



# Comparison of the Application of Just In Time (JIT) Business Principles and Traditional Philosophy in the Development of Integrated Digital Flour Mill Technology

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**Abstract.** Coffee is main commodity that must be developed from the upstream. The development is closely related to the production process that prioritizes the implementation of good business principles and the application of appropriate technology. This study aimed to compare the application of business principles to the use of Integrated Digital Flour Mill technology, the potential, and the causes of inefficiency of Flour Mill technology. The study aimed to compare the application of Just in Time (JIT) and traditional philosophy and to find out the potential and causes of inefficiency through applied research using observational data collection techniques and literature study. Triangulation and member checks were carried out to check the validity of the data. JIT analysis used 17 JIT principles and was developed with the systems development analysis. The results and discussion in this applied research showed that the application of the business principles of the JIT production system to the Integrated digital flour mill technology had a good impact on efforts to optimize production costs. Based on the analysis of 17 JIT principles and analysis of system development, it was found the potential and causes of inefficiency that can be handled through the application of digital flour mill technology was integrated with impulse sealer, conveyor and a solar-powered.

**Keywords:** Flour Mill · JIT · digital · solar panel

## 1 Introduction

South Sumatra (Sumatera Selatan) is the largest producer of coffee in Indonesia and the second in the world. This follows the coffee cultivation area in South Sumatra reaching over 280 hectares. According to data from the Ministry of Agriculture in 2020, coffee production in South Sumatra reached 199,324 tons. South Sumatra's coffee production is more than a quarter of the country's coffee production, which is 773,410 tons [1].

The head of the South Sumatra Trade Office stated that the coffee trade as the largest supporting commodity in South Sumatra is experiencing a decline in downstream. This is

due to the inefficiency of activities, especially exports because they have to go through Lampung. This is because Lampung coffee farmers better understand modern coffee packaging and selling techniques, so that coffee can be traded in various variants up to the export level. Expertise in processing coffee causes coffee connoisseurs in Indonesia and even abroad to be more familiar with Lampung coffee even though it comes from South Sumatra coffee farmers. This shows that South Sumatra coffee farming must be stimulated. Another problem faced by coffee farmers is the coffee grinding process, coffee packaging is not on time due to the far distance of the farm from the packaging site and the absence of electricity in the plantation area.

One of the farming groups in South Sumatra is the Besemah Jaya Farmer Group that grows coffee in Kota Pagaralam. This group used to market wrap coffee, but that activity was stopped due to poor management. Based on initial observations, other problems experienced by the partners are that they cannot optimize profits, cannot maintain the quality of the coffee grinder, cannot maintain the aroma and taste of the coffee, have not been able to carry out timely packaging in the farm area and the absence of electricity in the farm area. The partners have a strong desire to process ground coffee with better technology. Based on observational data, a more in-depth study is required with data collection and analysis. A summary of the problems raised in this study: (1) How does the application of business principles compare to the utilization of Integrated Digital Flour Mill technology?; (2) What is the potential and cause of technological inefficiency of the Flour Mill?

The specific objectives of the research are (1) to find out the comparison of the use of JIT production system business principles and traditional philosophy in an Integrated Digital Flour Mill; (2) knowing the potential and causes of inefficiency as a basis for producing Appropriate Technology (TTG) in the production of ground coffee with solar-powered coffee milling and packaging equipment.

The TTG used is expected to optimize profits, maintain the quality of ground coffee, lock the aroma and original taste of coffee with a good level of packing density, equipped with temperature inductors, solar-powered device mechanics, which allows timely grinding and packing in the farm area. The reduction in electricity consumption is expected to reduce operating costs. Urgent research is the need for solar-powered coffee milling and packaging equipment. The technology is able to optimize yield, maintain coffee grind quality, timely packaging for aroma lock, and reduce operating costs.

## **2 Literature Research**

### **2.1 Just in Time (JIT)**

Just in Time is one of the most widely practiced management philosophies, techniques or methods with the aim of purchasing raw materials and producing goods only when they are needed and at the right time for use at each stage [2]. There are many problems faced by the industry especially the inefficiency in the purchasing and production system. Through the implementation of JIT, these problems can be overcome and eventually there will be savings that will increase the company's profits [3].

## 2.2 Arduino Uno Controller

Arduino is an open-source single-board microcontroller that has high flexibility in both software and hardware to facilitate electronic design in a variety of fields [4]. Arduino uses the ATmega IC as a program IC and the software has a processing language programming language. This language is very similar to C language, but the writing is close to human language. Arduino has many advantages compared to other microcontrollers which are cheap, simple, Open Source Software, Open Source Hardware.

## 2.3 Solar Panels

Solar panels are a collection of solar cells designed in such a way as to be more effective at absorbing sunlight. Solar cells are composed of several photovoltaic components or components that can convert light (photos) into electricity (voltaic) [5]. Basically, solar cells are composed of layers of silicon which are semiconductors, metal, an anti-reflective layers, and metal conductor strip. This layer plays an important role in generating electricity so that it can be used for all needs. The number of solar cells that are arranged into solar panels will be directly proportional to the energy obtained. The more solar cells used, the more solar energy is converted into electrical energy [6].

## 2.4 Digital Flour Mill Mechanics

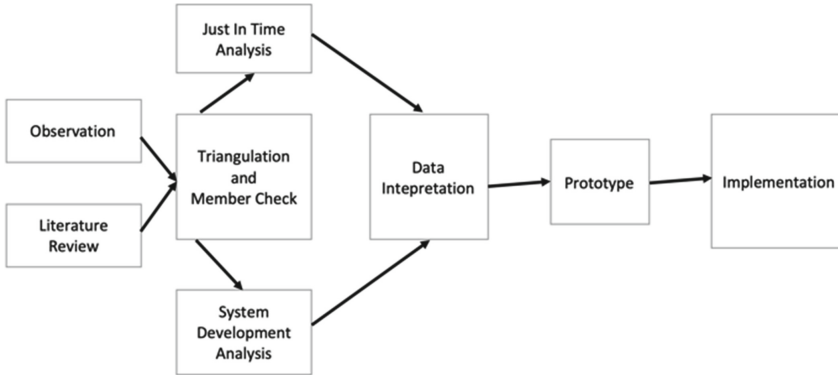
According to [7] Pully is the drive system in coffee bean grinders and grinders. This system consists of several types depending on the time required in each flour session. The fastest pull was with a diameter of 6 inches with a time of 2.51 min and the slowest pull was a 3 inch with a time of 4.10 min. Pull with the fastest coffee bean flour shaft rotation is the 6 inch pulley reaching 5017 rpm and the slowest shaft rotation on the 3 inch pulley reaching 2460 rpm. The pull that produces the highest torque for coffee bean flour is with a diameter of 3 inches reaching 920 rpm, while the latter is a diameter of 6 inches 12.89N. The use of the pully system is believed to be able to maximize the coffee grind with a high degree of fineness so that the quality of the coffee powder is ideal.

A type of electric motor known as a dc motor is most commonly utilized in industry to aid in production [8]. DC motors are more often used for activities that require speed regulation than ac motors. In addition to controlling the speed of rotation, the dc motor control system also controls the direction of rotation of the rotor, clockwise or counterclockwise. One of the DC motor control systems is to use Width ModulationPulse (PWM) as a trigger on control drivers such as H-Bridge transistors.

# 3 Research Method

## 3.1 Types of Research

This type of research is a type of applied research. This research is a research that is used to solve a specific problem on a specific research object [9]. The subjects of the study are all reliable informants and have a direct relationship with the object of the study. The object of his study is a solar-powered coffee milling and packaging device.



**Fig. 1.** Flow of Applied Research conducted

This technology is equipped with a temperature indicator to maintain the quality of the coffee grinding process.

This research is located in Besemah Jaya Farmer Group located in PagarAlam Village, Utara Pagaralam District, Pagaralam City, South Sumatra.

### 3.2 Data Collection Techniques

The Data collection procedure used is as follows [10]: (1) Observation, observing people doing certain activities being observed [11]; (2) Literature Review, data collection technique by examining theories relevant to the research problem.

### 3.3 Data Analysis

Before analyzing the data, the following methods are used to test the credibility of data through the following techniques [12]: (1) Triangulation is a strategy that uses multiple methods to collect and analyze data. The triangulation that is used is a triangulation of resources, methods, and time [13]; (2) Member Check is a method for determining whether the interpretation of observational data processing is appropriate for research partners [14].

The quality of solar-powered coffee grinding and packaging equipment, as well as the temperature indicators and gain projections embedded in the mechanism, are also the goals of the data collection and analysis methods (Fig. 1).

### 3.4 Method of System Development

There are two types of system development: software and hardware. The term “software development stage” refers to the system development life cycle (SDLC), which consists of the following steps: (1) System Analysis, in which problems and objects of study are investigated and a Proposed System workflow diagram is created;(2) System Design using Arduino based Firmware for temperature detector and yield optimization system; (3) Coding Process, microcontroller with C language; (4) System Testing Black Box Testing by providing test scenarios to the system.

4 Results and Discussions

4.1 Decision

Just In Time (JIT) Analysis

JIT analysis in research using 17 JIT principles [15]. Comparison of the effects of JIT implementation and Traditional Philosophy on Integrated Digital Flour Mill Technology can be detailed as in Table 1 (Tables 2, 3, 4, 5, 6, 7 and 8).

Table 1 shows a comparison of 17 JIT principles, namely Quality, Expertise, Errors, Inventory, Lot Size, Queue, Automation Value, Sources of Cost Reduction, Material Flow, Flexibility, Overhead Role, Labor Cost, Machine Speed, Purchase, Accelerate, Cleanliness, Horizon. The comparison is the result of observing the implementation of integrated digital flour mill technology from a business perspective. Through this assessment, a scientific study can be carried out that can be used as a flour mill development.

**Table 1.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Quality Criteria and Skills Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Quality	Fulfillment of quality without incurring additional costs in the ground coffee grinding and packaging process, where the coffee grinding process can be carried out in the field directly because the mechanical technology of this coffee grinder uses solar energy. Thus, reducing electricity costs. In addition, the process of packing ground coffee can also be carried out directly in the farm area to ensure that the aroma and taste of the coffee is better preserved. This can reduce transportation costs.	It requires payment to produce a quality product which is the cost of grinding coffee at a grinding equipment rental place. In addition, the packaging process must be carried out in different places that require coffee transport services so that the cost is higher. The process of transporting coffee for packaging can result in the loss or reduction of the coffee's original aroma and taste during the journey. Because the coffee powder is exposed to air before being packaged.
Skills	Farmer Group members are experts. The chairman of the Farmer Group and the University have the role of providing services to farmer group members to operate digital flour mill technology as an effort to improve the expertise of the farmer group which leads to increased knowledge related to the science and application of modern coffee milling and packaging technology.	Leaders of Farmers' Groups and Universities act as experts. Members of the Farmer Group act as servers according to the rules set by the experts. This causes members of the group to not have sufficient expertise and abilities in the use of coffee milling and packaging technology. This has the effect of not improving the ability and expertise of farmer group members over time.

**Table 2.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Error Criteria and Availability Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Error	Zero defects in implementation of technology is standard that must be met. Errors at the technology implementation stage are used as a reference in making improvements in the future. In addition, each recommendation note from the final evaluation results will be used as a future reference to update the digital flour mill technology in the future.	Errors must be studied without any reduction to avoid these errors so that the quality of the resulting ground coffee production is not optimal. Additionally, procedural errors caused by the absence of temperature control detectors caused previous coffee milling and packaging machines to suddenly overheat. This will affect the quality of the coffee grinder and tend to make maintenance of traditional coffee milling and packaging machines difficult.
Availability	the coffee supply becomes a burden which is the real problem. In this regard, the digital flour mill provides a more practical integration feature, which is believed to be able to overcome the problem of coffee availability in the market. The milling and packaging process carried out in the same place can improve the timeliness in the kopo powder production process. This of course can ensure the availability of ground coffee in the market more timely.	Coffee preparation has the benefit of ensuring smooth production, but with previous coffee grinder technology, there was still a long series of activities that took a long time starting from the coffee panne process, drying to milling and packaging. This is due to the fact that previous technology did not have integration features that allowed all processes to be carried out at one time and one place so it took a long time to produce ground coffee. This often results in late and often untimely availability of ground coffee in the market.

### System Development Analysis

The designed coffee packaging control system consists of 5 (five) main parts which are: (1) Microcontroller Module, (2) Display System, (3) Push Button, (4) Power Supply and (5) DS18B250 Temperature Sensor. The microcontroller module functions as a control center that processes input data from temperature sensors or variable values entered through push buttons. Temperature values from temperature sensors and input variables will be processed and displayed on the system display to provide information to the user in the form of optimization parameters for the income obtained. So that users can carry out the correct process in the coffee bean processing production cycle.

**Table 3.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Lot Size Criteria and Line Up Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Lot Size	Must have a small Lot Size, where the digital flour mill has a coffee grinding capacity that is not too large so that the ordering capacity to grind and pack the ground coffee must match the capacity offer end by the digital flour mill.	Must have an economical Lot Size using the EOQ principle. In the use of traditional ground coffee grinding and packaging technology, the lot size or capacity of ordering ground coffee is still very necessary, which is calculated according to the need. This is due to and related to the cost of renting grinding equipment which tends to be high and if the farmers have traditional technology coffee grinding equipment, they also need to take into account the electricity costs that may arise. This results in the need to calculate the amount of coffee orders and other additional costs as well as calculation the price offered for each packet of ground coffee either according to the ability and purchasing power of the community. So, for this case, EOQ-based calculations are still very necessary if using traditional manufacturing technology that tends to be more complex and risks lowering profits.
Line Up	Avoiding long queues in the production and packaging process is the main thing in implementing a digital flour mill. The digital flour mill application is believed to be able to save time because all activities from harvesting coffee, grinding, and packing coffee powder can be carried out in the same location, which is in the garden of the farmer group without the help of electricity. This certainly increases the efficiency of the activity process and saves time in the coffee grinding and packaging process. The complexity and integration offered is expected to ensure the availability of ground coffee commodities in the market.	In practice, the use of traditional coffee grinding and packaging technology often results in lengthy processes as they must be carried out in different places. This often results in inefficiency in the process of preparing ground coffee in the market. In addition, there are several ground coffee factories that queue up so much that groups of farmers have to wait for a long time or even days to produce ground coffee which results in the income they will receive being late.

**Table 4.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Value Automation Criteria and Sources of cost reduction Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Value Automation	Automation is invaluable. Therefore, there is integration between technological blocks to ensure consistency of quality and taste of ground coffee. This automation is expected to speed up the process of grinding ground coffee, speed up the packaging process, and speed up the preparation of ground coffee in the market.	Automation is only carried out in the milling process, but traditional coffee milling machine technology does not yet have automation in terms of packaging, machine temperature control, and automation of solar energy use.
Sources of cost reduction	Reducing acquisition costs and speeding up product flow at production time are the main goals of implementing a digital flour mill. Due to the implementation of the technology, all process activities can be carried out at the same time and in the same place, in addition to reducing the cost of electricity consumption and packaging at the same time.	Cost reduction is done through labor reduction and increased machine utility. This causes the grinding machine to work harder which causes the machine to be more easily damaged and the cost of electricity will be high because the number of working hours of the machine is longer.

**Table 5.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Material Flow Criteria and Flexibility Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Material Flow	Coffee is close to the production process (pull system) so that the digital flour mill can ensure a better quality of ground coffee taste.	Coffee is placed separately outside the production area (push system). In this regard, the process of producing ground coffee and its packaging that is far apart often results in the aroma of ground coffee being contaminated with air which often causes less consumer satisfaction with the ground coffee products offered.
Flexibility	Flexibility is achieved through the compression of process lead times. The low lead time level offered by the digital flour mill application will lead to time efficiency. This is believed to ensure the availability of ground coffee products more timely than before.	Any flexibility will incur the cost of excess machine capacity. Excessive engine capacity will of course cause high electricity and labor costs.



**Table 6.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Role of Overhead Criteria and Labor Cost Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Role of Overhead	Group members who manage those who do not add value are assumed to waste so much that with the digital flour mill application they can optimize the minimum number of workers but achieve high production capacity.	The overhead function is assumed to be the coordinating aspect of the coffee grinding process. It is assumed that the use of traditional coffee grinders will increase factory overhead costs. That is, by maximizing machine hours to catch up with ground coffee production capacity, it will inevitably increase the total cost of labor, machine maintenance and electricity costs.
Labor Cost	The cost for labor is classified as a fixed cost because the digital flour mill application does not require a lot of labor force with a high working capacity of the machine because the features provided by the digital flour mill are able to reduce labor costs.	Labor costs are classified as variable costs because in the use of traditional coffee grinders the number of hours used will be very influential and the wages given to workers. The higher the order of the coffee grinder, the higher the labor cost will be.

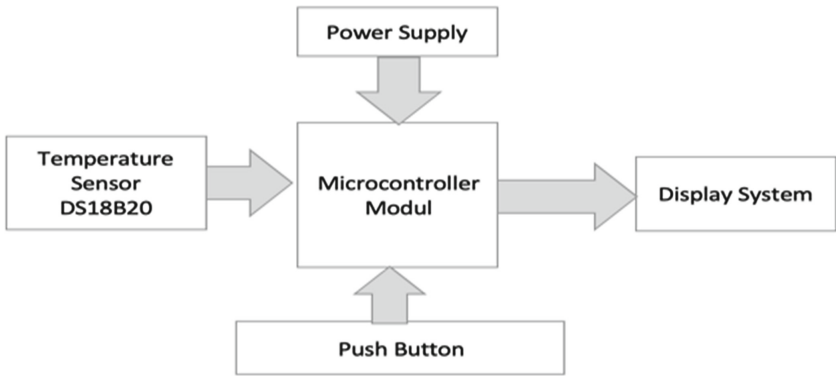
**Table 7.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Machine Speed Criteria and Purchase Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Machine Speed	The flour mill is assumed to be like a marathon, not too fast but able to run for a long time without stopping. The heat detection feature on the digital flour mill is also able to optimize the quality of machine work without increasing machine maintenance costs, because users can know when the machine needs to rest for a while.	The machine is likened to a sprinter but the duration is not too long because traditional coffee grinders tend to heat up easily. This is due to the absence of a heat sensor detector mounted on the engine body. This can also affect the machine's durability and high maintenance costs.
Purchase	The source of coffee raw materials comes from the farm itself or a certain party that consistently provides coffee beans for grinding and packaging.	Receive a variety of coffees from many suppliers. This caused many queues which created uncertainty about the availability of ground coffee in the market.

**Table 8.** Comparison of the Effects of JIT Implementation and Traditional Philosophy on the Group of Coffee Producer. Farmers Groups with Expediting Criteria, Cleanliness Criteria and Horison Criteria

Criteria	Impact of JIT Implementation	Effects of Traditional Philosophy Application
Expediting	No speeding and working around the use of digital flour mill is allowed.	Work around and speed up part of the business system used for the use of traditional coffee milling machines.
Cleanliness	Cleanliness in line with the activity of producing ground coffee needs to be applied, this is in line with the principle of implementing solar energy as the main energy source of this technology.	Working and doing production that results in dirty is a consequence of business activities against the implementation of traditional coffee grinders.
Horison	Patience and patience will affect the entire business process towards the standard of zero defects.	The effects of the production process are expected in a short time when implementing a traditional coffee grinder.

Data: Observational Data, 2022

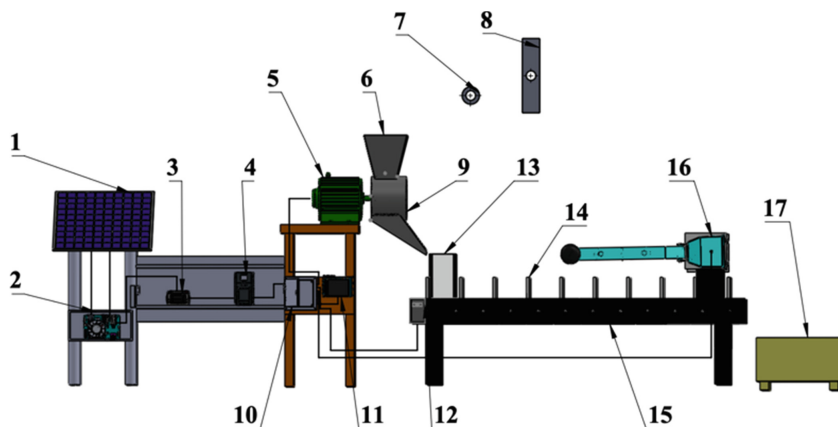


**Fig. 2.** Circuit Block Diagram

Figure 2 describes the development of the working system of the tool. In Fig. 2, the development of the tool work system has referred to the Just in Time business principle. Based on the circuit block diagram in Fig. 2, an integrated digital flour mill prototype can be made according to Fig. 3.

The prototype design in Fig. 3 describes the components in more detail related to the integrated digital flour mill technology that uses the JIT principle. The above design part can be explained as follows:

1. Solar Cells
2. Control Panel



**Fig. 3.** Digital Flour Mill Prototype integrated with

3. Battery
4. Inverter
5. Motor Grinder
6. Hopper
7. Clamp Adapter Arbor
8. Grinder Blade
9. Smoothing Tube
10. Relay
11. LCD
12. Rope Control
13. Plastic/Packaging
14. Barriers
15. Belt Conveyor Machine
16. Impulse
17. Shelter

The instrument interface consists of an LCD and a  $3 \times 4$  matrix keyboard. The LCD will display the temperature data reading from the DS18B20 sensor, and there is also a display to predict the result.

## 4.2 Discussion

Based on the results of previous data analysis, this applied research was carried out by developing and implementing TTG solar-powered coffee brewing and packaging with a temperature indicator as a measure of device performance effectiveness. This situation is due to coffee grinding and packaging equipment previously only being able to grind and pack coffee with electricity, unable to optimize results by applying JIT methods, unable to grind temperature-controlled coffee to maintain quality, unable to maintain the aroma & taste of coffee with the packaging density that is ideal, unable to carry out

packaging on time in the farm area, due to the distance from the factory and packaging is very far, not yet able to use solar energy instead of electricity. to be used in the middle of the park where it is difficult to get electricity and can reduce operating costs.

Research of [16] states that the development of automatic coffee grinders can increase the production of ground coffee. The production yield is greater, which is originally 20 packages in one process to 40 packages. Besides [7] said the application of the Pulley system in coffee grinders and grinders has the highest speed so it is very efficient in terms of time and coffee fineness. In addition, the coffee bag packaging process is also more effective with the help of TTG packaging mechanics, this TTG is believed to speed up packaging time, increase density, and fill SNI coffee bags [17]. The ground coffee production process will be more effective because the Decision Support System (SPK) is built based on compliance with product criteria with management accounting based on Just In Time (JIT) which meets the objective of helping in checking aspects of inventory cost efficiency. and non-financial performance (production effectiveness, timeliness), delivery, and product quality [2]. In addition, research from [18] stating that the use of the Arduino microcontroller will provide effective work in controlling the temperature. It aims to make the equipment work more efficiently if it is used continuously. This past research will be integrated into new knowledge to solve problems in this applied research.

## 5 Conclusion and Suggestion

The results and discussion in this applied research show that the application of JIT production system business principles to Integrated digital flour mill technology has a positive effect on efforts to optimize production costs. Based on the analysis of 17 JIT principles and system development analysis, it was found the potential and causes of inefficiency that can be controlled through the application of digital flour mill technology integrated with solar-powered impulse sealing conveyors.

Future research is expected to provide updates on the technology currently in use through integration with operating systems on gadgets. The implications of this study are expected to solve problems in coffee plantations.

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## References

1. G. E. Tresia, W. Puastuti, and I. Inounu, "Carrying Capacity for Ruminant Based on Plantation Byproducts and Potency of Enteric Methane Emission," *War. Indones. Bull. Anim. Vet. Sci.*, vol. 31, no. 1, pp. 23–36, 2021.
2. A. Aznedra and E. Safitri, "Analisis Pengendalian Internal Persediaan Dan Penerapan Metode Just In Time Terhadap Efisiensi Biaya Persediaan Bahan Baku Studi Kasus PT. SIIX Electronics Indonesia," *Meas. J. Account. Study Progr.*, vol. 12, no. 2, pp. 120–132, 2018.

3. Z. Li, Q. Ying, W. Yan, and C. Fan, "Does just-in-time adoption have an impact on corporate innovation: evidence from China," *Account. Financ.*, 2021.
4. L. Louis, "Working Principle of Arduino and Using it as a Tool for Study and Research," *Int. J. Control. Autom. Commun. Syst.*, 2016, doi: <https://doi.org/10.5121/ijcacs.2016.1203>.
5. Z. Iqimal, I. D. Sara, and S. Syahrizal, "Aplikasi sistem tenaga surya sebagai sumber tenaga listrik pompa air," *J. Komputer, Inf. Teknol. dan Elektro*, vol. 3, no. 1, 2018.
6. M. Rajvikram and S. Leoponraj, "A method to attain power optimality and efficiency in solar panel," *Beni-Suef Univ. J. basic Appl. Sci.*, vol. 7, no. 4, pp. 705–708, 2018.
7. M. Azmy Tsaqib, "VARIASI DIAMETER PULLY SISTEM PENGGERAK PADA MESIN PENGGIJILAN DAN PENEPUNG BIJI KOPI." DIII Teknik mesin Politeknik Harapan Bersama, 2021.
8. M. I. Esario and M. Yuhendri, "Kendali Kecepatan Motor DC Menggunakan DC Chopper Satu Kuadran Berbasis Kontroller PI," *JTEV (Jurnal Tek. Elektro dan Vokasional)*, vol. 6, no. 1, pp. 296–305, 2020.
9. M. Baimyrzaeva, "Beginners' Guide for Applied Research Process: What Is It, and Why and How to Do It," *Univ. Cent. Asia*, vol. 4, no. 8, 2018.
10. P. D. Sugiyono, "Metode Penelitian Bisnis: Pendekatan Kuantitatif, Kualitatif, Kombinasi, dan R&D," *Penerbit CV. Alf. Bandung*, 2017.
11. W. Olsen, "Observation Methods," *Data Collect. Key Debates Methods Soc. Res.*, 2012, doi: <https://doi.org/10.4135/9781473914230.n20>.
12. L. Birt, S. Scott, D. Cavers, C. Campbell, and F. Walter, "Member checking," *Qual. Health Res.*, vol. 26, no. 13, pp. 1802–1811, 2016, doi: <https://doi.org/10.1177/1049732316654870>.
13. N. Carter, D. Bryant-Lukosius, A. DiCenso, J. Blythe, and A. J. Neville, "The Use of Triangulation in Qualitative Research," *Oncol. Nurs. Forum*, 2014, doi: <https://doi.org/10.1188/14.onf.545-547>.
14. L. Gelling, "Qualitative Research," *Qual. Res.*, 2015.
15. A. Diana and F. Tjiptono, "Total Quality Management (TQM)," *Andi, Yogyakarta*, 2001.
16. J. A. Wabang, F. E. Laumal, R. B. Suharto, N. Lapinangga, and J. I. B. Hutubessy, "Optimizing Coffee Management in Wawowae Village through Increasing Human Resources and Machine Development [Optimalisasi Pengelolaan Kopi di Desa Wawowae melalui Peningkatan Sumber Daya Manusia dan Pengembangan Mesin]," *Proceeding Community Dev.*, vol. 2, pp. 502–509, 2019.
17. S. Mahdalena, "MANAJEMEN PENGEMASAN BUBUK KOPI ARABICA KORINTJI PADA PT. ALKO SUMATRA KOPI KABUPATEN KERINCI." Agrobisnis, 2021.
18. S. Herawati, "Rancang Bangun Sistem Monitoring Suhu Ruangan Bagian Pembukuan Berbasis Web Menggunakan Mikrokontroler Arduino Uno R3," *J. Teknol. Inf. dan Komun.*, vol. 13, no. 1, pp. 18–33, 2018.

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