Equipping Our Students in Welcoming IR 4.0 Era

Adi Susilo Jahja

Nowadays, the world is witnessing an unprecedented technology advancement of the Fourth Industrial Revolution (IR 4.0) that changes the business landscape (Egbetokun, Yun, Zhao, & Kim, 2018). In this vein, the digital and physical technologies are combined to create digital enterprise, which can create ample opportunities for new services and products, better customer service methods, new jobs types, and even new business models (Deloitte, 2018). As a result, in the last two decades, new business models which were not existence previously, appeared in the form of multinational corporations and national corporations. Among others, they are Facebook, Google, Airbnb, Grab, Go-Jek, and Traveloka.

In this sense, CEO of HSBC John Flint commented, new technology has enable banks to serve previously underserved communities, lowering cost delivery, enhancing proliferation of small-scale retail banking and micro finance institutions (Deloitte, 2019). His opinion is supported by Deloitte’s (2019) survey. It stated that eighty-seven percent of executives believed that Industry 4.0 will cause more equality and social economic stability, since various social groups in diverse locations can access jobs, education and financing opportunities. In view of this, Indonesia as one of the largest countries in the world, is in a position to benefit greatly from the ongoing industrial revolution. Although the progress of communication infrastructure is more prevalent in Java and Bali, the use of internet is still increasing. Additionally, the growing number of the population, who use gadgets have made them digitally connected, leads to high social media conversations. Therefore, this country is demonstrating rapid expansion in online platforms that create opportunities for e-commerce, on-demand services, and transportation (Parray, 2017).

While many see the light at the dawn of Industry 4.0, the risks of this circumstance should also be carefully considered. Since nascent technologies demand different knowledge and skills which for some are not matched with their education background, it potentially causes employment uncertainty and income inequality (Deloitte, 2019). This issue necessitates education institution to develop the curriculum that addressing these challenges. Accordingly, human factor skills that are needed in Industry 4.0 should be identified by apprehending the working mechanism of the key players in this case. By understanding the required skills, education institutions, including Perbanas Institute, can arrange and update present curriculum to make it suitable for answering those challenges. Thereby, the graduates can be expected not only qualified to compete in the job market, but also have advantages in pursuing their career.

Industry 4.0 System

Initially, Industry 4.0 is introduced in 2011 at Hanover Fair in Germany as a high-tech strategy in promoting digitalization of manufacturing. It is the continuation of previous stages which can be briefly described as follows (Kiel, 2017; Lu, 2017). The first industrial revolution began with the invention of the steam engine at the end of the 18th century, representing the mechanization. The second industrial revolution started at the beginning of the 20th century with the application of electrically-powered mass production technologies. The third industrial revolution began around mid-1970’s applied automatic production based on electronics and internet technology. Finally, the fourth industrial revolution, is characterized by network-
linked intelligent systems of people, machines, equipment and products employed to run production process, data management, customers relationship, and others (Bloem et al., 2014; Piccarozzi, Aquilani, & Gatti, 2018).

Every technology system is invented by persons who work passionately in doing analysis, process, and computing algorithms with hardware and software, not for the sake of technology itself. It should be orientated to the human benefit as the adage says, "of the people, by the people, for the people." Industry 4.0 has no exception. It is created to satisfy consumers through technology development. According to Kinzel (2017), to ensure its applicability and relevancy in the market, Industry 4.0 is created from the interactions of four key functions. Those are marketing, system designer, operation, and mediator.

In marketing, the ultimate concern is to deliver customer satisfaction with profit, as it is needed for business sustainability. Customers’ needs and wants should be identified thoroughly, so the corporations can deliver products or services to satisfy customers. Based on the list of customers’ needs and wants, the team of engineers and software designers should develop the system, which is subsequently operated by the system users to make the product or service. The mediator’s role is to coordinate all those parties and resolve conflict if their perspectives in formulating the system differ sharply.

The working mechanism of those actors can be illustrated as follows. Starting from marketing unit, people in this unit have to make continuous surveillance to identify the opportunities in corporation’s competitive environment. Thus, they collect everyday information about the trends and changing in their surroundings by talking to suppliers, distributors, customers, meet other company managers, browsing information, reading books and trading publications. To comprehend further the market opportunities or problems that they face, it is possible for them to make formal marketing research.

The people in marketing unit can come up with the idea of developing product or service and it can be followed up only after the organization conduct feasibility study as the basis for decision making. The idea, then, can be executed or not. If the idea is accepted, the project leader, which has the function as a mediator is appointed. He/she will coordinate all units to realize the idea. That idea will be developed further by a system developer or designer, who comprises of team of engineers and software designers that work together. In this case, software designers must understand and interpret the idea, and subsequently technology engineers have to ensure whether the hardware will be running well as required by software designers. Afterward, this unit should train system users to make sure that the system is able to be implemented smoothly. For sure, this process will need continuous discussions and interaction. When the system is settled and launched, the process is never ending. There are always feedback from the ever changing market and environment that demand continuous improvement to keep the system relevant.

**Skills Requirement**

The aforesaid illustration about team work mechanism can be fruitful if the people engaged are equipped with appropriate skills. In this regard, Katz (1974) legacy framework can be employed to describe the skills needed. He described three kinds of skills: technical skills, human skills and conceptual skills.
Technical skills are the abilities to conduct specific kind of activity by employing specialized tools, techniques, methods, procedures and processes. This might include knowledge, understanding and proficiency in a certain specialized field, like financial management techniques, practical accounting tasks or computer programming. Mostly, the important consideration for companies to hire fresh graduates is this kind of skill. After recruited by company, they can perform the job effectively if they demonstrate technical expertise, understand technology trends, and be able to solve technical problems. Quite often the workers are later promoted from their technical specialization to managerial position because of their competence in technical manner (Peterson & Fleet, 2004). As managers, their technical skills are needed to supervise, train, direct, and evaluate subordinates. In this respect, by using Aoun's (2017) framework, Indonesia Higher Education Ministry (Ahmad, 2018) emphasizes, to be competitive in their future career, students are not only equipped with basic literacy (read, write, and math), but also are required to understand technology literacy and data literacy. Technology literacy is needed to understand how the machines work, and data literacy is needed to undertake the flow of big data.

In every management level, how to work effectively with other people is the main concern for workers. To be successful in their career, they have to continuously develop human skills like communication, motivating others, negotiation, resolving conflict, supervising, delegation of authority and decision making (Patanakul & Milosevic, 2008). Without those skills, managers cannot effectively plan, organize, direct, and control their units. Correspondingly, Indonesia Higher Education Ministry accentuates the importance of human literacy that includes humanities, communication and design to enable them to function in the human milieu. Moreover, the Ministry also suggested the entrepreneurship content in the curriculum to make students more creative and innovative in exploiting opportunities.

While human skills cope with people and technical skills cope with things, conceptual skills cope with idea. As the individuals move further to the higher management level, the needs for technical skills have decreased since they have to devote their time more on conceptual matters. Conceptual skills are the abilities of managers to envision the future of organizations, to scan the environment and organization's capabilities, to formulate goals and objectives, to build long term and annual plans. Afterward, they interpret all these things into programs and business policies. Consequently, managers should possess the ability to analyse the organization as a whole in systematic manner, determine the main issues of the business phenomenon they face, think creatively to solve the problem, and take advantage of opportunities (Peterson & Fleet, 2004). In addition, Indonesia Higher Education Ministry underlines the importance of understanding the cultural agility to enable the students working in the diverse culture that prevails in Indonesia or in foreign countries.

The relationship of managerial level and those three skills are illustrated in the following figure.
Figure 1. Required Skills in Industry 4.0

Learning Methods

Those aforementioned skills need to be interpreted into subject matters that can be taught in current education system. Those skills can be learned by the students through the particular subjects. For instance, most of conceptual skills can be taught in strategic management or business foundations subjects. Likewise, Human skills can be studied in the subjects like human resource management, organization behaviour, or entrepreneurship. In addition, the more technical skills can be delivered in accounting, financial management, or IT related subjects. Furthermore, how to deliver those subjects to the students is equally important.

According to Indonesia Education Ministry (Tim Kurikulum dan Pembelajaran Dirjen Dikti Kemdikbud, 2014), since most of the lectures are delivered by using power point presentation, current students are not used to take notes because they can just copy the material. Thus, their ability to focus to the class lecture is not so good. They are more passive, and less likely to involve in learning process. This means, more effort are needed to increase their engagement in learning process. Accordingly, there is a call for change in learning approach, from the teacher centred learning to the student centred learning.

On the other hand, it is worth mentioning that the present students are becoming more internet savvy, so they can get learning materials from the internet easily. Additionally, they have ability compare those materials with other sources in the internet, and make judgement about classroom’s teaching. Hence, the teaching style nowadays is not the same as old days. While in the previous time knowledge is transferred from the lecturers to students, now the knowledge should be constructed by the students and lecturers. Lecturers not only delivering knowledge, but also cooperate with students in constructing knowledge, and helping students in conducting learning strategies.

In this regard, lecturers act as motivators, mediators and facilitators. As motivators, they should be more attentive to the students’ ability, stimulate their spirit, cultivate their confidence, and make them satisfied with their learning process. As facilitators, lecturers are demanded to provide guidance, relevant materials, books, journals, internet sources and also their time. As mediators, they are asked to lead the way for students in solving problem pertaining the learning materials and give feedback to the students. With this new paradigm, students are not in
passive-receptive position, now they can be more active and participative in knowledge construction.

Accordingly, students will be exposed to the real cases that should be discussed or solved. With this in mind, the learning process can be implemented by employing the appropriate methods that are suitable to the learning objectives. In this way, Indonesia Education Ministry (Tim Kurikulum dan Pembelajaran Dirjen Dikti Kemdikbud, 2014) offered several methods to be considered to enhance conceptual, human, and technical skills. For example, small group discussion method. It is conducted by the group with 5-10 persons, which are assigned to discuss the certain topic provided by lecturer. In this method students will learn how to be a good listener, collaborate, appreciate others point of view, argue with reason, and others. Other example is simulation method, which bringing the similar situation into the class by role playing, games simulation or practicing model simulation with computer. In this method students could enhance their skills in verbal and nonverbal communication, team work building, and problem solving. The other methods are discovery learning, self-directed learning, cooperative learning, collaborative learning, contextual instruction, project based learning, and problem based learning.

In order to deliver managerial skills content with those learning methods, lecturers’ role is crucial in constructing knowledge together with their students. In this vein, paradigm change in lecturers' mindset is indispensable to ensure that this new approach is viable. Then, they have to enhance their technology literacy, and have a willingness to update their knowledge and skills in this matter. Consequently, workshop or training should be conducted to prepare them in welcoming Industry 4.0.

In light of that, Perbanas Institute with 50 years’ experience in education which has two schools (business and IT), should be ready to deal with this new challenge. The resources of both schools can be synergized to anticipate IR 4.0. Hence, with regard to celebrate the 50th Institute’s anniversary, let us look to the future with optimism and hope.

*Senior lecturer in Management studies, teach at Perbanas Institute, Jakarta.*
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