



**INCREASING THE PRODUCTIVITY OF THE FURNITURE INDUSTRY
WITH KAIZEN
CASE STUDY IN SBRC FURNITURE JEPARA**

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ABSTRACT

Business competition in the digital era is very tight and dynamic. The furniture industry is required to always innovate and run efficiently in increasing its productivity. The increase in productivity is in line with the company's efforts to increase profits in line with efforts to maintain product quality and optimal customer service. However, efforts to increase this will be hampered by several aspects of waste. This is what small and medium enterprises such as SBRC Furniture, which is engaged in the production of carved frames, feel. This research aims to identify various wastes that occur by converting them through the Kaizen method to provide constructive notes to increase business productivity. The results of the study show that the production of SBRC Furniture carving frames in 2021 is 5.52 kg/hour, it is necessary to evaluate and re-plan. Factors causing productivity failure at CV SBRC Furniture are defects and wastage of time. Improvement planning with kaizen can be done by improving maintenance, providing a backup energy source as a backup for power outages, and storing raw materials after the oven is scheduled according to the production schedule.

Keywords: Productivity, Furniture, Jepara, Kaizen

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1. INTRODUCTION

1.1. The Resilience of Furniture Business

The digital era with all the disruptive changes it brings has led to intense competition in the manufacturing world, including the furniture sector. Shopping patterns, changing trends and increasingly varied consumer needs have forced business actors, especially the MSME furniture sector, to work more innovatively and productively. Where MSME Furniture must be able to read digital market opportunities, create new product designs, maintain the quality of raw materials, improve production HR skills to carry out branding and marketing strategies through various lines. MSMEs have so far played a strategic role in the country's economy, being pillars and solid foundations for the sustainability of the economy of the middle and lower classes.. This is proven by MSMEs being able to survive in all situations from the 1998 monetary crisis, the 2008 and 2018 economic crises, to the crisis and recession due to the Covid-19 pandemic yesterday (Kadeni, 2020).

MSMEs are able to carry out their functions as the driving force of the economy in realizing economic justice and equity by opening up employment opportunities for low-income groups, especially those with low education. This can also be seen in the MSMEs in the furniture sector in the Jepara Regency area, the majority of furniture production workers are lower-class people with low levels of education, but are more concerned with skills and ability to work. Moreover, the furniture and wood carving industry in Jepara is a hereditary tradition that has been deeply rooted as the main livelihood for the residents of the Kartini Earth city (Pujotomo, 2008).

The position of the furniture industry in Indonesia is quite strategic and has become a priority for the development of the creative economy. This is because the furniture business has a significant added value element from abundant raw materials from domestic forest products such as wood, rattan and bamboo. This business also absorbs a lot of manpower which is certainly a fresh source of foreign

exchange for state tax revenues as well as community empowerment. Apart from that, furniture products from Jepara also have cultural characteristics in the form of a touch of carving and distinctive designs and qualities that are globally competitive. Jepara furniture products are even in demand by the world community because of their quality and artistic value. This certainly makes Jepara a beacon for the national furniture industry (Marizar, Irawan & Mutiara, 2019).

. The total MSME Furniture based on data from the Jepara Regency BPS in 2020 is 4303 units with a total workforce of 81,491 people. This business unit processes raw materials into various types of household furniture, from doors, windows, cabinets, tables, chairs, couches, frames, to statues, calligraphy and flower pots. In 2019, the export figure of Jepara furniture products reached USD 186.85 million but in 2020 it decreased with a total export of USD 177.03 million due to the Covid-19 pandemic. Where some export destination countries carry out social distancing or protection policies so that from a total of 112 countries in 2019 only 92 countries received Jepara furniture products (Merdeka, 2021).

CV SBRC furniture is one of the furniture MSMEs in Jepara that specializes in producing carving frames made of teak wood with various shapes and variations of carvings, whether square, oval or round. The selection of CV SBRC Furniture as the object of research is because business actors do not yet have standardized work methods and production maps that are not yet efficient due to the placement of materials and flexible working hours. The urgency of the productivity assessment here is carried out in order to fulfill the indicators of system improvement to meet business objectives, to make strategic managerial decisions for optimal performance, as well as to compare an effective and efficient system with other companies. In other words, productivity measurement points are used as a predictor and improvement of the business unit system in order to develop and achieve future targets and goals (Vincent Gaspersz, 2002).

In the performance measurement system of a business unit, there are at least seven assessment standards as the starting point, namely effectiveness, efficiency, quality, profitability, productivity, durability, and innovation (Sink, 1985). If a business unit does not focus on the aspect of efficiency in the use and selection of raw materials and resources, but only on the aspect of profitability, it cannot be seen as a productive balance. If it is only based on profit in a certain period, but requires large expenditures at the production stage, it will ultimately cut the company's profit receipts. In this case, if the production expenditure increases, it will have an impact on the shrinking of the profit of the business unit (Mali, 1978).

For example, during the process of providing raw materials to CV. SBRC Furniture requires a large amount of money but is not efficient enough to cause a lot of waste. In addition to the management of labor resources at CV. SBRC Furniture is also not well organized and effective. This can be seen from the absence of a standard working time at each work station, which results in the operator not optimizing his working hours so that the production schedule is delayed. Ideally, every company needs a performance measurement system to take into account the increase in productivity. This system will assess whether productivity is on target or not. Companies can start by scheduling performance productivity calculations periodically (Kumar, 2019).

Experts have many perspectives in assessing business productivity where if it is calculated globally, it will be heavily influenced by two main aspects, namely the technical aspect and the human aspect. technical aspects related to the use and utilization of infrastructure for more optimal production, implementation of more measurable and effective work methods and use of inputs more economically. Meanwhile, the human aspect relates to matters relating to human behavior and activities when carrying out, using, and completing job desks under the provisions of their duties, authorities and obligations. The urgency of productivity measurement is to find out whether there is a difference from the output count to the input count. When the value of productivity achieved by the company is clear, then a policy of cutting

the waste that occurs can be implemented. So that excess input sources can be made efficient and economical according to the output calculation. (Baroto, 2002).

Furthermore, there is the concept of the productivity cycle which consists of four stages that influence continuous productivity improvement activities, namely aspects of productivity assessment, evaluation aspects, planning aspects and improvement aspects. In this case, the assessment of working time is an indicator of whether a work method can be called productive or not (Liker, 2006). Where, a clear division of performance hours between production divisions will determine whether the performance schedule is on target or not. If in a series of production processes there is a bottle neck, it will certainly affect the achievement of goals. Therefore, an effective scheduling scheme is needed as a standard for the most productive production (Ashmore, 2001).

From there, the results of measuring productivity in a period can be obtained as a review for improvement and increase in productivity in the next period. By analyzing the results of productivity measurements, it will be known the existing deficiencies, wherein the deficiencies can be corrected, so that a higher level of productivity can be achieved. Analysis of productivity is also the basis for companies in determining the direction of policies to increase productivity in the future. This study uses Kaizen as a concrete step in correcting mistakes that have been made before. Where the company has a commitment to increase productivity through gradual improvements. Kaizen can facilitate these improvements because the studies are comprehensive and integrative to provide productivity according to effective and efficient principles (Gasperz, 2002). The hope is that with this Kaizen-based research the company can implement constructive changes from the research results so that it can be an improvement in the future.

Kaizen comes from Japan which is understood as a system of continuous improvement. The comprehensive nature of Kaizen allows improvements to all aspects of the company. Fundamental improvements are of course in the aspects of its employees, from

the highest level to the lowest and involve a small amount of cost. From there emphasizes a process-oriented mindset, because the process must be perfected so that results can increase (Hidayat, 2018). In doing Kaizen, of course, researchers need several structured stages. Kaizen in every company, whether it's a manufacturing company or not, must start with these three activities: standardization, 5R and elimination of waste. The first step is to identify the actual standard time using the downtime method. After that, line balancing is done to minimize the number of operators and idle time. Then, identify the operator's work movements to determine efficient movements with left and right hand maps. Based on the results of exposure and identification of problems experienced by the company, the authors present a problem formulation, namely how to apply Kaizen in an effort to increase the productivity of the furniture industry with a case study at CV SBRC Furniture Jepara.

1.2. Literature Review

Research using the kaizen approach has been done by many previous researchers. Mahmod et.al (2017) has done research about The impact of Lean Six Sigma and Kaizen on reducing product defects in the automotive industry. Research results show that Lean Six Sigma (LSS) and Continuous Improvement (KAIZEN) have a positive effect in overcoming the problem of product defects. The results of this study will help the industry to seriously apply and focus on these two methods to reduce product defects and thus reduce waste costs. This study contributes to increase the knowledge about the methods of reducing product defects in the automotive industry. Then Kumar (2019) also conducted a study entitled 'Kaizen a Tool for Continuous Quality Improvement in Indian Manufacturing Organization'. The authors have identified and proposed a continuous approach to address these issues with a single team using global customer audit analysis. The whole process was carried out in two cases (Case 1 and Case 2). Kaizen is critical to solving this problem. The results of this research may encourage other industries to develop their global practices by removing small issues for continuity and implementing them into daily practice.

Then Wei Guo et.al (2019) with he title 'Integration of value stream mapping with DMAIC for concurrent Lean-Kaizen: A case study on an air-conditioner assembly line'. The study focuses on a new air conditioner assembly line that aims to improve PP in the assembly process. Twelve SPs were obtained from the VSM, which were divided into four SP groups. This means that the most important PP of each group can be selected at the same time. In this document, the most important and common imbalance problem is solved and DMAIC is used to improve the LOB speed of this assembly line. The calculation of the result shows that the level of LOB, average continuous uptime and delivery delay are clearly improved, especially in terms of financial performance, the first round of parallel LeanKaizen generated a profit of 797,051 yuan every month. This document introduces the first application of VSMDMAIC in design and manufacturing. It has made a lot of progress in incorporating air conditioning. However, this model is still in its infancy and more case studies are needed in the future.

Cherrafi et.al (2019) also conducted a study entitled 'Green and lean: a Gemba–Kaizen model for sustainability enhancement'. Therefore, this approach offers an integrated, lean and environmentally friendly model based on the Gemba Kaizen approach. The proposed model is based on Gemba Kaizen literature review. Articles in journals and practical literature and the authors' over 40 years of experience as a scientist, researcher, industrialist and consultant. This model has been validated in two cases in the aerospace and automotive industries. Consequently, the proposed model will help organizations interested in reducing resource consumption and improving environmental performance. The presented model can be the basis for further lean and green research. It helps organizations improve their sustainability practices.

2. METHODS

The variables studied in this study to increase the company's productivity are the work process of the frame circuit station and the waste of the furniture production process in the form of carving frames. The flow of this

research is generally carried out with the following process sequence:

First, data recapitulation, which includes recapitulation of real data on the production of engraving frames during the period January to December 2021, consisting of output (good final) and input consisting of data recap of man power (direct), man power (indirect), share man .

Second, measuring the production productivity of the Disamatic Molding machine, measuring production productivity based on the ratio of output (good final), and input consisting of data recap of man power (direct), man power (indirect), share man in accordance with the guidelines for measuring production productivity. applied by CV SBRC Furniture.

Third, evaluation of productivity, evaluating production productivity according to the plan in 2021, so that it is known that the productivity of carving frame production is known. Evaluation of cause and effect to find out the main problems that cause production productivity not to be achieved through a cause and effect diagram (fishbone diagram) referring to human factors (man), tools (machine), work environment (area), work procedures (methods), and raw materials.

Fourth, productivity planning, planning for productivity improvements based on the results of productivity evaluations carried out with the application of kaizen including the application of the PDCA cycle (plan, do, check, action), the 5-S movement (Seiri, Seiton, Seiso, Seiketsu, and Shitsuke).

3. FINDINGS AND DISCUSSION

3.1. Production Data Recapitulation

Here is a summary of the production data for engraved frames at SBRC furniture for the period 2021. Based on the data obtained by the author, the production report consists of a summary of data in the form of good final, man power (direct), man power (indirect), share man. Where the comprehensive data can be seen in table 1.

Table 1: Recapitulation of Carved Frame Production at CV SBRC Furniture in 2021

Month	Good Final (kg)	Man Power (Direct)/(hour)	Man Power (Indirect)/(hour)	Share Man (hour)
January	16341	1245	172	1921
February	20213	1371	203	2182
March	19243	1315	196	2093
April	19345	1383	182	1934
May	19498	1321	190	1949
June	18322	1173	187	1871
July	18942	1216	198	1912
August	19342	1283	177	1894
September	17349	1492	195	1705
October	17453	1345	209	1881
November	18238	1234	213	2139
December	19537	1426	214	1917

3.2. Productivity Measurement

Furthermore, measuring productivity by taking into account only one resource as an input variable is known as single-factor productivity. Measurement of productivity by taking into account all input variables (labor, material, energy, capital) is known as multifactor productivity) or total factor productivity (Schneider, 2007). In this case Gaspersz (2002) formulates the measurement can be seen by giving emphasis to the value of efficiency. Efficiency can be measured as the ratio of output to input. Productivity is a combination of efficiency and effectiveness, as productivity can be expressed in equation.

$$\text{productivity} = \frac{\text{performance}}{\text{the resulting output}} = \frac{\text{efficiency}}{\text{input used}}$$

The results of measuring the productivity of carving frame production in the 2021 period are based on the output produced (good final), and the inputs used include man power (direct), man power (indirect), share man. Completely can be seen in table 2.

Table 2: Production productivity of CV SBRC Furniture carving frames for the period 2021

Month	Good Final (kg)	Man Power (Direct) /(Hour	Man Power (indirect) /(Hour	Share Man (Hour)	Productivity	Plan Productivity	Difference
January	16341	1245	172	1921	5,18	8,50	-3,32
February	20213	1371	203	2182	5,57	9,26	-3,69
March	19243	1315	196	2093	5,49	9,19	-3,70
April	19345	1383	182	1934	5,77	10,01	-4,24
May	19498	1321	190	1949	5,64	10,02	-4,38
June	18322	1173	187	1871	5,71	9,79	-4,08
July	18942	1216	198	1912	5,68	9,90	-4,22
August	19342	1283	177	1894	5,81	10,21	-4,41
September	17349	1492	195	1705	5,31	10,17	-4,86
October	17453	1345	209	1881	5,40	9,27	-3,87
Nopember	18238	1234	213	2139	5,19	8,52	-3,33
December	19537	1426	214	1917	5,58	10,19	-4,61
Nilai rata-rata					5,52	9,58	-4,05

Seen in Table 2, it can be explained that the average productivity of engraving frame production during 2021 is 5.52 kg/hour with an average productivity target in 2021 of 9.58 kg/hour. If we compare the achievement of production with the target of production achievement, there is a difference in productivity of 4.05 kg/hour or it can be concluded that productivity needs to be evaluated and re-planned.

The evaluation of the causes of the lack of productivity in the production of engraving frames is determined based on a fishbone diagram with reference to human factors (man), tools (machine), work environment (area), work procedures (methods), and raw materials. Based on direct observation, it was found that the causes and consequences of the lack of productivity of engraving frames during 2021 are presented in table 3.

Table 3: Factors that cause the lack of productivity of CV SBRC Furniture

NO	Factor	Because	consequence
1	Man	Too many workers Irregular work scheduling	Waste of time
2	Tools	Power outage Broken machine	Waste of time Defect
3	Work Environment	The workspace is not neatly arranged so that it interferes with performance	Waste of time
4	Methods	Instructions are not executed optimally Other technical problems	Waste of time Defect
5	Materials	Supply of raw materials is not smooth Need wood drying process	Waste of time Defect

From there, it can be understood that two main causes have hampered the company's performance in achieving the production productivity target of engraving frames according to the plan in 2021, namely the defect factor and the waste of time. Then from the cause and effect explanation that becomes a

productivity constraint, the kaizen method can be applied for planning to increase the productivity of carving frame production in order to be able to achieve productivity according to the targets set by the company.

The initial stage of implementing kaizen in increasing production productivity is carried out by determining the production productivity target of engraving frames in 2022, which is 9.58 kg/hour (plan). Where the method applied to achieve the productivity target is by making improvements to maintenance, reducing man power by 1 person, and structuring raw materials (do). Ensure whether the plan which includes maintenance, reduction of man power and raw materials has been carried out (check). Production productivity of 9.58 kg/hour in 2022 is a standard that must be achieved by applying the planned method (action).

3.2. Kaizen Analysis

Application of the five step plan (seiri, seiton, seiso, seiketsu, and shitsuke) kaizen. The application is described in the following stages:

1. Seiri.

Companies must have a clear system in the jobdesk of workers. Separating between activities that are considered necessary related to the production process of carving frames and which activities are unnecessary and have nothing to do with the production process, to be minimized or eliminated in the production series of carving frames, which includes several aspects:

- a. Production machine. The activity that is considered to have the most influence on production productivity is maintenance. Where the company is still implementing the policy of repair policy maintenance, machine repair is carried out if the condition of the machine is damaged or experiencing interference. In fact, this is very time-consuming so that a good maintenance mechanism is needed that is preventive in nature and replaces old machines that are prone to damage to determine

- repairs from major failures based on availability, performance and quality. Often production tools such as wood cutting machines, smoothing machines and finishing machines are damaged.
- b. Power outage. Sudden power outages without notification have been the biggest obstacle affecting the productivity of the engraving frame production. When the power goes out, the production process automatically stops. The majority of employees use electric-powered machines in every assembly of the engraving frame components, except for the manual engraving stage. For this reason, secondary energy is needed that can be used as a back up when the electricity goes out so that the planning of the production process can run according to the targets set by the company.
 - c. Material / Raw Material. Companies need to ensure the availability of raw materials due to the limited number of suppliers of raw materials. As well as the lack of quality inspection of raw materials because the quality of the raw materials is very influential on the resulting product. The solution that can be given is of course by increasing the number of suppliers of wood raw materials across regions so that the availability of quality raw materials can be sustainable. Companies need to increase cooperation with a strong trust system for the suppliers of these raw materials.
 - d. Defective product. The activity that is considered to have the most influence on productivity is the presence of defective products due to the carelessness of workers. Operators at the saw mill do not pay attention to accuracy in the process of cutting wood logs into boards. So that sometimes the resulting board size does not match the specified thickness level. Human error here occurs because the operator or motivation is not optimal and there is no standard method in the production process so that the measurement error of the sample frame mall often fails not according to consumer orders so it must be remade. From there, for productivity planning, the trial setting is reduced by using standard settings based on incoming ordered products.
 - e. Labor. Working time is not optimal because there is no standard time in the production process so that workers do not optimize their working hours. When there is a setback in processing time as a result of machine settings or power outages, it automatically has a significant effect on the delay in the completion of production targets that are often carried out. For this reason, companies need to apply daily standards or targets for workers based on the operator's standard time of product components that must be produced, so as to optimize the operator's working hours. Then also improve the skills of workers with training facilities, for example.
 - f. work method. There is no map of the operation process, so there is no standard method (only based on work experience). This causes new workers to experience difficulties in the process of working on product components. The declaration of a standard operating process map of the production process carried out, so that operators do not experience difficulties in doing work. This can be done by adding work instructions on the machine process card for each product component to be processed.

2. Seiton

Regular storage of tools and raw materials in the right places, so that tools and raw materials are ready to use when needed in the production process. In the case of CV SBRC Furniture, the problem of storing raw materials in the form of wood is still done outside the factory (outdoor), due to lack of space, so that when it rains, the logs will get wet in the rain, so before entering the production process they must enter the oven stage for drying. So the solution that can be implemented is that the factory provides raw material stock of dry wood planks ready for production from the oven machine in the next month period. So that the delay in raw materials due to weather and the scarcity of supply of suppliers can be minimized.

3. Seiso

Maintain the cleanliness of the workplace so that work can run efficiently without any disturbance from a dirty work environment. Cleaning the production plant is the main point that CV SBRC Furniture must pursue, because generally the furniture business where it is produced is full of piles of wood scraps and wood shavings. Factories that are large in size can be cleaned periodically by moving the wood waste to another place and then selling it to collectors for a certain period.

4. Seiketsu

Companies need to implement a policy of habituation of workers to always maintain personal hygiene. At least be able to wear a uniform when working and prioritize the use of work equipment in a safe manner. This will certainly have an impact on increasing employee motivation and performance in completing projects according to the set targets. A fresh appearance and understanding of safety is a form of professionalism in carrying out work tasks according to their responsibilities.

5. Shitsuke

The company must also have a standard work system or create a jobdesk according to the production division and regular scheduling. This serves as a guide for employees in carrying out an optimal production process. Then it also regulates how to apply safe work procedures and sanctions given when negligence occurs that

causes product defects. This is important in building employee discipline and efforts to increase employee obedience in carrying out production according to SOPs that have been recorded by the company.

4.CONCLUSION AND SUGGESTION

This research resulted an increase in the productivity of CV SBRC Furniture in producing carving frames with the application of kaizen. First, the average productivity of engraving frame production during 2021 is 5.52 kg/hour with an average productivity target of 9.58 kg/hour for the year. There is a difference in productivity of 4.05kg/hour or it can be concluded that productivity needs to be evaluated and re-planned. Second, the results of the cause-and-effect analysis found that there were two main factors that led to the lack of or not achieving the productivity of carving frame production at CV SBRC Furniture as planned in 2021, namely defects and time wastage. Third, planning improvements with kaizen can be done by improving maintenance, providing backup energy sources as backup power outages, and storing raw materials after the oven on a scheduled basis according to the production schedule.

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References

- Ashmore, C. 2001. Kaizen and the Art of Motorcycle Manufacture. Engineering Management Journal Vol 11.
- Baroto, Teguh. 2002. Perencanaan dan Pengendalian Produksi. Jakarta: Ghalia Indonesia.
- Cherrafi, A. Et.al. 2019. Green and lean: a Gemba-Kaizen model for sustainability enhancement. PRODUCTION PLANNING & CONTROL 2019, VOL. 30, NOS. 5-6, 385–399 <https://doi.org/10.1080/09537287.2018.1501808>

- Faritsy A.Z.A & Suseno. 2015. Peningkatan Produktivitas Perusahaan dengan Menggunakan Metode Six Sigma, Lean dan Kaizen. *Jurnal Teknik Industri*, Vol. X, No. 2, Mei 2015. P.103-116
- Gasperz, Vincent, 2002. *Total Quality Management*, Jakarta:Gramedia Pustaka Utama.
- Guo, W. Et. al. 2019. Integration of value stream mapping with DMAIC for concurrent Lean-Kaizen: A case study on an air-conditioner assembly line. *Advances in Mechanical Engineering* 2019, Vol. 11(2) 1–17
- Hidayat T. & Putra R.A. 2018. Analisis Peningkatan Produktivitas Produksi Mesin Moulding Disamatic dengan Penerapan Kaizen (Studi Kasus: PT XYZ). *Smeinar Nasional IENACO-2018*
- Hines, P., and D. Taylor. 2000. *Going Lean*, Lean Enterprise research center, Cardiff Business School.
- Liker, J. K., & Meier, D., 2006, *The Toyota Way Fieldbook A Practical Guide for Implementing Toyota's 4Ps*, McGraw-Hill Companies.
- Kademi, Ninik Sriyani. 2020. Peran UMKM (Usaha Mikro Kecil Menengah) Dalam Meningkatkan Kesejahteraan Masyarakat. *EQUILIBRIUM Jurnal Ilmiah Ekonomi dan Pembelajarannya* 8(2):191
- Kumar, Ravinder. 2019. Kaizen a Tool for Continuous Quality Improvement in Indian Manufacturing Organization. *International Journal of Mathematical, Engineering and Management Sciences*. Vol. 4, No. 2, 452–459
- Mahmod, R. Mashahadi, F. Ashari. N.A. 2017. The influence of lean six sigma and Kaizen to reduce defect products in automotive industry. *Journal of Emerging Economies & Islamic Research* 5(4) 2017, 81 – 90.
- Mali, P., 1978, *Improving Total Productivity: MBO Strategies for Business Government and Non Profit Organization*, New York : John Wiley & Sons.
- Marizar, E.S., Irawan, A.P., Mutiara, M.W. 2019. Pengembangan Desain Ukir Kayu Pada Industri Furniture Di Jepara. *Jurnal Muara Ilmu Sosial Humaniora dan Seni* 3(2):433
- Pujotomo, D. Santoso. H., Nursanti H. 2008. Analisis Pengukuran Produktivitas Pada C Citra Jepara Furniture. *J@TI Undip*, Vol III, No 1, p.26-34
- Schneider Electric Production System, 2007, *Value Stream Mapping*, France: George Consulting, L.P.
- S. Pande, Peter, Robert P. Neuman, 2008. *The Six Sigma Way – How GE, Motorola, and Other Top Companies are Honing Their Performance*. The McGraw-Hill Companies, Inc.
- Summanth, David.J. 1984. *Productivity Engineering Management*. Mc Graw-Hill Book Company.
- Sink, D.S., 1985. *Productivity Management: Planning, Measurement and Evaluation, Control, and Improvement*. John Willey an Sons. Inc. Canada.
- Redaksi Merdeka.com.
<https://www.merdeka.com/uang/ekspor-mebel-jepara-anjlok-akibat-pandemi-covid-19.html>