

## ORGANIZATIONAL ENGINEERING IN THE GLOBAL INDUSTRIAL ERA 4.0

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**Abstract:** Change industry updated in time this requires bachelor intellectual focus self in wade changea order world . Not could denied that swiftly rate industry 4.0 mature this, force whole nation prepare generation resource humans who have painstaking talent in address technology. Therefore collaborate with community and organization must adapt self, so interaction and good relationship join manipulation organization balanced with demands growing era. Data used is qualitative data . Study this study References and reference relevant . in nature analyze the data of the method used is with reducing data, presenting data, and conclude as well as check results study in a manner sustainable in the research process. The research results show that; 1). Manipulation organization is change tatnan as well as the system that should conducted in match desire needs demand market and society. 2). The era of globalization 4.0 is marked with technology, and consequence significant to change, then develop potency man must aligned constructionalization of intellectual capital for compensata industry 4.0 pace. 3) The era of globalization 4.0 namely proficiency utilization digital technology in organizational processes and programs, completion various assignments, Development skill and competence organization education Becomes must, everyone element civilized with technology, I see as well as teachers, must role Becomes agent transformation strengthening all field, in particular build talent participant teach, manage learning must adapt with the globalization era Industry 4.0 now this

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## INTRODUCTION

Mature this middle face revolution industry 4.0, p this based on analysis Mckinsey Global Institute quoted Falih explained that revolution Industry 4.0 can give extraordinary implications normal globally, where robots and machine will remove many field work in the world especially on sector field work (False Suaedi, Article). on one different sides, according Oesterreich and Teuteberg (Andreas, Erol, Sihn vol. 52, pp. T . D), industrial era this more attached on connectivity and capable digitization increase efficiency chain manufacture and quality product so that later day could eliminating 800 million field work all over world until reach year 2030.

Morrar et al, explained that era of revolution this industry 4.0 colored by intelligence artificial ( *artificial intelligence* ), super computers, engineering genetics, technology nano, car automatic, and innovation ( Morrar & Mousa, Journal: Issue 11, 12-20). It capable threaten Indonesian nation as wrong one country that has force work and number enough unemployment high.

The Indonesian government needs address change this with fast and appropriate through drafting capable strategy increase power competitive industry national at a time create

field more work large for period long. this era disrupt various activity man in various field, no only in field technology information and communication course, however also other fields such as economic, social, political, health, and so on.

Development revolution industry also no free in construct *mindset* t man and give influence in development of intellectual capital owned by every organization. Intellectual capital capable become a weapon main ”a organization in accommodate development organization. More further explained Falih, intellectual capital consists from three component base including human capital , structural capital , and relationship capital. Human capital is amount from knowledge explicit sourced innovation and improvisation, and competence in produce solution best based on the knowledge you have organization the. Structural capital is ability organization produce performance optimal intellectual and performance organization whole with through a continuous process organization and structure that drives the business unit its members.

Relationship capital show connection something organization with its *stakeholders* and could seen from various part outside possible environment add score something organization the. For example just in organization education , relationships and relation from various party Becomes must, fine from government observer education, figure society, custom culture and religion. all of them must synergize in intertwine relationship, so quality education can felt together and in a manner togetherness

For elaborate third component the, in relation engineering organization in time current industry wasted so need understand that human capital, structural and connection is with able operate and wheel organization on every organizational level. Hence, in like globalization era this, every leader in organization both formal and non-formal to be something inevitability will proficiency use technology renewable. Ability civilized with world technology become score plus for movement or Up retreat something organization. So focus study in paper this, how engineering organization in face challenges in the era of globalization industry 4.0

## **RESEARCH METHODS**

Qualitative research methods are used in conjunction with literature review and analytical techniques. This study looked at relevant literature and references. In analyzing the data, researchers followed Miles and Huberman as translated by Tjetjep Rohendi Rohidi (2009:137). In the research process, the methods used are reducing data, presenting data, and concluding and examining research results on an ongoing basis.

## **RESULTS OF RESEARCH AND DISCUSSION**

The transformations that occur today are different from those that occurred before in terms of scale, size, and complexity. There are two types of competencies that are required to be able to adapt in the era of the industrial revolution 4.0, namely personal competence and interpersonal competence as a form of intellectual construction. Register et al. (2016), outlining that personal competence can be seen as the ability to develop cognitive abilities and value systems. that a person may have while interpersonal competence is embedded in the individual as a social being with his environment where it takes the ability to communicate, cooperate and build social connections, and social structures with other individuals and groups.

### **A. Organizational Engineering**

Before studying organizations in the globalization of this industry further to provide a theoretical package, it is better to start by defining the meaning of the organization itself. The organization is an exciting thing to learn and apply in everyday life. According to some experts, the organization are defined as follows:

- 1) According to James D. Mooney (1974), human cooperation to achieve common goals includes all forms of human collaboration.
- 2) Ralph Currier Davis (1951) is a group of people who work together to achieve a common goal.
- 3) Robert V. Prestuhus (1958), the system of regulating interpersonal relationships
- 4) According to Michael J. Jucius (1962), a team is a group of people who work together to achieve a common goal or objectives.
- 5) According to Robbins (1984), a social unit is a consciously coordinated social unit with relatively identifiable boundaries that work on a reasonably continuous basis to achieve a shared or group goal (Candara & Rifa'I, 2016: 49-50).

Some elaboration of the above definition of organization leads to the conclusion that an organization is a group of people led by one person who works together and coordinates continuously to achieve common goals.

Meanwhile, this study will more clearly outline an organization's understanding and analysis of engineering. Organizational engineering is a technique for redesigning administrative processes. It is the process of reviewing all levels of an organization's operations and determining how to improve them. A company can align for the future by using this technique. The dynamics of adaptation of an institution, including an educational institution, to its internal and external environment, can occur in various forms. However, fundamental changes were made to maintain or expand the institution's existence.

According to Kotter (1997), as Kusdi cited, here are the types of organizational change (2013: 21)

- 1) Restructuring or changing the organizational structure when deemed insufficient, ineffective, or inefficient in achieving various organizational goals and objectives.
- 2) Reengineering, namely changing the organization's work system to create more effective and efficient linkages that are more integrated between existing subsystems. It's time to re-engineer if the subsystem is severely unbalanced.
- 3) Create a turnaround strategy closely related to the winning design, such as changing the market share/target of service users or changing the form of incentives/facilities for service users (products).
- 4) Acquisition, i.e. combining two institutions with the same business/field of duty to produce superior products, pursue higher economies of scale, or earn more profit.
- 5) Downsizing means reducing the organization's size to make it more efficient by eliminating unnecessary structures or laying off excess employees. Reduced profits and budget cuts are among the culprits. Downsizing is done to save money.
- 6) Quality programs or changes to meet specific quality standards for the products or services produced.

7) Renewal of organizational culture, especially the renewal of corporate values and norms. Carried out when the organizational culture is no longer relevant to the goals and objectives of the organization, so it is necessary to develop a new culture.

From the description of the points above, organizational engineering is a change in form, character and system that must be carried out in adapting to the demand of the market and customers (society) to increase creation and innovation in answering the principles of the globalization era so that organizational programs become effective and efficient.

#### **B. Era of Globalization 4.0**

According to wikipedia.org, "industry 4.0" is the name of the latest trend of automation and data exchange in factory technology. Cyber-physical systems, the internet of things, cloud computing, and cognitive computing are all part of this industry. According to Zesulka in Sigit (2020: 76-78), industry 4.0 is based on three interconnected factors: 1) digitization and economic interaction using simple techniques to economic networks using complex techniques; 2) digitization of products and services; and 3) new market models. Then Sung (2017, Jurnal) added that machines will operate independently or in collaboration with humans.

Further explained by Lee and Bagheri (2013: 38-41), industry 4.0 is characterized by an increase in manufacturing digitization driven by four factors:

- 1) Expansion of data volume, computing power, and connectivity.
- 2) The emergence of business intelligence, capabilities, and analysis.
- 3) The emergence of new forms of human-machine interaction.
- 4) Improved transfer of digital instructions to the physical world, such as robotics and 3D printing.

If all revolutions that occur chronologically refer to the previous industrial revolution as a point of departure. The second industrial revolution will not happen as long as we continue to rely on muscle, wind, and water for production. The third industrial revolution added computers and robots to the production line. As a result, computers and robots became the foundation of the Fourth Industrial Revolution. So, what are the technological advances that have occurred recently in our computer world? The Internet is the most visible of these advances. All computers are connected to a shared network, and as time goes by, the size of the computer shrinks, becoming as small as our fists. That's why we can feel smartphones at this point. This causes the information process to run fast; For example, any problems can be identified immediately. The Internet of things ushered in the Fourth Industrial Revolution (Bernadetha Nadeak, pp. 127-128).

Disruption is no longer limited to the business world in today's world. The phenomenon of disruption has a significant impact on various fields, including education, government, culture, politics, and law. Political movements that gather the masses through mass concentration, for example, have been replaced by social media-based movements. The government is now challenged to run the bureaucracy effectively and efficiently using e-governance (Banuprasetyo & Trisyanti, Article: 24)

In general, industry 4.0 is characterized by increasingly sophisticated technological developments that lead to the effectiveness of all work and streamline time and financing. Specifically in the world of education, Professor of UIN North Sumatra Medan Giyoto, when teaching S3 students taggal October 1, 2022, predicts that online learning systems (online), will be preferred in the learning system in the future, considering the flexible process, so people definitely prefer those that save time and cost and only mediate smartphones in the learning process, especially education at the postgraduate level.

Setyo Utomo explained the era of industrial globalization at the education level in his writing mentioning that the era of the industrial revolution 4.0 had an impact on the world of education. The use of digital technology in the learning process, task completion, and improving teacher competence cannot be separated from the current development of technology and information.

Educational practices in schools that rely on the transfer of knowledge from teacher to student are no longer effective in preparing students to enter the industry 4.0 ecosystem that prioritizes the development of 21st century competencies. Education 4.0 can only be implemented with reference to a new educational paradigm that characterizes learners as liaisons, creators, and constructivists in the context of the production and application of knowledge. The development of the quality of human resources requires teachers who are expected to be agents of transformation in strengthening human resources, developing student talents, and managing learning that is more in line with the demands of the era of industrial globalization 4.0. (Susilo Setyo U., 2020: 11-12). At the organizational level, organizations must have intellectual capital in human resources that are able to create organizational value that contains at least four characteristics, according to Malik in Falih Suaedi, among others, to be able to compete in the global world and be adaptive to changes in the world. Industrial Era 4.0. First, identify valuable resources that enable organizations to implement strategies to improve efficiency and effectiveness. Second, resources are scarce, where the organization has resources that other organizations do not have, and if the strategy is implemented, the organization will gain a competitive advantage. Third, unique resources that are difficult to replicate (imperfectly imitable resources), require other organizations that seek to imitate to incur high costs. Fourth, substitution occurs when other organizations that lack resources can replicate the effect by replacing resources.

Based on this explanation, it can be concluded that the very rapid development of science and technology has had a significant impact on human life, including the creation of intellectual capital in the era of the fourth industrial revolution. Human capital, structural capital, and relational capital can all be combined to create individual competencies that are integrated with the ability to communicate, collaborate, and build social relationships, both socially structured with individuals and with other groups in an organization.

### **C. Organizational Behavior in the Era of Globalization 4.0**

Changes in behavior in business organizations are intended not only to improve business enterprises for the better, healthier, and more profitable, but also to change the country for more prosperous.

The success of Ford, Eastman Kodak, and Singer sewing machines can be used as a formula for improving the welfare of the country by innovating to change organizational behavior to make it more efficient and profitable. Japan, South Korea, Nigeria, Rwanda, India, Argentina, and Mexico have all demonstrated models of improving the country's welfare through innovation (Sawulski, et al., 2019). According to the World Economic Forum, there will be disruption in the world of education in emerging countries, including Indonesia. As many as 65% of our current elementary school students will continue to work in jobs that are currently unknown. By 2022, robots and artificial intelligence devices will replace millions of types of human jobs. By 2021, up to 60% of universities worldwide will use virtual reality (VR) technology to create a completely new learning environment (Sentot Imam W, 2020).

According to the Wikipedia article <https://www.maxmanroe.com/revolution-industri-40.html>, the industrial revolution 4.0 has four principles that allow any company (organizational unit, pen) to identify and implement various industrial scenarios. 4.0 includes:

- 1) Interoperability (fitness); the ability of machines, devices, sensors, and humans to connect and communicate with each other through the internet for everything (IoT) media.
- 2) Information Disclosure; the ability of information systems to create virtual replicas of the physical world by enriching digital factory models with sensor data.
- 3) Technical Assistance; First, the ability of help systems to assist humans in collecting data and creating visualizations to make informed decisions. Second, the ability of cyber-physical systems to help humans perform various tasks that are difficult, unpleasant or unsafe for humans.
- 4) Self-determination; the ability of cyber-physical systems to make decisions and perform tasks independently (Kompasiana.com).

It is specifically mentioned that the development of the industrial revolution 4.0 has increased the importance of creating organizations that achieve high momentum. Human resources, facilities and infrastructure, as well as systems and procedures, are easier to integrate with cyber-physical systems, the internet of things (IoT), cloud processing, and cognitive processing. The political will of the organization's top management is crucial in leveraging the industrial revolution 4.0 as a roadmap for developing high-level organizational leaders, but if the leader of the organization does not know anything, that is the main essence of realizing a high leadership organization in the industry. Revolution Era 4.0.

The current digital world and industrial revolution have influenced several types of business models and jobs in Indonesia, one of which is traditional taxis or motorcycle taxis starting with online-based modes; Thus, the challenges of skills and strategies

facing the digital age require a commitment to increase investment, learn by doing, improve digital skills for the digital age of tomorrow, and develop education.

The real threats in the future are terrorism and deradicalization, the spirit of terrorism, the threat of drugs, and the economic crisis. Millennial generation success tips should always be to open up to a wider environment, maintain concentration when completing tasks/jobs, be sensitive to changes, set aside time to study, do not copy/plagiarize other people's work, seek information from trusted sources, set aside time for rest, and put all your potential/strength into achieving success (Wahju S. Utomo, <https://itjen.dephub.go.id>).

In navigating the world of organizations in the world of industry 4.0, various things need to be adapted, ranging from self-adjustment, sensitive to information, proficient in technicians and decision making that targets the use and benefits, so that all work program units in the organization are more effective and efficient and no less important thing to note is the reliability of human resources in the organization. Even though the organization already knows theoretically the concept of industry 4.0, but the people in the organizational environment do not prepare for skills in the field of technology, it is difficult for the organization to develop a good work program, as well as educational organizations. The ability to use technology in the field of education is a necessity. All administrative agencies now use information technology services, so it is clear that educational institutions that do not prepare themselves to be civilized with technology will be left out of the torrent of information and work procedures in the organization of these educational institutions.

## **CONCLUSION**

From several descriptions in the content of this paper, in this last study will draw several conclusions including:

1. Organization is the cooperation of a group of people with one leadership who cooperate with each other, coordinating continuously to achieve common goals.
2. Organizational engineering is a change in form, character and system that must be carried out in adapting market and customer (community) tututan in order to improve creation and innovation in answering the tantangan. the era of globalization so that organizational programs become effective and efficient.
3. The era of globalization 4.0 is characterized by the rapid development of technology that has a major impact on human life, including the structuring of intellectual capital that exists in the era of the industrial revolution 4.0. From human capital, structural capital, and relationship capital, which can be combined into individual capabilities combined with the ability to communicate, cooperate, and form social relationships, both in structure social individuals as well as in organizations created by other groups.
4. The era of globalization 4.0 is the proficiency of utilizing digital technology in organizational processes and programs, solving various tasks, and increasing the competence of employees or subordinates, especially for leaders, cannot be separated from the current development of information and technology. The development of skills and competencies of educational organizations is a necessity, all education administrators must be civilized with technological advances, as well as teachers are very instrumental in being agents of transformation strengthening human resources in building student talents,

managing learning that is more in line with the guidance of the era of industrial globalization 4.0

## **SUGGESTION**

For the improvement of this study, it is also important to pick some suggestions, the following:

1. Every leader or authority in the organization must understand the rapid pace of change both in the local and global order, so that organizational engineering can be aligned with the needs society according to the times
2. The era of industrial globalization 4.0, requires each country to prepare generations to keep pace with the pace of development of the times. Therefore, the role of the government must be more active in making training, and courses in both government and private agencies so that the generation is truly technologically literate as a means of offsetting developed countries in the world

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