The Role Of Sustainable Urban Building in Industry 4.0.

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Abstract. The construction industry has significant environmental, social, and economic impacts on the community. As one of the main results of the construction industry, buildings largely reflect this during the transition cycle. Both positive and negative negatives. The negative impacts of buildings and construction activities also disrupt human activities themselves, such as discussing, dust, traffic congestion, air pollution, and waste disposal during construction. After completion, the building continues with the surrounding environment. It needs appropriate technological innovation assistance to overcome the difficulties of building these buildings. The method of this study a qualitative approach by reviewing and synthesizing journals related to Sustainable Urban Development. The role of Sustainable Urban Buildings using renewable technology is necessary to overcome these development problems so that they no longer have negative impacts on humans and their environment. Therefore, Sustainable City Buildings if developed using environmentally friendly technology, will make city buildings efficient and effective for reducing carbon emissions that exist every day.

Keywords: Sustainable Urban Building, Construction Industry, Sustainable City Building

1. INTRODUCTION

Zou etc. [1] stated that the construction industry has significant environmental, social, and economic impacts on society. As one of the main results of the construction industry, buildings largely reflect this impact during their life cycles. Both positive and negative effects. Where positive impacts occur such as providing buildings and facilities to meet human needs, providing employment opportunities directly or indirectly (through other industries related to the construction industry) and contributing to the national economy. For example, the construction industry in Australia contributes 7.5% of gross domestic product (GDP) and provides more than 1 million jobs. Similarly, buildings and construction activities play an important role in urbanization. While the negative impacts of buildings and construction activities are also recognized to interfere with human activities themselves, such as noise, dust, traffic congestion, water pollution, and waste disposal during the construction phase, next completion, the building continues its impact on the surrounding environment. According to the World Business Council for Sustainable Development, building construction alone accounts for 40% of total energy consumption. Apart from energy consumption, buildings also produce greenhouse gas (GHG) emissions that are responsible for global warming. Building carbon emissions worldwide will reach 42.4 billion tons by 2035. So that it needs an appropriate technological innovation to be able to solve problems from the construction of buildings and buildings. Where the use of technology here is expected to be the solution provider in the development problem.

Finnegan, etc. [2] states that sustainable energy technology can define as equipment to turn on, ventilate, heat, or cool buildings that rely on resources that do not have adverse long-term environmental impacts. The definition of environmental impact generally refers to the lifetime impact of technology, which includes operational (currently being used) and so-called, contained the result. The effect held to see energy and emissions (such as CO2) which are released to make, produce, transport, use, and dispose of each technology. Osunsanmi etc., [3] stated that Digitizing the construction industry could offer greater opportunities regarding the elimination of delays in the provision of affordable and quality housing and hence emerged as an alternative method for housing delivery strategies. The arrival of industry 4.0 provides links between people and objects to create a future factory that ensures full digitalization of the manufacturing sector. It will create progress in the digital manufacturing environment automatically.

Development of 4.0 industry itself can be achieved from a combination of smart construction sites, simulations, and virtualization to create more efficient construction project performance. Smart factories will be build by
applying industrial innovation 4.0 such as the internet, RFID (Radio-frequency identification), and other forms. The simulation phase will include the use of BIM (Building Information Model), virtual reality and 3D printing to design and manage construction projects while the last stage of cloud computing will be used to store data and thus increase the free flow of information in the industry because it is expected to provide quick information for construction professionals use cloud data storage. So that the framework created creates sustainable and quality housing by the industry concept 4.0. Therefore, it is very crucial for the role of these technological advances in the development of a sustainable urban building.

This study aims to understand the role of sustainable urban development in industry 4.0 and provide new information and ideas for companies and academics to create renewable innovations in the implementation of sustainable urban development in the industrial era 4.0.

2. METHODS
In this paper, the literature review methods are used by reviewing and synthesizing journals relating to Sustainable Urban Development [4]. Regarding to Templier etc [5], there are six steps to review articles in this method, namely: 1. developing the aim of research and research questions. In this step, researchers have to justify why they conducted their review, as a guideline to choose an appropriate design and provide the structure for the next step of the review process [6]. Defining the research questions in this research represent one of the most important steps to be taken in any study, such as an empirical study, a conceptual piece or a review paper. All authors reviews must necessarily exclude a multitude of work that lies near the boundary of their problem, even if they works that other reviews might choose to include. Therefore, in this research, researcher must define the key concept of their review to formulate the research questions. This article is focused on the concept of sustainability of urban building in industry 4.0 era. 2. seeking the current literature. This step start with identifying potentially relevant studies. When a review is focused with the findings in general, then it should ideally capture all the studies of interest. Researchers must select and justify a search strategy that is appropriate for research questions. 3. Screening for involvement. To claim that papers are appropriate with the research questions, researcher should ask themselves if each paper addresses the problem under inquiry and helps them to answer the reason question. 4. Assessing the quality of primary research. Researchers start in this step with looking the assessment tools such as the definition of the variables and their respective measures, the description of research method, and the results. Next, aggregating those results and selecting the papers through the interpretation of the findings and the recommendations for the future research. 5. Reducing data. This step, researcher gathered and extracted applicable information from each study. Extracting data for reviews usually include some thematic coding and conceptual classification, then making interpretations and judgement. 6. The last step is analysing data with using appropriate techniques to make the information reasonable and to report the review results. Narrative and developmental reviews present the logical reasoning and justifications behind the findings. Authors have to organize, compare, collate, summarize, interpret the information previously extracted in order to suggest a new contribution to knowledge.

3. RESULTS AND DISCUSSIONS
Based on articles from Zou, etc., [1], stated that to achieve green buildings is needed, the use of renewable energy technology innovations. This is depletion of conventional energy (coal) resources and related environmental problems. As a result, the development of renewable energy and utilization of renewable energy in other sectors has become a priority of many governments reflected in relevant public policies. And one of the areas is building. Such a lack of infrastructure that connects electricity generated from buildings around the electricity grid presents one of the most significant challenges. Renewable energy resources commonly used in buildings include solar hot water, solar PV, small wind turbines, geothermal heat pumps, and others. So that the use of renewable technology is essential.

One key element of sustainable building design is reducing resource consumption and increasing the efficiency of resource use. One common approach is to reduce, recycle, and reuse or construction of waste. It is a general approach by the government to encourage green building materials and technology to minimize construction and demolition waste.

Chel, etc. [7], states that there are four ways to reduce building energy consumption, which ultimately results in mitigation of CO2 emissions through energy conservation. These aspects include (a) Passive building design that is comfortable and oriented to utilize solar energy, (b) Low energy material for building construction, (c)
efficient household appliances to save building operational, and (d) structure integrated renewable energy technology.

Apostolou, etc., [8], argues that sustainability in buildings can be achieved mainly by combining smart grid systems in the context of buildings. This system is based on renewable energy sources and requires low CO2 emissions, where the use of smart grid technology here is beneficial in achieving that sustainability.

Sustainable building design defined as the design, which aims to minimize or prevent the reduction of critical environmental resources, such as energy, water, and raw materials, prevent ecological collapse caused by infrastructure during their lifetime and create an accessible building environment, safe, healthy, productive, and fun. This building design must have positive benefits for the environment, society and the economy to be considered sustainable.

The application of a smart grid system in buildings can contribute to building sustainability. This design also uses smart networks. Smart networks are electricity networks, which include smart meters, equipment, and renewable sources of energy, which can communicate with each other and offer valuable information to users regarding their status of electrical devices or grid loads at certain times. That way, users can control the production and distribution of energy and change their behavior using electrical devices more consciously.

Felgueiras, etc., [9], argued that the sustainability of building in the future would be an essential thing based on their design and operating system. Besides that, all the activity which is related to building activity will become a significant contributor to the sustainability building challenge. Therefore, reducing the demand for energy in sustainability building become a crucial thing to respond to the problem in this era. The energy consumption in building system has responsibility for energy consumption globally.

The current electricity energy paradigm has essential consequences both at the economic and environmental level. The Zero Energy Building strategy provides several guidelines for achieving better results in building energy demand. The use of this strategy by combining electronics and ICT in the application of the system. Thus, in general electronics and ICT play an essential role in the system, increasing efficiency, but also complexity. A similar situation will occur in the design of new buildings, which integrate electrical design, electronic design, system design, and informatics design, among others. It means that building design will do so increasing very significantly in complexity and, as such, a new generation of highly skilled engineers was needed.

Zheng etc., [10], argues that urban reforms provide valuable opportunities for sustainable development. Sustainability assessment is considered a useful tool in ensuring sustainable development in practice. However, urban change is usually accompanied by many social, economic, and environmental conflicts among various stakeholders. So that two crucial components found, namely (a) sustainability and building conditions, and (b) a decision-making matrix for urban renewal strategies.

Grant, [11], argues that it is essential to promote new cities, new central business areas, and strengthen existing urban development through the application of green technology to a sustainable future for the town so that it can solve the problems of slums urbanism that occurs every year.

Park, etc. [12], stated that it is crucial to building a sustainable building technology database by considering the performance of reducing greenhouse gas (GHG) emissions. Most ways to reduce greenhouse gas emissions can be divided into architectural planning and architectural, technical methods. This primary planning method maximizes natural energy consumption by optimizing the layout and orientation of buildings in a more environmentally friendly manner. And there are found three categories (ecological environment, materials and resources, and energy) associated with greenhouse gas reduction technology.

Horton, etc. [13] argued that sustainable urban space architecture is a necessary arrangement for an increasingly diverse and diverse range that must also reach children. Where the increase in the number of children in a day - to - day basis should be a manifestation of urban planning and policy planning interventions. By doing education on these children, it will shape them as agents of change, where the findings also prove that very little research involving children.

Palliyaguru, etc. [14] argued that the Integral Sustainable Design and Construction (ISDC) framework for rural contexts is essential to address existing physical, social, and cultural problems. It is because, across the continent of Asia, the design is fragmented. So as to create an implementation that only focuses on the short term. As a result, there is no long-term sustainable planning. As the findings in Sri Lanka, there are still poor communities in the target of public buildings, where there is minimal attention in rural buildings. Thus creating
a conceptual idea about building integrated design and framework for the development of sustainable rural communities in the Ampara region of Sri Lanka with the ultimate goal of empowering the community. He, etc. [15] argued that the relationship between the "formula" for the successful sustainable initiatives is mutually beneficial. Where this can overcome risks and uncertainties. For example, Chinese cities were chosen as representatives of sustainable urban communities with low-carbon status by changing the paradigm as an industrial city that was not environmentally friendly. However, sustainability is not easy. Where there are many risks and uncertainties throughout the promotion and implementation of these sustainable initiatives. Rodas, etc. [16] stated that one of the keys to achieving prosperity in urban agglomeration is urban and sustainable regional development. Desired sustainable development implies the relationship between human communities in the environment occurs not by quantitative physical environment or uncontrolled growth but through qualitative improvements that support development more than growth. Here lies the difference between growth and development: there cannot be a city that is undefined and sustainable, but progress can be sustainable, and this will become a territorial city and sustainable development. Therefore, the process of developing urban planning in urban areas has many consequences, not only in spatial structure but also in the land valuation patterns.

Galagoda, etc. [17] states that green infrastructure such as living walls is a technological solution to replace declining green plants in urban environments and also reliable applications for thermal regulation of buildings through the effects of insulation and increasing efficiency of energy use. So that thermal comfort and local climate greatly affect the green infrastructure. Based on the above article, we can draw a red thread here that the use of environmentally friendly technologies combined with urban planning will create sustainable innovations that can reduce the effects of these greenhouse gas emissions, so that the development of the sustainable municipal building is very significant for the advancement of infrastructure in each of these regions.

4. CONCLUSION

The role of the Sustainable Urban Building if developed with the use of environmentally friendly technologies will make sustainable urban building efficient and effective in reducing carbon emissions that exist daily. So that the implementation of the Sustainable Urban Building becomes very crucial because it can be a means of creating sustainable innovation, especially in the country of Indonesia itself which has a growth in property and housing that is greatly increasing from year to year.

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