately restricting the growth of faculty members and capping building expansions.

As the point of departure to explore the grand possibilities for "Tri Darma Perguruan Tinggi" of HEIs in Indonesia, it is important to highlight the explanation from Christensen and Eyring (2011-a, p.8):

> The real advantage of the traditional universities, though, is their ability to blend online and face-to-face learning experiences. Hybrid instruction has proven more effective than either of the pure modes. Traditional universities can deliver the best of both – low-cost, convenient online learning blended with periodic classroom-based instruction. Moreover, the face-to-face learning at the traditional university goes beyond the classroom; it includes the important informal learning that comes when students interact with one another in social activities and with professors in research.

From this perspective, HEIs in Indonesia need to understand not only the three dimensions of disruptive innovation but also a model of change, so they can introduce the new process of "education – research – community services" for promoting ecopreneurship education in their universities.

Empirical Studies Related to Ecopreneurship Education

To look more closely at the context of ecopreneurship education for HEIs in Indonesia, it is considered necessary to revisit the previous findings for identifying and tracking the progress of ecopreneurship education in universities (see e.g., Lubis, 2015; Lubis, 2016; Lubis, 2017, Lubis, 2018-a, Lubis, 2018-b, Lubis, 2019).

Most of the constructs and discourses referred to in the focus of inquiries related to entrepreneurship as an umbrella theory and a wider academic discourse. Those previous studies show a considerable amount of effort in providing an appropriate knowledge base, which may have helped ecopreneurship education to develop and gain momentum, particularly for HEIs in Indonesia. And in an attempt to further extend the discussion about the new process of “education – research – community services” for promoting ecopreneurship education in their universities, the author utilized the idea of *The Innovative University.* The author intends to explore the grand possibilities for “Tri Darma Perguruan Tinggi” of HEIs in Indonesia.

The Context

The Ministry of Environment and Forestry of Indonesia reported that BMA generates around 3,800 tons of waste daily, while the Sarimukti landfill only can manage 2,000 tons of waste each day. The existing waste management around BMA consists of two levels. At the block number or *Kelurahan*, residents independently manage household waste collection by paying a waste collector to take their discards and bring them to a transfer station or *Tempat Pengelolaan Sampah* (TPS). From the TPS, the BMA’s local administrations use trucks to transport collected waste to the Sarimukti landfill. However, not all wastes are captures by this system.

In Indonesia, the development of MSW facilities in urban areas cannot be handled by the district or city. Often, this condition leads to regional problems, thereby demanding the intervention of provincial governments. Therefore, talking about the disruptive innovation and ecopreneurial activities in the context of CM Waste Bank in Bandung City, which is located in BMA, it is considered necessary to explain the waste management policies and regulations in Indonesia. The Waste Management Law of 2008 (No.18/2008) encourages collaboration between regional governments for addressing waste problems, as regards to the construction and operation of joint facilities that may function as regional final disposal facilities. Implementing the Waste Management Law of 2008 is not as easy as it looks. First, there is no agency solely responsible for waste management. Second, the law highlights the need to sort waste but does not prescribe enforcement strategies. Third, community structures in *Kelurahan* or *”Rukun Warga”* as they are called in Indonesia, do not have the resources and the authority to require their residents to sort their household waste.

Furthermore, adding pressure to Bandung City and other cities in Indonesia is the Presidential Regulation No.97/2017 on National Waste Management Policy and Strategy *(Jakstranas)* also targets 30% waste reduction and recycling by 2025. Unfortunately, waste reduction and recycling are also not performing anywhere close to government targets. To make matters even more difficult, the search for any new disposal sites is becoming increasingly problematic due to land shortages within suitable distances from large urban centres, particularly in Java island.

For a better understanding to learn why CM Waste Bank is essential to this study, it is important to show the existing neighbourhood as of October 2019, which may provide a brief illustration for the identification of this study. Figure 1 shows the imagery of the sub-district in Bandung City and represents one of the areas with the highest density population. According to the government's data in 2017, the cities and districts around BMA have around 8 million residents and the population of Bandung City was around 2.5 million, with a density of 14,795 people/km² and with a total area of 167.67 km². This situation certainly will generate pressure and challenges to some issues regarding the waste management facilities and services (see e.g., Lubis, 2015; Lubis, 2016; Lubis, 2017).

CM Waste Bank was initially come up as one of the topics of discussion by the faculty members and the students at several HEIs in Bandung City. In 2017, those faculties and the students have taken action for designing the community services based on the fundamental principle of the "Tri Darma Perguruan Tinggi" or the three pillars of HEIs in Indonesia, namely "education", "research", and "community services". This initiative also caught the attention of local media, and can be viewed at the following YouTube links:

- https://www.youtube.com/watch?v=4fxNiH0c3GI
- https://www.youtube.com/watch?v=3SLi-9pgAv8
- https://www.youtube.com/watch?v=UXdEZPWuOFc

Figure 1. The neighbourhood around CM Waste Bank
Source: earth.google.com/, with author's modification. Author's document, October 8, 2019

Up to this point, it is important to understand at this stage what the challenge that the author is interested in and with which the author has some knowledge about the disruption innovation and ecopreneurship education issues. Those issues are as follows:

- There are many barriers to deep inquiry the disruption innovation in which the real-life conditions of CM waste bank’s customers (on one side) and the social sector organizations, as well as the regulators of MSW disposal systems (on the other side) are involved.
- The ecopreneurship education continues to be the product of experience, which is rooted in the real-word application and refined in the classroom.
- The process of “education – research – community services” or “Tri Darma Perguruan Tinggi” describes as a journey and not a destination.

With that in mind, the aim of the present study is two-fold. Firstly, it attempts to identify and describe the experiences of CM waste bank’s customers within the context of *“the three dimensions of disruptive innovation”.* Secondly, it attempts to identify and describe the experiences of students within the context of *“the three dimensions of disruptive innovation”* and ecopreneurship course. Taking both primary sources of information into consideration may lead to foster a conversation around the topic of ecopreneurship education and the innovative university.

Methods

Data for the study were collected over a period of one semester during the academic year of 2019 to 2020 from *”Rukun Warga”* RW-05 sub-district Cipaganti, Bandung City. It combined traditional field techniques such as participants-observations, survey questionnaires, and focus group discussions. Additional data were collected from the archives and other documented sources. The three research questions (RQs) that were addressed in this study were the following:

- RQ1 What do you think about “the three dimensions of disruptive innovation”? Important? Less important? Or not important?
- RQ2 Which of the following best describes “waste management solutions in Indonesia”? Enabling technology; innovative business model; coherent value network.
- RQ3 Which of the following best describes “Tri Darma Perguruan Tinggi” that you are interested in? Education, research, community development.

Results and Discussion

The thematic analysis was driven by the *Theory of Disruptive Innovation* (Christensen, *et al.,* 2006) and *The Innovative University* (Christensen & Eyring, 2011-a; Christensen & Eyring, 2011-b). Thematic analysis is more of a method and not a methodology, it is flexible because it is not tied to a particular epistemological or theoretical perspective. Braun and Clarke (2006) argued that thematic analysis can be done in many different ways;

thus, it may prove challenging to define clear guidelines for doing it. However, thematic analysis is simple to use and is appropriate in this case study. In conducting the thematic analysis of this study, the results and discussion will be presented systematically based on the three questions and the primary sources of information for this study.

The CM Waste Bank's customers

It is found that CM Waste Bank's customers consist of eight neighbourhood groups and each group has a chairman and secretary as well as a finance manager elected by the group members. However, only a relatively small portion of the neighbourhood groups expressed a high degree of willingness to participate in this study. Of the 181 customers, a total of 52 respondents (17 males and 35 females) completed the questionnaires, which translates to the rate of 29%. Like many waste banks in Indonesia, in this study, the majority of the respondents were housewives. This condition was to be expected because there seem to be the social norms that women have to stay at home and to take care of their children and other household chores.

- Q1 What do you think about "the three dimensions of disruptive innovation"? Important? Less important? Or not important?

The vast majority of respondents believe that *"the three dimensions of disruptive innovation"* is less important, which is a signal that *enabling technology, innovative business model, coherent value network* is not necessary for the housewives in CM Waste Bank. However, this was considered not as a problem, nor a sign of negative responses. Of course, one can always draw various lessons from *"the three dimensions of disruptive innovation"*, depending on what one is interested in.

Someone may want to highlight that the *enabling technology, innovative business model, coherent value network* which expands people's capability to receive the more affordable and accessible waste bank's services were not interested until somehow a business opportunity was perceived. In other words, one may also note that the *enabling technology, innovative business model, coherent value network* matter for which capabilities – affordable and accessible – get expanded. And equally important is to note that the ideas about the possible meaning of the *"the three dimensions of disruptive innovation"* for the waste bank's customers about what it could allow them to do and be, was a factor shaping further "education – research – community services" development. This could be the inspiration for designing new and innovative "Tri Darma Perguruan Tinggi" for HEIs in Indonesia.

- Q2 Which of the following best describes "waste management solutions in Indonesia"? Enabling technology; innovative business model; coherent value network.

Nearly half of the respondents considered the *enabling technology* to be the best describes *“waste management solutions in Indonesia”.* This was considered not as a problem, nor a sign of negative or positive response. The waste bank’s customers may not understand *“waste management solutions in Indonesia”* in any detail, but they can sense that *enabling technology* is passing them by. Of course, information technology is continuing to leap forward, and perhaps they are only dimly aware of the rise of the *“waste management solutions in Indonesia”* and its potential impact on their lives.

However, although the Ministry of Environment and Forestry of Indonesia promotes waste banks as a strategic program, the *“waste management solutions in Indonesia”* may not solve the problems of their waste management facilities and services that are now being created by the highest density population. This condition may lead universities to launch initiatives in the context of exploring the possibilities for “Tri Darma Perguruan Tinggi” that may serve as the instruments for promoting the idea of *The Innovative University.* But will that be enough? All of this leads to one very important conclusion: HEIs in Indonesia will need to reinvent themselves not just one, but many times.

The university students

During the academic year of 2019 to 2020, a total of 9 students registered in the ecopreneurship course. As a result, the sample size is determined based on a census with the total numbers of respondents were 9 (6 males and 3 females). Based on the gathered data, the author found that most of the respondents or 75% of students completed their undergraduate degree from the business and management area, 15% were graduated from engineering studies, and the rest 10% were graduated from social sciences studies. The majority of the respondents (80%) were individuals between 22 to 25 years old.

A total of 9 respondents completed the questionnaires – a response rate of 100%. All those students are allowed to practice their academic-based knowledge outside the classroom, which they are formed into teams and expected to transfer their relevant knowledge directly into a real-world context, in the form of “education – research – community services”. This process took place from September to November 2019.

- Q1 What do you think about “the three dimensions of disruptive innovation”? Important? Less important? Or not important?

All the respondents believe that *“the three dimensions of disruptive innovation”* is important, which is a signal that *enabling technology, innovative business model, coherent value network* is necessary for the students. This was considered as something positive, essentially because it may lead to offer the students plenty of opportunities for development and learning. Moreover, this condition was to be expected because young adults love going online. They tend to use the internet and social media to connect with, comment on, and discuss things with others, through social networking, which experts now define as *digital natives* because they are born with technology.

In other words, all those students may also have a good understanding of the *enabling technology, innovative business model, coherent value network* in the context of waste management at CM Waste Bank. If they understand what it means to the phrase *enabling technology, innovative business model, coherent value network,* the university has every reason to trust them with managing their academic-based knowledge. And equally important is to note that *"the three dimensions of disruptive innovation"* may serve as the instruments for exploring the possibilities of "Tri Darma Perguruan Tinggi" in the next future.

- Q2 Which of the following best describes "waste management solutions in Indonesia"? Enabling technology; innovative business model; coherent value network.

The vast majority of respondents considered the *innovative business model* to be the best describes *"waste management solutions in Indonesia".* This condition may demonstrate positive outcomes in connection with their understanding of a business model that targets non-consumers or low-end consumers. Clearly, low-end consumers or the least profitable customers setting presented challenges to the business, but their perception show that they were positive about it, one that was highly relevant to their learning in the context of the waste bank. This condition was to be expected because over the last decade the term "social entrepreneurship" has emerged as a recognizable field in development work with young people.

Nonetheless, as their understanding is in dynamic interplay with "education – research – community services" factors, it is important for the university to asses other factors involved, such as the waste banks' customers perception in terms of the waste bank mobile application. In this context, it is important to build a variety of programs and activities that seek to achieve the same outcome and results. For example, the community development program with various themes, that aimed to invest in students to promote positive social change and innovative solutions that can be sustained and replicated.

- Q3 Which of the following best describes "Tri Darma Perguruan Tinggi" that you are interested in? Education, research, community development.

The majority of respondents tend to have a strong interest in *community development.* The results were not surprising because those students are allowed to practice their academic-based knowledge outside the classroom, in the context of ecopreneurship course. In other words, the ecopreneurship course during the academic year of 2019 to 2020 provided opportunities for students to do physical work for the needy giving them a first-hand concrete experience of what being needy is all about. This condition may demonstrate a mixture of self-development and social services. It involves academic theoretical knowledge as well as practical knowledge.

If the students interested in *community development,* the university can set up the program which covers a variety of approaches, including funding, technical assistance, networking, marketing, events, and research. And if more students have a growing interest in the field of *community development,* the university may provide a range of ecopreneurship education with *hybrid instruction* (Christensen & Eyring, 2011-a, p.8).

Towards a Conceptual Framework of Disruptive Innovation Learning Model

As explained earlier, the starting point for this study was a desire to explore the ideas associated with the devotion of understanding the process of “education – research – community services”, so-called “Tri Darma Perguruan Tinggi” or the three pillars of Higher Education Institutions (HEIs), in response to the concept of *The Innovative University.* To this end, the author attempted to expand the concept of “the triple drivers of ecopreneurship” (Nugroho, 2015) and “the pyramid of ecopreneurial action” (Lubis, 2015).

It has appeared that the data generated from respondents’ responses indicated that the ecopreneurship course has a positive impact on students. Moreover, it has appeared that *“the three dimensions of disruptive innovation”* may serve as the instruments for exploring the possibilities for “Tri Darma Perguruan Tinggi” to keep moving forward. This means there are interconnected relationships between the concept of ecopreneurship education and the idea of *The Innovative University.*

In this study, the author described that most of the constructs and discourses referred to ecopreneurship are relate to the aspect of ecology and environment. Therefore, talking about the disruptive innovation and ecopreneurship education, it is important to understand of the Waste Management Law of 2008 (No.18/2008). A piece of knowledge about this law provides a foundation from which one can begin to understand and apply the principles of waste management to the ecopreneurship education and the innovative university settings. With that in mind, the author proposes a conceptual framework, so-called “Ecopreneurship Disruptive Innovation Learning Model or EDI Learning Model” as an alternative model to foster a conversation around the topic of ecopreneurship education and the innovative university, as illustrated in Figure 2.

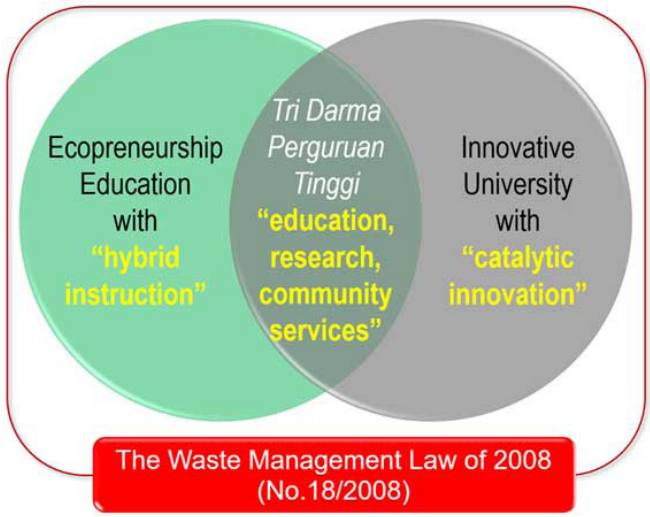

Figure 2. Author’s construct for Ecopreneurship Disruptive Innovation Learning Model

In closing, rather than a definitive conclusion on future directions for ecopreneurship education in universities, the author hopes this study serves as the opening of a new chapter for exploring the possibilities of “Tri Darma Perguruan Tinggi” in HEIs around Indonesia.

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Dr. Ir. Ratna Lindawati Lubis, M.M. Ratna Lubis is one of the core Faculty members at Telkom University, a higher education institution under PT. Telkom Education Foundation or Yayasan Pendidikan Telkom (YPT) in West Java Province, Indonesia. She’s also the author of *ECOPRENEURSHIP In mind … In attitude … In action …* You can find Ratna on https://www.researchgate.net/profile/Ratna_Lubis or http://mm.telkomuniversity.ac.id/en/ratna-2/

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