

Implementation of just in time for cost saving of 4-wheel tractor manufacturing preparation process (case study on pt iseki indonesia)

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ARTICLE INFO**Article history:**

Received Nov 30, 2025
Revised Oct 08, 2025
Accepted Oct 30, 2025

Keywords:

Just in time;
Cost of preparation.

ABSTRACT

Business development is growing and creating competition for business actors by producing competitive, innovative and high-tech products. Research Object of PT Iseki Indonesia Pasuruan. Based on observations with management that the implementation of the Just In Time System is still high production costs so that the cost of the product is too high resulting in the product not being able to compete in the market. This type of research uses a qualitative descriptive approach. The data processed are primary data in the form of production records and the results of interviews with management. Based on the results of the study, it was shown that the application of the Just In Time system was proven to reduce the cost of part preparation, as evidenced by changing the preparation for the MFGC type tractor part taking which previously took 1405 hours or Rp. 78,680,000, after the implementation of the Just In Time system, it changed to 261 hours. or Rp. 14,616,000. So the total cost savings after implementing the Just In Time system is Rp. 64,064,000. The application of the Just In Time system has indeed been proven to be able to eliminate many useless things in the company.

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1. Introduction

Business development in Indonesia continues to grow and create competition for business players, requiring companies to remain among customer preferences by producing competitive, innovative and high-tech products. This is also driven by ever-changing customer tastes, requiring management to continuously develop products in order to maintain the company's survival (Hartatik et al., 2023), (Setiawan et al., 2024). In addition, competition has become more intense, considering that competitors are no longer only domestic but also include many foreign competitors who have entered the domestic market. These foreign competitors offer high-quality products at low prices using their advanced technology. To face this increasingly intense global competition, companies must have the right strategy (Bintang & Hendra, 2024), (Yuliaty, 2020).

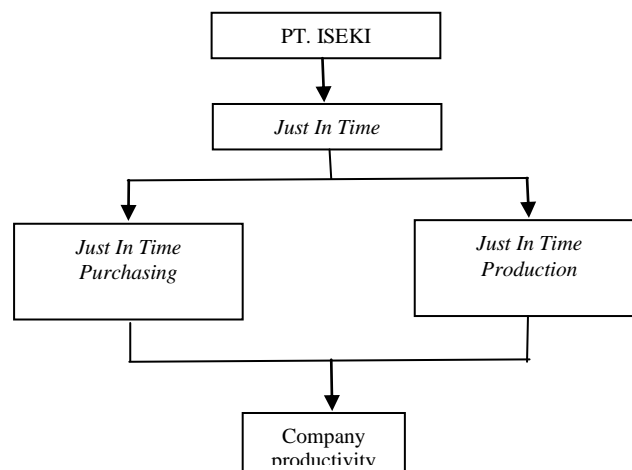
One strategy that can be implemented is the Just In Time system. The main objective of Just In Time is to reduce production costs and increase overall productivity (Juardi, Majid, & Hardiwansyah, 2022), (Juardi et al., 2022). The implementation of the Just In Time system enables companies to reduce production costs and make continuous improvements in creating quality products. To meet consumer desires and needs in terms of both quality and price, companies can use a pull system. Just In Time requires that raw materials and other purchased goods be delivered on time, and that finished goods be completed exactly when needed. In the Just In Time system, the production process does not allow for defective products due to the absence of inventory. With no inventory, waste can be eliminated on a large scale in the form of quality improvements and lower production costs. Costs that do not add value for consumers are eliminated through continuous

improvement efforts, so that the company's production process activities truly benefit consumers (Anisa, 2024), (ALFARISI, 2023).

PT. Iseki Indonesia is a foreign company investing in Indonesia, founded by Noriyaki Kimura in 2012. Foreign investors, particularly those from Japan, still consider East Java to be the most favoured province and a highly attractive investment destination for investors looking to expand their businesses. The company is engaged in the production of 4WD contractors. It continues to develop its business based on agricultural tools with the use of appropriate technology, including viewing East Java as an investment opportunity. Based on observations with management, the implementation of the Just In Time (JIT) system still incurs high production costs, resulting in high product costs and high selling prices that are not competitive with similar products on the market. Therefore, an analysis of the Just In Time (JIT) system is needed to ensure that product costs are reasonable and competitive in the market (Chintia et al., 2025), (Andriono et al., 2025).

Some previous studies related to the Just In Time system include: (Yudhistira, 2024), (Fahrurahman, 2022), (Amalia, Liow, Widjaja, Fauzi, & Samosir, 2023), (Susanti & Arief, 2021), (Simanjuntak & Silitonga, 2024), (Urohman, Suryana, Pandin, & Riyadi, 2024).

from some of the studies that have been mentioned previously resulted in a varied conclusion. One of the studies mentioned above shows that the Just In Time method resulted in significant savings in raw materials, at over 90%. This shows that the implementation of Just In Time is considered very helpful in reducing costs and increasing efficiency.



2. Research Method

In this study, the type of research used is descriptive research. In descriptive research, the author uses a qualitative approach, because the analysis consists of written and spoken words from people and observable behaviour. The author will conduct research with the following research focus: Implementation of Just In Time for Cost Savings in the Preparation Process for Manufacturing 4-Wheel Tractors. The location of this research is PT Iseki Indonesia, located in Pasuruan.

The data used is primary data sources such as observation, which is a data collection technique by directly observing the object being studied and systematically recording all data. Data collection is also carried out by conducting interviews as one of the data collection methods. Interviews are a data collection method by conducting interviews or direct questions and answers with company leaders and staff who have the authority to provide the data needed in the research. In this method, the author conducted interviews with parties involved in the implementation of the Just In Time (JIT) system.

Secondary data such as the history of PT Iseki Indonesia. The organisational structure of PT Iseki Indonesia. The division of tasks within each organisational structure of PT Iseki Indonesia. The techniques used to collect data in this study were: Documentation, which involved studying the forms and records used in the implementation of the Just In Time (JIT) system. Observation, which involves directly observing the implementation of the Just In Time (JIT) system. Bibliography method, which is a data collection method

that uses books related to the issue being discussed. The bibliography was compiled by the author by reading books and literature related to the Just In Time (JIT) system at PT Iseki Indonesia.

The research instruments in this study were: an interview guide containing a number of questions to be asked to the research subjects. The observation guide, the tools used were the optimisation of the five senses and writing instruments.

3. Results And Discussions

The production process flow for four-wheel tractors at PT Iseki is quite long, starting from the receipt of goods from suppliers to export, which takes four days. The broad outline of the production process is as follows:

a. Checking materials before they are sent to the Production Department

All materials or parts, whether local or imported from abroad, are checked by the QC Department of the Receiving Division. There are two inspection methods: 'Check All Parts' and 'Sampling'. The All Parts method is applied to parts that have never been used in PT. Iseki before. This may occur during the launch of a new product, where all parts are new, or when there is a change in supplier. Even if the parts are identical in form, a complete inspection is required because the supplier that manufactures the parts has changed. Not only for new parts and parts that have undergone changes, but also for parts considered vital or parts that, if defective, are sent to the production department and assembled into a tractor. Defective parts can cause fatal accidents for tractor drivers; therefore, all parts must be inspected. These vital parts are referred to as 'S' parts.

b. Transmission Assembly

The transmission is a key component of a tractor, containing numerous gears that drive the tractor's wheels, as well as options that can be installed on the tractor. An example is the rotary plough for ploughing rice fields on NT type tractors. The transmission also contains hydraulic parts that enable the tractor to lift loads when a loader is attached, as shown in the image of the MF type tractor. After the transmission is assembled and ready to move on to the next process, the assembly is first tested to ensure that there are no problems with the gear assembly or blockages in the assembled hydraulic parts, which could cause the tractor's power to fall below the specified standard. This checking process uses a testing machine with many indicators that can show whether the power of each part of the transmission is appropriate or not. This machine is part of the application of JIDOKA in Toyota's production system, where discrepancies can be analysed, identified and reported by a machine.

c. Engine Assembly

In order to move, the transmission will be powered by an engine, which is why it will be connected to the engine at the front. The engine itself is imported directly from Japan and is equipped with a Diesel Particulate Filter (DPF) system, enabling it to pass Euro 4 standards. The DPF functions as a device to control and condition the exhaust gases produced by diesel engines, making them environmentally friendly.

d. The painting process

To prevent corrosion problems with the tractor in the future, all metal parts must be coated with paint. There are four paint colours: blue and red for the exterior, and black and grey for the interior. The painting process uses an electrostatic system. The advantage of this painting system is that the tip of the sprayer produces ions by applying a very high electrical voltage. The coating material or paint is propelled by air and, when passing through the nozzle tip, captures some of the charge, becoming a charged particle. The material to be coated or painted, which is generally a conductor, is given an opposite charge. In conductors, the electric charge is distributed evenly across the surface. The charged coating particles are attracted by the charge on the surface of the material to be painted, causing them to fall evenly onto the surface of the object.

e. Assembly process on the Main Line

The main line is the team that assembles tractor components that have been subdivided into several parts by the previous team. The main line carries out the assembly of electrical systems, steering systems, combustion systems, cooling systems, interior parts, exterior parts and many other components. These numerous components are then combined to form a tractor.

The assembly process is carried out on a conveyor, so the assembly PIC must know the assembly time required and the amount of main power needed so that the assembly process on the conveyor is not delayed, thereby enabling daily targets to be achieved with the appropriate use of main power and, of course, without excessive use of main power. The assembly system on the Main Line is a JUST IN TIME system because workers will only assemble the parts needed in the required quantities and within the required time, making the production efficiency on the Main Line the highest compared to other areas.

f. Initial inspection process

Inspection is an examination involving tests and measurements carried out based on specific characteristics related to the object being inspected. Inspections are carried out to check objects to ensure that they meet certain standards. There are many items that are checked on a tractor after it has been assembled. Starting with testing the power output of the Power Take Off (PTO), which is a shaft used to transmit power from the tractor engine. Generally, the PTO shaft exits from the rear end of the tractor. The benefits of the PTO shaft are quite varied, including providing power for towed implements and driving other options that will later be attached to the tractor. The commonly used PTO speeds are 540 RPM and 1,000 RPM.

g. Delivery Inspection Process

After the tractor has been tested for its systems and features, it will undergo another thorough inspection before being packed, using a checklist to examine each system and the tractor's exterior one by one. As the final gatekeeper in the tractor production process, employees responsible for this area must obtain a special licence.

h. Packing Process

Once the tractor has passed inspection at the Delivery Inspection section, it will enter the packing area. It will then be stored in the warehouse before being exported in a container.

The implementation of this just-in-time system has eliminated excess stock box marshalling, as it is no longer permitted to take parts outside of what is required by the production plan. This prohibition is based on the ability to speed up the retrieval of MFGC tractor parts, which are produced in the largest quantities each year. Thus, even with the same number of workers, the work can be done in a different way, namely in accordance with the sequence of the production plan.

The implementation of this just-in-time system has been proposed to the company, where in one year, the trial unit for the MFGC type reached 1,144 hours, which, when converted to cost, equals $1,144 \text{ hours} \times \text{£}56,000 = \text{£}64,064,000$. This has been assessed and approved by the management of PT Iseki Indonesia, so this suggestion has been accepted and appreciated. Submissions to the company are always reviewed by the Engineering department to determine whether they are truly beneficial or not. While it was initially stated that the materials needed to build this rack would cost nearly £12.5 million, the results of this improvement in just one year have already reached £64 million, meaning that the benefits of implementing the Just in Time system can be realised in just one year.

Moving forward, there will be the creation of special racks for tractor types other than MFGC, but there are still constraints in terms of time and space to carry out this project. It is scheduled that by the end of 2023, there will be one more special rack that will be made to implement the just-in-time system, the benefits of which can already be felt. The reason for having to wait until 2023 is because of the increase in market demand, which has caused production capacity to exceed the target set at the beginning. This has resulted in a large number of tractor parts being ordered and stored in the space originally intended for the construction of the special racks. For the time being, the company is expanding the area by building a new factory next to the existing building. It is hoped that this construction will help increase production volume and also allow for improvements that require space for their implementation (Julyanthy et al., 2020), (Putri, 2022).

4. Conclusion

The implementation of the Just In Time system has proven to reduce part preparation costs. This is evidenced by changing the method of preparing MFGC tractor parts, which previously took 1,405 hours per year, or Rp 78,680,000 (hourly labour cost = Rp 56,000). After implementing the Just In Time system, this was reduced to 261 hours, or Rp 14,616,000. Therefore, the total cost savings achieved after implementing the Just In

Time system amounted to Rp 64,064,000. The implementation of the Just In Time system has proven to eliminate many unnecessary things, and this needs to be developed in other areas within PT ISEKI INDONESIA. It is evident that there are still many areas without stock control restrictions, as evaluated by the needs and actual processes, resulting in a large amount of stock that takes time to control and also takes up space. Although space constraints remain an issue at present, this does not mean that improvement activities should be put on hold. Once new areas become available, improvement activities can be carried out immediately without waiting for data collection. The improvement process will certainly incur costs, but if these costs can be offset by the savings achieved each year, then the costs incurred will be considered reasonable as a form of long-term investment.

ACKNOWLEDGEMENTS

The author is grateful for the opportunity provided by the company and several other stakeholders who supported the smooth running of this research. The author would also like to express his gratitude to the lecturers at the Yadika Pasuruan Institute of Technology and Business for providing mental encouragement and guidance throughout the research process, enabling these results to be presented.

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