**Vocational Students' Perception And Readiness
In Facing Globalization, Industry Revolution 4.0
And Society 5.0**

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**Abstract.** The development of globalization marked by the enactment of agreements between countries such as the ASEAN Economic Community (MEA), ASEAN Free Trade Area (AFTA), China-ASEAN Free Trade Area (CAFTA), and other agreements has consequences for the flow of goods and labor among countries in the world. As an educational institution, higher education has a strategic role in preparing professional human resources to compete with workers from countries in the world. This article aims to investigate and analyze the readiness of Indonesian students in facing globalization, industrial revolution 4.0, and society 5.0. A questionnaire was distributed to students from six departments in the Faculty of Engineering Universitas Negeri Yogyakarta to investigate it. A systematic sampling procedure led to 126 completed questionnaires. The indicators of students' readiness include knowledge readiness, skill readiness, mental readiness, and support readiness. Data will be analyzed by descriptive quantitative statistics to describe the readiness of students. The results of the study show in general the students' readiness in facing globalization, industrial revolution 4.0, and society 5.0 in a suitable category with an average score of 2.86 (71.5%). In detail, it can be explained, the readiness of students in terms of knowledge is in a Good category with an average score of 2.92, Good skill readiness with an average score of 2.74, mental readiness in the Good category with a score of 2.68, and work support readiness score 2.74

1. **Introduction**

Globalization has many definitions according to the context used. Albrow [1] states, globalization as all the processes by which peoples of the world are incorporated into a single world society. Robertson [2] defines globalization as world compression and intensification of the consciousness of the world as a whole. Ohmae [3] popularized the term borderless world, global village, invisible continent, and shrinking world. From these definitions, globalization can be defined as a network, process of interaction and integration among people, companies, and governments [worldwide](https://en.wikipedia.org/wiki/World) that simultaneously brings together previously scattered and isolated communities in world interdependence and unity.

Ghemawat and Altman [4] state that the world is more globalized than ever before, even since the Brexit and Trump shocks, has been shaped by a tug of war between economic fundamentals and policy threats. The predictions that globalization would collapse under a wave of economic nationalism have proven no more accurate than [proclamations of a flat world](https://foreignpolicy.com/2009/10/14/why-the-world-isnt-flat/) that dominated the global business discourse a decade ago. The phenomenon of globalization, which is complex and multifaceted, is seen as a form of capitalist expansion that requires the integration of local and national economies into an unregulated global market economy.

The era of the Industrial Revolution 4.0 was marked by the very rapid development of communication and transportation technology, spurring the acceleration of globalization in all fields, both trade, labor, and culture [5]. Basically, globalization is a process of interaction and economic integration related to social and cultural aspects. However, conflict and diplomacy are also a big part of the history of globalization. Globalization indicates an increase in local diversity, which is influenced by human contact across geographic boundaries as well as the high-speed exchange of commodities and information (Kubota, 2002). Globalization is sometimes used broadly to include policies for trade growth and liberalization as well as reduced costs of transportation and technology transfer. The debate about globalization is a popular and controversial topic, even though the COVID19 pandemic is currently being contained.

One of the types of globalization is the Association of Southeast Asian Nations (ASEAN) that was established in 1967. ASEAN has an objective to build communication, cooperation and support economic, technological, and competitive development in the Southeast Asia region. Indonesia, together with Thailand, Malaysia, Singapore, and the Philippines, are the countries that are pioneering the formation of ASEAN. Brunei Darussalam afterward joined the other countries in 1984, Vietnam in 1995, Myanmar in 1997, Laos in 1997, and Cambodia in 1999 [6]. To integrate the economy, regional economic ASEAN formed the ASEAN Economic Community (AEC). AEC has the vision to make Southeast Asia an integrated production base as transnational capital by eliminating intraregional barriers to trade and investment and creating the cross-border infrastructure to connect ASEAN national markets. Economists would project regional gross domestic product increases of 5.3 percent or double this if the AEC were to be combined with extra-regional trade pacts (Petri et al. [2012](https://www.tandfonline.com/doi/full/10.1080/09512748.2015.1022593)). AEC is a follow up of ASEAN Free Trade Agreements (AFTA) and CAFTA. It appears attractive because it provides preferential access to both sides, and it may make good progress that would call attention from outsiders to become more involved within the grouping.

The China-ASEAN Free Trade Agreement has been hailed as a landmark pact in pushing for freer trade between China and the ASEAN countries. With the establishment of the free trade zone, trade and investment between the Chinese and ASEAN economies are expected to increase significantly; but while the economic benefits are inexorable, the extent of gains derived from closer integration hinges on the Sino-ASEAN economic relationship, which is both complementary and competitive. At the present stage of development, China and ASEAN are more competitive than complementary, given the similarity in their trade and industrial structures. ASEAN and China are also direct competitors for foreign investment, rather than significant investors in each other's economies. Despite these challenges, the prospects for bilateral trade to flourish are bright if both China and ASEAN can interlock their economies through deeper integration in the long term.

Globalization drives significant changes in the industrial world, known as the industrial revolution. The first industrial revolution took place in the 1780s and lasted almost 200 years. The first industrial revolution was marked by changes in the use of manual manufacturing tools with mechanical devices driven by steam engines. The use of production machinery encourages increased productivity. The second industrial revolution began about 100 years later at a slaughterhouse in Cincinnati, Ohio, and reached its climax with the production of the Ford Model T in the United States. The development of sustainable production lines based on the work division and the introduction of conveyor belts resulted in other productivity explosions. The third industrial revolution began in 1969, which was marked by the discovery of controlled electronic devices. Modicon presents the first programmable logic controller that enables digital programming in industrial automation systems. The programming paradigm still manages the engineering of modern automation systems today and leads to a very flexible and efficient automation system.

Now we have entered a new phase to the fourth industrial revolution that has emerged, known as Industry 4.0. The implementation of internet technology in the industry has become a significant technical background of Industrie 4.0. This technical basis is often mixed with corresponding future visions. Despite some overeager marketing messages, Industrie 4.0 is still in the future. Most of the technical ingredients are already available, although they are mainly used in other applications, e.g., the consumer industry ([Rainer Drath](https://ieeexplore.ieee.org/author/37682819100), 2014). The revolution industry 4.0 is characterized by automation, interconnectivity, machine learning, big data, Internet of Thing (IoT), cyber-physical systems, smart manufacturing, lean production with smart digital technology to create a more better-connected and holistic ecosystem for companies that focus on manufacturing and [supply chain management](https://www.epicor.com/en-us/supply-chain-management/) [2], [3], [4]. While every company and organization operating today is different, they all face a common challenge—the need for connectedness and access to real-time insights across processes, partners, products, and people.

Society 5.0 is the future aspiration of Japanese society in the future. At this time, people are expected to have very high intelligence supported by technology. With the support of information technology that is all connected to the internet (Internet of Things or IoT), artificial intelligence (AI), big data, 3D printing, and robots are joining every industry and in all social segments. This new order is expected to be able to solve problems that are not possible today, making everyday life more comfortable and sustainable. Society 5.0 makes it possible to solve all the problems that best meet the needs of each individual.

In the field of health and other aspects of society that are affected by human aging, it is necessary to think about how the lifestyle of society is more appropriate in this era. In the education sector, it is necessary to prepare students for the future to enter a generation that is resilient and flexible to changing times. Students need to be given skills to survive in a changing society and be able to become leaders in this era of change

The development of science and technology is speedy, demanding professional human resources. In the current era of globalization, prospective workers are required to have competencies following the standards issued by professional associations (Reference, year). Higher education as an educational institution designed to produce prospective professional workers is required to be able to meet the needs of the world of work by providing provision and work experience while they are studying. Students need to prepare themselves for knowledge, skills, and mentality in entering the workforce. There are still many students who do not know well about the ins and outs of the world of work. They are still confused about what competencies are needed, the relevance of the material learned on campus with the fields that will be undertaken in the world of work, and how the real work culture is. The lack of preparation of students and university graduates in entering the workforce is one reason they cannot compete with other prospective workers.

1. **Problem Statement**

Advances in technology and communication today have eliminated the geographical boundaries that separate all countries in the world. No country can meet its own needs but depend on one another. Globalization, industrial revolution 4.0, and society 5.0 have resulted in internal changes and the production of goods and services. Additionally, the global distribution of jobs, power, markets, currencies, and information has changed (Othman, 2000). On the one hand, this is progress or development, but only places developed countries as leaders and become pioneers in this progress. For example, in theory, globalization offers enormous trade and investment opportunities for developing countries such as Indonesia. However, due to the limitations of developing countries in terms of technology and human resources, globalization only benefits some people at the expense of many others.

The competition that is too free can put local companies, local banks, and other companies under enormous pressure. As a result, continuing efforts need to be made by developing countries to ensure that they produce a generation that can survive in a competitive world.

In the era of industrial revolution 4.0, the workforce must have added value beyond the knowledge, skills, or expertise possessed through education. Future workers must have an efficient, productive, and innovative mindset to meet the demands of a competitive and globalizing world. They must be able to keep up with the rapid development of science and technology. One essential aspect that can add value to vocational education graduates in Indonesia is the mastery of foreign languages, especially English. Knowledge and technology need to be learned with language. The ability in the field of science-supported by the language of good communication skills is the key to getting a job both at home and abroad. Language skills are an added value for workers in the era of industrialization and globalization (Rashid 1993). Several Asia Pacific countries allocate a relatively low percentage of GDP to build their ICT and R&D infrastructure (World Competitive Yearbook, 2001). As a result, a low percentage of skilled and knowledgeable workers in the population, such as scientists, engineers, and ICT specialists. Besides, the level of R&D innovation is also low among these countries, resulting in a low number of technopreneurs and entrepreneurs (Reynolds et al., 2002).

The problem of readiness to enter the workforce, especially with the enactment of the globalization, industry revolution 4.0, and society 5.0, need to be studied and investigated in order to provide input to the educational institutions, the community, government, business, and industry to improve the quality and competitiveness of students and graduates to increase national economic growth. This article will discuss the readiness of Indonesia students' readiness to enter the workforce in terms of aspects of knowledge readiness, the readiness of mental readiness skills, and work support readiness skills.

Readiness is defined as the state of readiness of a person, system, or organization to face a situation and carry out a planned set of actions (Ali, 2014). Readiness is based on the thoroughness of the planning, adequacy, and training of the personnel, and supply and reserve of support services or systems. Readiness is described as a condition that states the level of one's mental or physical readiness to act or receive experience. Slameto (2003) explains that readiness is the overall condition of a person or individual, which makes him ready to respond or answer in a certain way to the situation at hand. Adjustment of conditions will affect or tend to respond. Caplin in Muhamad (2012) explains that readiness is a level of development of maturity or maturity that is useful for practicing something or trying a task. http://www.businessdictionary.com/definition/readiness.html). Readiness is the extent to which the community is prepared to participate in the world of networking. It is measured by assessing the relative progress of a community in the areas most important for ICT adoption and the most critical ICT applications. When considered together in the context of a strategic planning dialogue, an assessment based on these elements provides a powerful picture of student readiness.

Measurement of work readiness can be done by an ability test or competency test related to knowledge, skills, and attitudes. In addition to competency tests, measurements can be made by a questionnaire to reveal the perception of one's readiness to enter the workforce. A question that arises is whether students, in particular, those in Indonesia, are ready for the significant changes which will be brought about by the implementation of globalization, industry revolution 4.0, and society 5.0. To date, this question remains moot because there has been little research into the development of Indonesia students towards meeting the challenges posed by globalization, industry revolution 4.0, and society 5.0. Therefore, there is a lack of knowledge about the factors inﬂuencing the development of Indonesian students and the readiness of Indonesian students for globalization, industry revolution 4.0, and society 5.0.

Ali [5] found that most Indonesian workers have a high level of knowledge and skills, but many still have problems communicating in English and the use of information technology. Therefore, this exploratory study investigates the competencies of Indonesian Engineering students and their readiness for the globalization, industrial revolution 4.0, and society 5.0. There are three main research questions addressed by this exploratory study:

1. What are the levels of competencies of Indonesia students?
2. What is their level of readiness for the globalization, industry revolution 4.0, and society 5.0?
3. Is there any relationship between the competencies of Indonesian students and their level of readiness towards globalization, industry revolution 4.0, and society 5.0?

This research contributes to the field of engineering education and increases understanding of the development of engineering education in connection with the formation of the AEC. Besides, this study broadens the information available to students, faculty, and researchers on how free service will impact engineering professionals in ASEAN member countries. This study also highlights the steps needed to prepare engineering students in Indonesia to face an international competition between ASEAN member countries after the formation of the AEC in 2015.

1. **Method**

The investigation of vocational students' readiness in facing globalization, industrial revolution 4.0, and community 5 use a questionnaire to students from six departments in the Faculty of Engineering Universitas Negeri Yogyakarta. A systematic sampling procedure led to 126 completed questionnaires. The indicators of students' readiness include knowledge readiness, skill readiness, mental readiness, and support readiness. Data will be analyzed using descriptive statistical techniques to describe the readiness of students to globalization, industrial revolution 4.0, and society 5.0

This study uses descriptive quantitative, which aims to get an overview of the phenomena that occur in the present time regarding the problems of Indonesian students' readiness in facing globalization, industrial revolution 4.0, and society 5.0. This research was conducted on students at Yogyakarta State University, which numbered around 5,000 people. The research sample was Faculty of Engineering students from 6 departments, each of which was taken 15 people so that the total sample amounted to 90 people. Sampling is done randomly.

Data collection was carried out through questionnaires in the form of questionnaires to students to fill readiness data to face the globalization, industrial revolution 4.0, and society 5.0 from the aspects of knowledge readiness, skill readiness, mental readiness, and work support readiness. To sharpen the analysis, the questionnaire was equipped with academic data in the form of GPA, the average value of theory courses, average scores of practical courses, TOEFL / IELT scores, work experience, and competency certificates. The results of the questionnaire data were then processed with statistics to determine the average score, the range of data, and material analysis.

This study uses survey techniques to engineering students about their perceptions of readiness to face globalization, industrial revolution 4.0, and society 5.0. Survey research is designed to test the characteristics of a sample or population on defined variables and rely on instrumentation for observation and measurement. However, survey research cannot conclude a cause and effect relationship. The main objective of this study is to determine the readiness of engineering students to meet the needs and challenges of globalization, the 4.0 industrial revolution, and society 5.0. The population is a final year undergraduate student at one of the Yogyakarta state universities. The sample was taken randomly as many as 126 students from 6 majors.

1. **Result and Discussion**
2. Students' Readiness

Based on the results of the questionnaire filled out by the respondents, obtained perceptual data about their readiness in facing globalization, industry 4.0, and society 5.0. The following is the questionnaire result data, which is displayed in graphical form in the figure. 1.

Fig. 1. Readiness of students

The readiness of Engineering Faculty students in facing globalization, industrial revolution 4.0, and society 5.0 as a whole shows the level of readiness to enter into the high category. The highest readiness was in the skill readiness aspect with a score of 3.12 (78.5%), followed by the knowledge readiness aspect with a score of 2.99 (74.5%), followed by mental readiness and work support with the same score of 2.92

1. Students' Readiness in Per Subject

Furthermore, it can be sorted for each perceptual score of student readiness in facing globalization, the industrial revolution 4.0, and society 5.0 for each department. Data shows that the readiness level of students in 6 majors shows relatively the same value, which ranges from 2.96 to 3.00, which is included in the good category. Figure 2. shows the level of readiness of students per department in facing globalization, industrial revolution 4.0, and society 5.0.

Fig. 2. Readiness of students

The data above shows that in general, the level of student readiness is relatively the same as the value that is not too large. The lowest readiness is the students in the electronics engineering education department and the highest in electrical engineering education and food and clothing engineering education.

* 1. Student Readiness by Aspect

Student readiness data for each department can be detailed in the measured aspects, namely knowledge readiness, skills readiness, mental readiness, and work support readiness. The results can be seen in Figure 3, where each student has a different level.

Fig. 3. The readiness of students by aspect

1. **Conclusion**

From the results of data analysis and discussion that has been done, it can be concluded that students of the Faculty of Engineering, Yogyakarta State University, have readiness levels in a good category with an average score of 2.99 (74.5%). The average readiness from the knowledge aspect was 2.99 (74.5%), readiness from the skill aspect 3.13 (78.25%), readiness from the mental aspects 2.92 (73%), and readiness from the supporting aspects of work 2,92 (73%).

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