Challenges and Opportunities of Higher Education Institution in the disruption era towards Education 4.0

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ABSTRACT
It is not surprisingly that fast development of Industry 4.0 affected by rapid technology development of Artificial Intelligence (AI), Big Data, Internet of Things (IoT), Automation, and IT based technology will impact on how higher education will be. As the nature of higher education to operate on Education, Research, as well as Community Service in which should be aligned to strategic environment. Therefore, consequently if the strategic environment is changing then the operation of higher education must adapt to it. It is, the situation, nowadays that fast development of Industry 4.0 should be responded promptly by higher education by means of redefinition of the university, faculty as well as study programs to align with the strategic environment so called Industry 4.0. It is simply to say that University must become University 4.0 as well. This paper will elaborate how the university should redefine itself to become university 4.0 as well as to cope with the rapid changing of strategic environment, in especially in the requirements by Industry 4.0. The method used on this paper is descriptive analysis based on expert opinion.

Keywords: Education 4.0, Disruption, Higher Education, Industry 4.0

INTRODUCTION
The wave of 4th generation of Industry, known as Industry 4.0, driven by impact of rapid development of Artificial Intelligence (AI), Internet of Thing (IoT), Big Data, and so on in which due to the rapid development of IT. The similar wave due to the existence of IT technology may impact to higher education that never happened before. We have observed that distance learning method with help of IT technology has been practiced for some years in the past which allowed people to keep study in distance and even to take the university degree online. However, in the era of Industry 4.0, (higher) education may somewhat different than before not only in terms of a) how to deliver it but also b) whether the courses offered still relevant or not.

Consequently to face the challenges and opportunities of Industry 4.0 Era, higher education institution (HEI) should, proactively, take necessary steps to align with the rapid development of the technology.

LITERATURE
Higher Education in the Disruption Era
The definition of disruption means disturbance or problems which interrupt an event, activity, or process (Oxford dictionary). Disruption era indicates that competition will escalate rapidly and intensely. Consequently that any organization including but not limited to higher organization may fail to compete if they practiced as usual without looking any innovation alternative to see other possibilities in its competition.

In the case of (private) higher education organization especially in Indonesia where student intake and student body will be the major back bone to sustain. Disruption may become another game changer, those who have innovative idea may in short period of time can escalate the student body rapidly. On the other hand, those who maintain “brick and mortar” organization may suffer of declining student intake. Student intake in, especially private, higher education organization were affected by not a single factor, and it is not easy to define what the factors are. The factors can be categorized simply into a. Academic, b. Non-Academic, c. Others (Figure 1). Academic factors are generally related to academic portfolio such as study programs, courses, lecturer, accreditation, teaching, research,
community services and so on. Non-Academic factors are generally related to infrastructure, laboratory, marketing, and so on. While Others factor are generally related to those that are not academic and non-academic can be from internal or external such as external innovation responds.

![Factors impacted to student intake](image)

Figure 1. Factors impacted to student intake

Disruption can be classified as other factors, that is why awareness of disruption in (private) higher education institution will not be the same. For example: the way of HEI responds to the rapid changing of IT/technology development will also not be the same. There are many reasons of that no matter either slow or fast responds to the changes. The important thing to note is that due to the rapid changing of IT development may impact to also to rapid deterioration of intake or rapid improvement of intake. Then the question is “how to respond to rapid IT development (disruption) effectively”. No respond or not pay attention enough to the disruption can be classified also as bad response. The reason is because in “no respond” situation, organization is actually operated in “business-as-usual” mode no matter what has changed in the environment. Consequently, when the changes has gone far enough there will be too far to catch up and even not enough energy available in the organization to respond.

**Education 4.0**

Unlike in education 1.0 where traditional teaching applied in in-class teacher-based learning system. Students in education 1.0 gain knowledge by means of what has been given by teachers, passive students, and what has been explored by them. The development of knowledge is considered slow and limited. When IT development gain interest to the social media like blogs and many more, the way to delivered teaching is now slightly different. This is the so-called education 2.0 where teachers are now communicating with traditional and social media. The role of the teacher in now broaden to become a mentor, and student become more active. It is actually an evolution of education. In education 3.0 student become more active in the knowledge development. They are actively sharing knowledge, idea using IT media of communication.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Education 1.0</th>
<th>Education 2.0</th>
<th>Education 3.0</th>
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<tbody>
<tr>
<td>Primary role of professor</td>
<td>Source of knowledge</td>
<td>Guide and source of knowledge</td>
<td>Orchestrator of collaborative knowledge creation</td>
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<tr>
<td>Content arrangements</td>
<td>Traditional copyright materials</td>
<td>Copyright and free/open educational resources for students within discipline, sometimes across institutions</td>
<td>Free/open educational resources created and reused by students across multiple institutions, disciplines, nations, supplemented by original materials created for them</td>
</tr>
<tr>
<td>Learning activities</td>
<td>Traditional, essays, assignments, tests, some groupwork within classroom</td>
<td>Traditional assignment approaches transferred to more open technologies; increasing collaboration in learning activities; still largely confined to institutional and classroom boundaries</td>
<td>Open, flexible learning activities that focus on creating room for student creativity; social networking outside traditional boundaries of discipline, institution, nation</td>
</tr>
<tr>
<td>Institutional arrangements</td>
<td>Campus-based with fixed boundaries between institutions; teaching, assessment, and accreditation provided by one institution</td>
<td>Increasing (also international) collaboration between universities; still one-to-one affiliation between students and universities</td>
<td>Loose institutional affiliations and relations; entry of new institutions that provide higher education services; regional and institutional boundaries breakdown</td>
</tr>
<tr>
<td>Student behaviour</td>
<td>Largely passive absorptive</td>
<td>Passive to active, emerging sense of ownership of the education process</td>
<td>Active, strong sense of ownership of own education, co-creation of resources and opportunities, active choice</td>
</tr>
<tr>
<td>Technology</td>
<td>E-learning enabled through an electronic learning management system and limited to participation within one institution</td>
<td>E-learning collaborations involving other universities, largely within the confines of learning management systems but integrating other applications</td>
<td>E-learning driven from the perspective of personal distributed learning environments; consisting of a portfolio of applications</td>
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Education 4.0 due to rapid IT development and also impacted to the era of Industry 4.0 has changed significantly the way of education. Education 4.0 is the personalization of the learning process, where the learner has complete flexibility to be the architect of his or her own learning path and has the freedom to aspire for, approach and achieve personal goals by choice (5). Education 4.0 is characterized by the ability of learning in anywhere anytime, the delivery is also not just in-class but more flexible, therefore the way to measure effectiveness may no longer by examination instead by evaluation. Ownership of student to explore knowledge is become higher as they can learn from any media of learning such as open courseware, open online course, etc. This is in-short a leap frogging in education.
METHODOLOGY
This paper is developed based on writer subjective extensive experience in educational sector as well as using a practical benchmarking in Indonesia’s higher education institution.

DISCUSSION
Disruption in its nature has always challenges and opportunities for higher education institution. The way to see and react to disruption depends merely on how higher education institution itself. The expectation is to always look on the positive aspect of disruption while trying to reduce the negative impact of it.

This paper tries to elaborate several challenges and opportunities that the author considered to be underlined. There are logically many challenges and opportunities that higher education institution can explore. The challenges and opportunities in every higher education institution may be different and it depends on the internal and external situation. This paper will only mention several of them.

Challenges
The challenges due to disruption of Indonesia (private) higher education institution (HEI) among others are

a. Student Intake and Student Body
This is perhaps the bottom line factor for (private) HEIs to survive and sustain especially if the operational cost depending merely on the number of students. Without reasonable number of students, (private) HEI has difficulty to develop such innovative initiatives. Consequently, if number of students erode due to inability to cope with disruption then the risk of (private) HEI to sustain may be in trouble. On the other hand, if (private) HEIs can cope with disruption by effective initiative then they may experience the privilege of disruption by means of number of students. The question is “How to cope with disruption for (private) HEI?”. One of the answer is by applying education 4.0.

b. Applying Education 4.0
Applying education 4.0 simply means utilization of up-to-date IT technology in higher education institution. The application can be 1. To increase efficiency, effectiveness and productivity of HEI’s government and governance, 2. To innovate the teaching, 3. To improve a connection of stakeholders, 4. To carry out the new frontier of study programs, 5. Etc. By applying education 4.0 then the characteristics of as indicated in II.2 may be achieved. The positive impact of applying Education 4.0 is that number of students may increase however at the same time it increases the possibility of international competition among HEIs.

c. Fierce of International Competition
Competition among (private) HEIs to attract new students is now getting more intense. HEIs are nowadays competing each other by any means to attract new students. The way of competition nowadays is also different compare to ten years ago. For example: infrastructure and tuition fee are now not a key to win the competition, similarly accreditation is not a major factor to win the competition. The question is what the key factors of competition then?

Competition related to disruption means innovation. The innovative (private) HEI most likely will win the competition. It is the end-to-end innovation that covers both academic and non-academics factors. Therefore, it is not surprisingly (private) HEIs use any media of online marketing to promote their brands. They also utilize an online enrolment system to ensure that enrolment is getting more easier, faster, reliable with reasonable cost. With the use of technology, competition is nowadays become borderless consequently any (private) HEIs no
matter where they are can compete each other to attract new students. Shortly competition in HEI is now getting intense.

**Opportunities**

Opportunities due to disruption and education 4.0 among others are:

a. **Flexible education system**
   By applying recent IT technology in education opens possibility to conduct flexible education where distance and time no longer be a problem. Lecturer can be done in distance using any online media. Students can also learn from any online sources of lectures from any HEI that offer online lecture. Even students can choose the lecturer they are prefer in social media that deliver a course. Flexibility opens possibility for anyone to study while at the same time pursuing a career for life. It is in contradiction with lecture in twenty years ago where student should be a full-time student with the main job to be a student. In doing so students also learn a practical and real-life application of their knowledge. Flexibility is also apply on administration system where students and lecturers can work on their academic assignment anywhere, anytime.

b. **International standardization**
   Another opportunity applying education 4.0 is that HEIs can standardize their academic and lecture with other HEIs from other country. Simply by evaluating lecturer posted in online media. So that slowly HEIs can find their standard by a comparison in at least on online lecture.

c. **Involvement in Triple-helix plus**
   Triple-helix is a partnership concept in HEI that involve three parties i.e. HEI, Government and Business. Triple-helix plus is a similar concept with more partners in stead of only three. Using education 4.0 partnership become more efficient, effective with broader parties. Partnership will not be limited by distance anymore. HEI from anywhere can extend partnership to any partners regardless country, language, etc. As long as the parties have similar or common interest they can do partnership much easier than before.

**CONCLUSION**

In conclusion of the challenges and opportunities of HEI towards education 4.0 is that education 4.0 offers a lot of opportunities both quality and quantity for HEI to be much better than before. Rapid development of IT technology helps HEI and students to perform their academic role much better, flexible and reliable than before.

The only consideration of education 4.0 is the will of initiative for innovation from HEIs, in especially the will of their leaders. Without such a will of initiative, technology that drive education 4.0 has no effective influence to HEI.

**REFERENCES**


