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A Systematic Literature Review: Implementation of Quality Control in Improving the Quality and Quality of Red Bricks

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Abstract

This study aims to identify the application of quality control in brick production. Quality is the factors contained in an item or result that causes the goods or results in accordance with the intended use of an item. This study uses a System Literature Review (SLR) approach which is used to identify and refer to the research methodology with certain relevant questions. Based on the research that has been done with this method it allows researchers to provide actual evidence regarding the data sources and criteria in selecting problem analysis. The research conducted is to examine the traditional brick making process and its sales strategy. Brick is the basic building material made of clay that is ground, then molded and dried and then baked. This production is used for efforts to improve the quality of brick products for small-scale industries. To improve the quality of brick products, manufacturers still use traditional sales strategies, one of which is offering bricks to projects that are being worked on. In addition to brick production, it is a flexible business. Besides that, the process of burning bricks can also cause air pollution which makes it suffocating for those who inhale the smoke. Thus, it can be concluded that effective Quality Control will be able to produce a broad market, higher productivity and lower overall production costs, so that companies can benefit from using an effective strategy.

Keywords
Bricks, Quality control, Traditional strategy and Systematic Literature Review.

1. Introduction
Quality control in every production is very important, one of which is the production of bricks, and every aspect of operation and production management, especially in industrial conditions (WG Miller, JH Nichols 2020). Without the right level of control we cannot achieve the right level of product quality and therefore we cannot achieve the right level of meeting customer demands. In the Indus tri. All organizational processes are digitized and controllable (Gajdzik and Wolniak 2021; He et al. 2021; Kadir and Broberg, 2021; Saniuk et al. 2020, Ingaldi and Ulewicz 2020).

Production controls and methods vary between companies and specific factories as not all organizations currently have an adequate level of digitization. The degree of digitization has an important impact on the methods used to control the production process. In some situations, effective production is worse (Wilson 201 9, Jonek-Kowalska 2019). Construction, like every industry, produces unwanted environmental impacts, being one of the most unsustainable industrial sectors for several reasons, such as high energy consumption (Geng et al., 2019), indiscriminate use of non-renewable resources that contribute to product scarcity), and the emission of activities that pollute the environment (Sandanayake et al. 201 9).

Production of building materials is often the cause of high consumption of resources and energy (Murmu and Patel 2019). The effect can emit greenhouse gases that cause global warming (Huang et al. 2019), and, at the end of their life, waste bricks disposed of in landfills, contaminating the soil (Erduran et al. 2019). Throughout the life cycle of alternative bricks, some differences are found when compared to traditional bricks in the extraction

of raw materials, waste replaces clay completely or partially; and in the production stage, (Figure 1) combustion is often removed and replaced by a stabilization process. (Zhang et al. 201). The following are statistics on sales of red bricks from March 2019 to March 2022 (Saha et al. 2021).

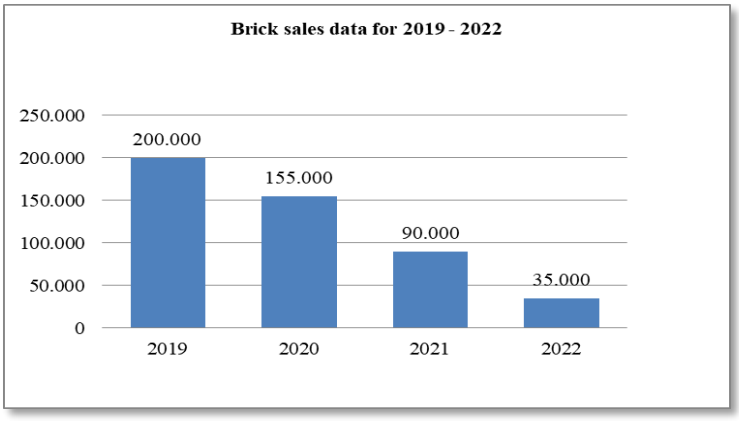

Figure 1. Brick Sales data
Source: https://ejournal.undip.ac.id/index.php/jgti/article/view/27400

Based on the figure 1, it can be concluded that brick sales have decreased from year to year. This is due to the fact that since the covid pandemic there have been many construction workers who have not got jobs, both in building houses and buildings. One of the strategies to increase manufacturing efficiency is through the development of productivity needed to achieve good financial and operational performance. (Plinere & Aleksejeva 2019).

1.1Research Objectives

Based on the background and problems presented, this research aims to identify the process of making bricks and to determine the strategy of selling quality bricks.

2. Literature Review

This study focuses on identifying "quality" as a factor in equity investments is a collection of metrics designed to capture high-quality financial indicators in a company. Quality metrics are popular in the practicing investment community, but there is no agreed standard definition for quality factors. On the other hand, factors such as value and size have clear and acceptable definitions. Although the extensive literature is dedicated to certain aspects of quality, certain aspects used in the definition of practitioner are only little explored in the academic literature (Kose 2019).

Quality control is an activity of researching, developing, designing and fulfilling customer satisfaction, and providing the best service that includes all activities within the company, from the highest leadership to its employees (Ishikawa 2020). This activity is to maintain and improve the products and services offered to the company (Nobuyuki 2020). Clay bricks were one of the first artificial materials produced by humans for building purposes. Clay bricks are only produced by mixing clay and water. The hardening method evolved from sun drying to industrial ovens, which allowed for increased strength and durability (Fernandes, 2019). The bricks are produced in brick kilns which emit very harmful gases which in turn affect human health, the environment and the economy. The research results show that CO2, CO and SO2 have the most harmful effects on the environment. Similarly, carcinogenic dioxins, SO2 and PM have adverse effects on human health (Khan 2019).

3. Method

This research was conducted by collecting many journals related to the topic of brick production, related to the application of quality control which was only published from 2019 to 2022 (Figure 2), where the solution was using the System Literature Review method approach or commonly called SLR. A literature review method system that identifies, assesses, and interprets all findings on a research topic to answer pre-defined research questions (Wicaksana & Anistyasari 2020). The System Literature Review (SLR) selection process uses data sources taken from journal literature that has been indexed with ISSN (International Standard Serial Number)

(Sarjono 2022).

SLR is also used to review, identify, and critically evaluate, synthesize the literature, and select literature to be used in a rigorous, transparent, and replicable manner. Thus, the conclusions obtained through the SLR method are able to provide reliable conclusions about what is known and unknown in the research reviewed. (Vrontis & Christofi 2019). The SLR method makes it easy for researchers to explore further the things they want to research, which by following a predetermined process to conduct a literature review can allow researchers to provide actual evidence regarding data sources and criteria in selecting problem analysis (Mahanum 2021 Romero et al.2020).

Question, conduction contains the stages of implementing the SLR that have been determined previously, and reporting is the stage of writing the results of the SLR. After that compile a protocol that contains procedures and methods of doing SLR. The writing structure of the SLR usually consists of 3 major parts, namely the introduction, main body, and conclusion (Yusuf 2019) (Narastyawan et al. 2021). In general, there are five steps for compiling research using the Systematic Literature Review (SLR) approach by following the basic implementation guidelines on how an article is selected, evaluated, analyzed, and interpreted, as follows (Banomyong et al. 2019).

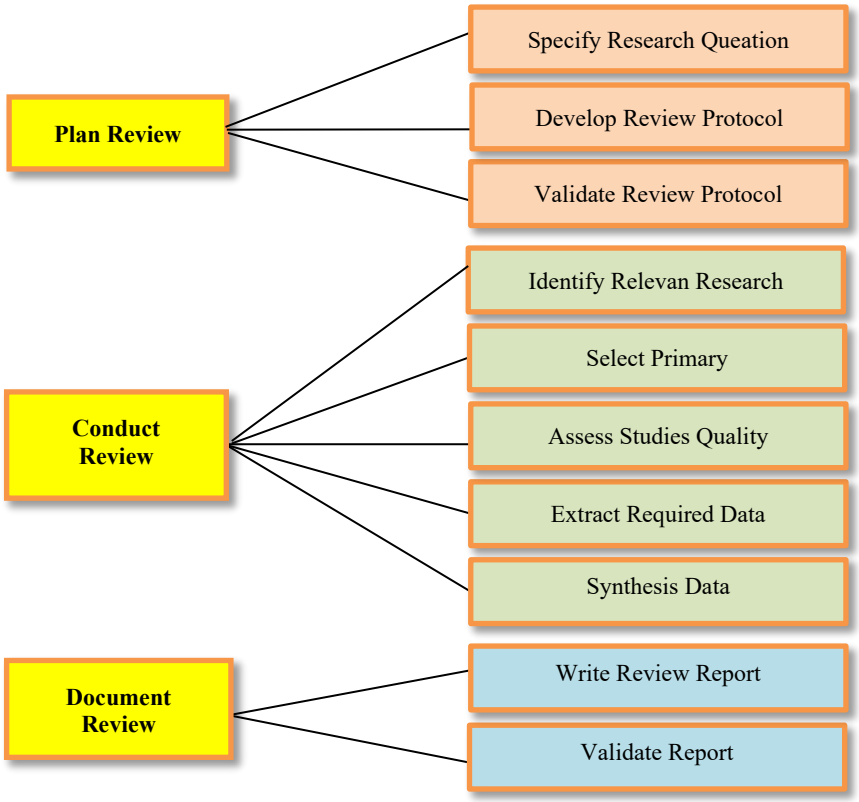

Figure 2. Steps of the Literature Review System

Steps in eliminating journals

The first stage in eliminating the literature review system data is the planning stage, starting from determining the topic to be researched, developing the discussion topic and validating the review of journal topics regarding bricks.

The second stage is the implementation stage, before going into a deeper stage, identify the relevant research, then select a basic study to assess the quality of the data, which then sort out the data needed to make a journal literature review system.

The third stage is document review. After reading and eliminating journals taken from Google Schoolar, approximately 40 relevant journals are obtained to be included in the SLR (System Literature Review) journal.

4. Data Collection

In conducting research, researchers obtain the required journals or literature through various platforms, such as Google Scholar. The reason researchers use this platform is because the entire site allows researchers to carry out a complete reference search process, such as journals, books, scientific works, and articles from academic publishers, universities, and academic organizations. By using this platform, the author has obtained approximately 40 references related to the research topic under study, namely the topic of applying quality control to improve the quality and quality of bricks (Rahayu et al. 2019).

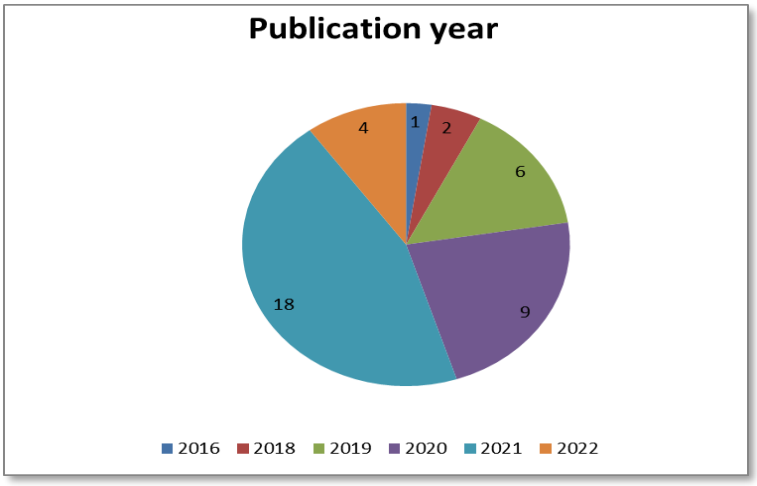

Figure 3. Classification of Journal Based on Year Risse

From the figure 3 it can be seen that from 2016 - 2022 journal articles from Google Schoolar used in the System

Literature Review review of relevant journals in 2021, namely 18 journals from researchers (Asif et al., Anum et al., Saha et al, Ahmed et al., Ncube , et al, Arif et al, Saha, et al., Haslindah et al., Danso et al, Bhushan et al, Khanwar et al, Raza et al, Wolniak et al, Daniel et al., Basoro et al, Ketov et al, Jeet et al, Aniyikaiye et al, Carrero et al, Xie et al, Bath et al, While the journal at least is 1, namely in 2016 (Karnadi).

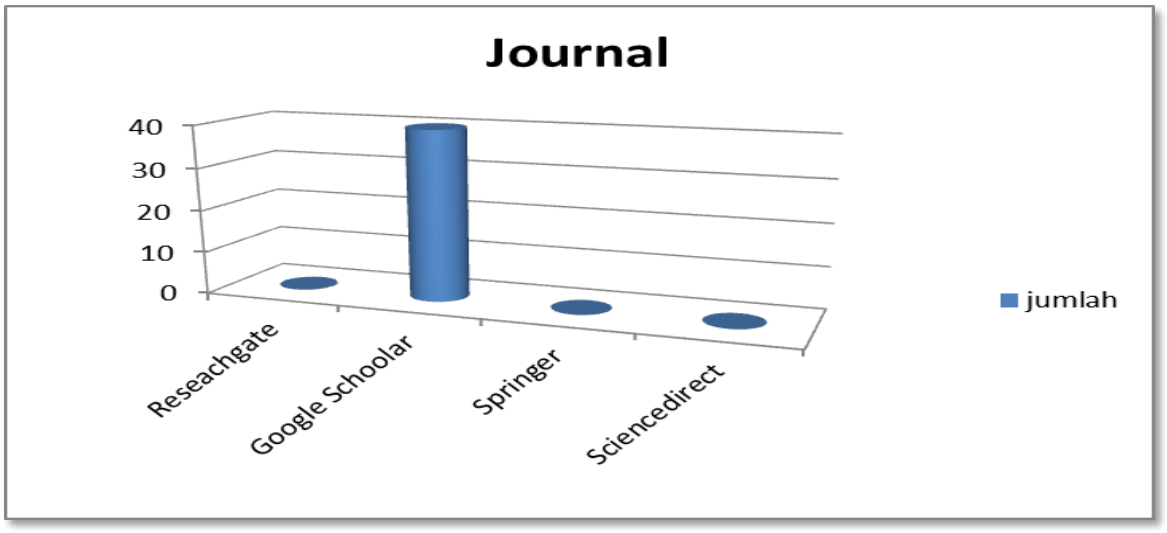

Figure 4. Source Journal Study

The figure 4 shows that Google Schoolar is the most widely used journal reference in System Literature review research because the contents of the journal are relevant. The SLR method is used for research that focuses on ongoing problem analysis to obtain a more complete information structure, so that it can produce systematic,

explicit, and reproducible research to facilitate researchers in identifying problems, evaluating, and synthesizing published scientific works. Previously it has been produced by previous researchers (Khatimah 2021).

5. Results and Discussion

5.1 Brick making process

The traditional process of producing fuel bricks is considered to be energy-intensive and uses natural materials, especially clay. The traditional brick-making process involves transporting raw materials to the factory, crushing, storing in silos, dosing, dry mixing, mixing with water, and preparing blocks (Carrero et al. 2021). The processes involved in the production of burnt bricks according to the manufacturer's observations are soil mixing, brick molding, brick pressing, brick drying, brick burning, and cooling and stacking of burned bricks (Ozbilge et al. 2022); (Ochammad and Kristanti 2020).

Excavation is the first stage in brick production which involves, mining of soil for soil suitable for brick production. Manual tools such as shovels, wheelbarrows and buckets are commonly used. Any available land in the vicinity regardless of its quality is used. During this process, the soil is excavated by digging, the topsoil is removed, and the soil height is reduced (P Jeet, et al. 2021). Soil particles or dust released during this process, are carried through wind erosion with consequential effects on human life. Shahram et al. have reported the impact of dust on the respiratory, cardiovascular, and vascular systems of the human brain. Dust particles weaken deoxyribonucleic acid (DNA) skin and lung cells, they also exacerbate meningitis, fever, pain, allergies, and viral infections (Mirza et al. 2020, ; Daniel et al. 2021).

After the raw material is processed into dough, the next step is molding and drying then it is fed into the double brick making machine which molds the bricks and then takes them to the rack. The bricks are kept on the shelves for about four days or depending on the weather. After that, the air-dried bricks are arranged on top of the burning piles, leaving space between them for easy circulation of the burning heat. Apart from using husks, firewood and dry palm shells are also used as fuel to burn bricks. The bricks were burned continuously for 3 days to a temperature of 600 °C. After being burned, the bricks are allowed to cool naturally for 3 days and then stacked to be ready for supply (Atmodiwirjo et al 2018).

The main stages of brick making

Excavation → **Preparation** → **Molding** → **Drying** → **Firing**

The traditional process of producing fuel-fired bricks is considered energy-intensive and uses natural materials, especially clay (Youssef et al. 2020). In addition, brick manufacturers use a mixture of livestock manure 9Y Amir et al. 2019, Candra et al. 2022). The process of making bricks starting from excavation, namely excavation is the first stage in brick production using manual tools such as shovels, wheelbarrows and buckets (Ncube et al. 2021, Raju and Ravindhar 2020). Preparation is the second process after the collection of raw materials, namely by combining soil and water. Molding is the molding stage of the brick dough. Drying, after the wet bricks are printed, enter the drying stage (Figure 5). At this stage the producer utilizes energy from the sun's heat. And the last is frying (burning stage), this stage is carried out to strengthen and increase the durability of the bricks (Aniyikaiye et al. 2021)

Several obstacles encountered during the production of charred bricks included the rush of workers in printing and transporting green bricks to the shelves which affected the shape and size of the bricks; and the application of fire/uneven heat to the bricks which can result in differences in the combustion temperature (Charai et al. 2022).

(a). Soil sample

(b). Mixing of soil and water

(c). Moulding of bricks

(d). Racking of green bricks **(e).** Burning of bricks **(f).** Stacking of burnt bricks

Figure 5. Molding is the molding stage of the brick dough. Drying, after the wet bricks are printed, enter the drying stage.

Compressive strength and water absorption are important properties of baked clay bricks. The compressive strength and water absorption are affected by the method of manufacture and the process of burning the bricks. in brick production there are negative sides, namely air pollution caused by burning bricks, human health injuries caused by pollution of brick factories (Bhat et al. 2021; Raza and Ali 2021; Asif et al. 2021). Air pollution results in poor air quality which in turn has an impact on human health (Tolulope et al, 2021; Khan et al. 2019; Saha et al. 2021).

5.2 Bricks sales quality stategy

Marketing strategy is a means to communicate company goals with the direction to be taken to achieve goals to stakeholders or parties who have decisions within the company. Today, clay brick is one of the most popular and preferred construction materials in many parts of the world due to its high tensile strength, durability, thermal and sound insulation, fire and weather resistance. But besides that, the process of burning bricks can also cause air pollution (Xie et al. 2021; Miller et al. 2020).

Strategy is an effort to direct the company so that the company's mission is realized. Business development is an effort in the process of preparing for business growth opportunities. The business development strategy in an Islamic perspective emphasizes more on Islamic business principles, namely customer oriented, transparency, healthy competition and fairness. The company's internal and external environment which includes natural resources, human resources, capital, marketing and technology (Haslindah et al. 2021. These strategies include increasing capital and lending for industrial entrepreneurs, expanding the brick marketing network by promoting it through social media and print media (Karnadi; 2016). As a support for the development of the brick industry, increasing the capacity and quality of human resources by conducting more training and providing training for the available workforce, socializing and registering owners of the unregistered brick industry so that their legality is guaranteed as well as getting legal protection and increasing cooperation. with third parties and stakeholders to help with limited capital and finances (Carrero et al. 2021; Zhu et al., 2020; Mehra et al. 2018).

In direct channels, manufacturers sell products to end customers directly through online ordering systems or the internet; then, the producer determines the level of product quality, the level of quality prevention efforts, and the direct selling price (Danso et al. 2021, Wolniak et al 2019). Prices in the direct channel, with final customer product demand and price elasticity decreasing, the quality level of manufacturer's products and direct sales prices will increase, and the level of quality prevention efforts will also increase (Haniegal and Mohamed, 2020, Zhu et al. 2020). In the retail channel, the manufacturer sells the product to other retailers, who will define a strategy for checking product quality and then selling the product to the final customer (Farajnia et al. 2021). Manufacturers determine the level of product quality, the level of quality prevention efforts, and the overall price of sales, and retailers determine the level of quality inspection and retail prices in there retail channels, with final customer product demand and price elasticity decreasing, manufacturers' product quality levels and wholesale sales prices will increase. , and retail prices of retail products will also increase (Shooshtarian et al. 2020, Diaz et al. 2019). Compared to the direct channel scenario, the level of product quality and retail prices will be much higher (Karnadi 2016).

6. Conclusion

The manufacture of bricks generally uses raw materials from nature, namely clay which is processed from the stage of collecting raw materials to the stage of burning which is then sold. However, the continuous use of raw materials can also result in wastage of natural resources. In addition, the impact of burning bricks can also interfere with human respiratory health which causes shortness of breath. Sales of bricks also need a strategy to increase sales profits and reduce the risk of loss. Traditional brick production strategies are generally through direct marketing involving producers and consumers. customers, such as promotions to large projects and to homes.

7. Suggestions

7.1 For Business people

The traditional brick production process requires a lot of time and clay raw materials, to anticipate the scarcity of raw materials, it is necessary to add auxiliary materials to combine these products. Auxiliary materials are usually a mixture of white clay and ash from burning bricks or mixed with livestock manure. Profit from brick sales must increase. If you only rely on traditional strategies, it will not grow fast, for that you must apply SWOT analysis, especially WT analysis to increase brick business promotion activities, improve brick quality, increase knowledge about small industries so that they are not outdated, increase consumer attractiveness, increase knowledge of technology, increase the role of brick business managers, and improve and maintain safety when producing stone.

7.2 For Further Researchers

Suggestions for researchers are to prepare further about what will be the object of research to produce better results so that it can be used as a reference for future researchers.

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Popi Ariska born in Jakarta, is a student majoring in Management at STIEBI Jakarta with the goal of becoming a Bachelor of Management and being able to take advantage of the knowledge gained from the field of Management.