Improving the performance of enterprise resource planning with the implementation of Systems, Applications, and Products in Data Processing (SAP) in a car seat manufacturing company

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ABSTRACT

Using an Enterprise Resource Planning System (ERP) during the Industrial Revolution 4.0 is a long-term investment for companies looking to enhance efficiency, performance, productivity, and decision-making capabilities. Typically, ERP systems employ a centralized database to streamline various business processes, reducing manual labor and improving workflows. These systems often include a Dashboard that provides real-time data for measuring productivity and profitability. Updated instantly when entered into the system, this information allows companies to make quick, informed decisions based on accurate, up-to-date internal data. However, discrepancies between transaction processes, such as mismatches in the quantity of goods recorded in the SAP system and actual production, can hamper the effectiveness of ERP control. To address this, research has been carried out to process information in real time and with greater accuracy. The study involves a literature review, hardware prototypes, and program development, ultimately leading to increased SAP user accuracy from 63% to 86%. This improved accuracy helps identify factors hindering optimal SAP performance and provides recommendations for resolving transactional issues. Ultimately, consistency and commitment from users and relevant stakeholders are vital for maintaining an optimally functioning ERP system.

1. Introduction

Enterprise Resource Planning (ERP) systems are information systems that companies use to manage and automate all major parts of their operations, such as finance, human resources, accounting, logistics, production, distribution, and other important parts. ERP is a very important software used by companies because it can help carry out resource planning. ERP system implementation released by SAP provides step-by-step guidance on implementing SAP in companies widely used in SAP ERP implementation projects because it is a best practice in adopting SAP to companies. With this method, implementation costs are optimized. (R. Maulidina, 2020).

In practice, many ERP implementations use the System Analysis and Program Development (SAP) application. SAP is software or a program to run ERP in a company. SAP is widely used by companies, especially large companies because of its advantages that are very beneficial to the company. An ERP system or Enterprise system is software that has various modules integrated to provide support for functional parts of a company such as finance, human resources, marketing, sales, and inventory management (Pontoh, 2019). The complexity of ERP systems is an issue that is always

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emphasized during application development. ERP implementation projects in a company are considered very risky because they are large, complex, usually unknown to the organization, and implemented under tight schedules (F. Mahar, 2022). explained that delays in inventory management can result in decreased performance in the company (Husnah Husnah, 2017). SAP implementation is an application of information technology that integrates the operational activities of a company (Kovács, 2021).

SAP is a business solution software consisting of enterprise resource planning and interrelated software solutions. Solution software consists of enterprise resource planning and interrelated software solutions such as supply chain management, customer relationship management, product life cycle management, and product life cycle management. Such as supply chain management, customer relationship management, product life cycle management, and supplier relationship management, supplier relationship management (Angolia, 2018). SAP implementation is an information technology application that integrates the operational activities of a company (Farmawi, 2019). SAP is known because it is one of the ERPs that provides best practices from well-known companies in the world, thus guiding companies that implement it how best practices should be to guide companies that implement it how best practices should be done so that company performance increases along with SAP ERP implementation (Darmaningrat, 2019), that SAP Implementation has a direct influence on performance & Has a direct influence on operational smoothness (Heri Subagyo, 2022), In this study, it is necessary to observe the factors that affect the performance of the successful implementation of ERP, system testing and integration with interfaces are very important because it is very influential in the successful implementation of SAP ERP (Bakhri, 2019).

After getting references from some of these studies, the hope and purpose of this research is to provide insight into the reasons for inefficiencies in the current SAP implementation and propose solutions to improve transaction handling. This research will help in monitoring the production process effectively over time.

The SAP parsing process in the work area follows these steps: 1) Prepare QR kanban at the kanban post before assembly, 2) Scan the finished goods kanban using a fixed scanner for production instructions, 3) The scanned data is sent to the SAP weblog, 4) Once received, the data is forwarded to the SAP Data Server, and 5) The data can then be viewed and downloaded through the available applications. The production work process flow is explained in Fig. 1.

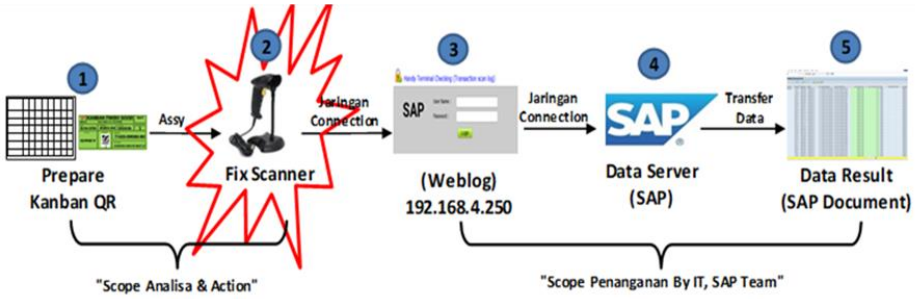

Fig. 1 SAP workflow.
Source data from the company

Based on observations made, there are obstacles to the SAP operation process, especially in Car Seat Manufacturing Companies, namely the inequality between the number of goods entering the SAP system and the actual production, causing a gap in quantity and nominal production dollars which makes ERP control not optimal, Fig. 2 data result graph gap actual vs SAP**.**

Based on the results of the comparison of SAP data with actual production in February ~ March 2024, there is still a gap of 5862 pcs (63%) between the actual production quantity of 15729 pcs and the data from the SAP kanban scan process of 9867 in the Production line, based on SAP workflow, which can be analyzed only in process numbers 1 and 2, namely related to the QR kanban control process and the QR kanban scan operational process. As for numbers 3, 4, and 5, namely related to

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weblog data and SAP servers, they cannot be analyzed further because it is connected to network connections and systems where the authority is Information Technology (IT) and Finance.

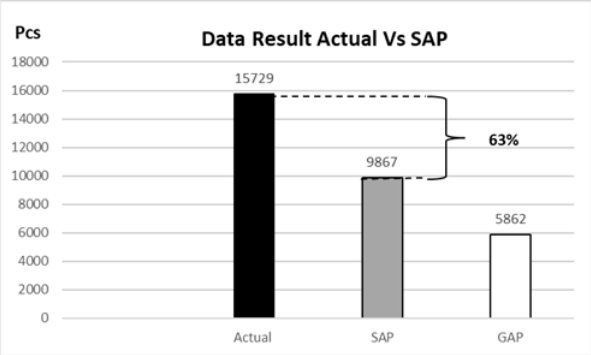

Fig. 2 Actual vs SAP gap graph.
Source data from the company

The use of an ERP system in a company is very important in integrating the company's operational data that has been processed and can be used as a tool to make decisions in a company. SAP is very important for companies to integrate various modules so that they can become a unified whole. One aspect of the cause of failure that is quite a challenge in ERP implementation is the social and organizational aspects. Employee motivation in accepting and running ERP systems in ERP implementation projects is one of the biggest failure factors affecting ERP implementation. (Meltzer-Asscher, 2018) However, more than that, the use of SAP has many advantages, so it is very important to use. In its use, SAP can provide real-time processing where all processes can be done directly anywhere. Because SAP is integrated, if there is a change in one of the modules, the other modules will also change automatically. With these automatic changes, the process can be seen immediately at that time without having to wait some more time to see the results. This research aims to process information in real-time and accurately. This research builds an SAP System.

The purpose of this research is to help accelerate the flow of information about the condition and status of the production process in real-time. The objective of this Final Project research is to identify the factors contributing to the non-optimal performance of the current SAP implementation and to suggest improvements to address the issues that hinder optimal transaction performance.

The main objectives of the purchasing department are to maintain the quality and value of the company's products, minimize the turnover of capital used to supply inventory, maintain the flow of goods in and out, and strengthen the organization's or company's competitiveness. Purchasing can be defined as an effort to meet the needs of goods or services needed by the company and can be received on time with appropriate quality and at a favorable price. (Klasa, 2018). Inventory is a recoverable item that will be used to fulfill a specific purpose, for example for use a process. which will be used to fulfill a specific purpose, for example for use in a production or assembly process, for sales returns, or for spare parts. Production or assembly process, for sales returns, or spare parts. A piece of equipment or machinery (Ganesha, 2020).

2. Methods

The research phase begins with a literature study, looking for references, designing the system and determining the components to be used, making hardware prototypes, making programs, and conducting tests. The flowchart of the research stages is shown in Fig. 3, the details of the research flow can be seen in Fig. 3.

Explanation of the Research Framework Diagram:

1. Literature Study by searching and reading some literature, and journals about ERP, and SAP in the Production process.
2. Observation in the production machine area
3. Collection of data needed to find out what factors affect the decline in productivity and quality.
4. Make alternative proposals for improvement based on the results of the analysis,

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5. Discussion of results and analysis
6. Choosing the Best Improvement Proposal

Best Improvement All stages are carried out based on data and the results of SAP design trials that will be made and developed, each activity is carried out by a predetermined schedule.

With the flow chart described and the explanation of each step of the activities listed in Fig. 3, it is hoped that the research carried out can be more focused.

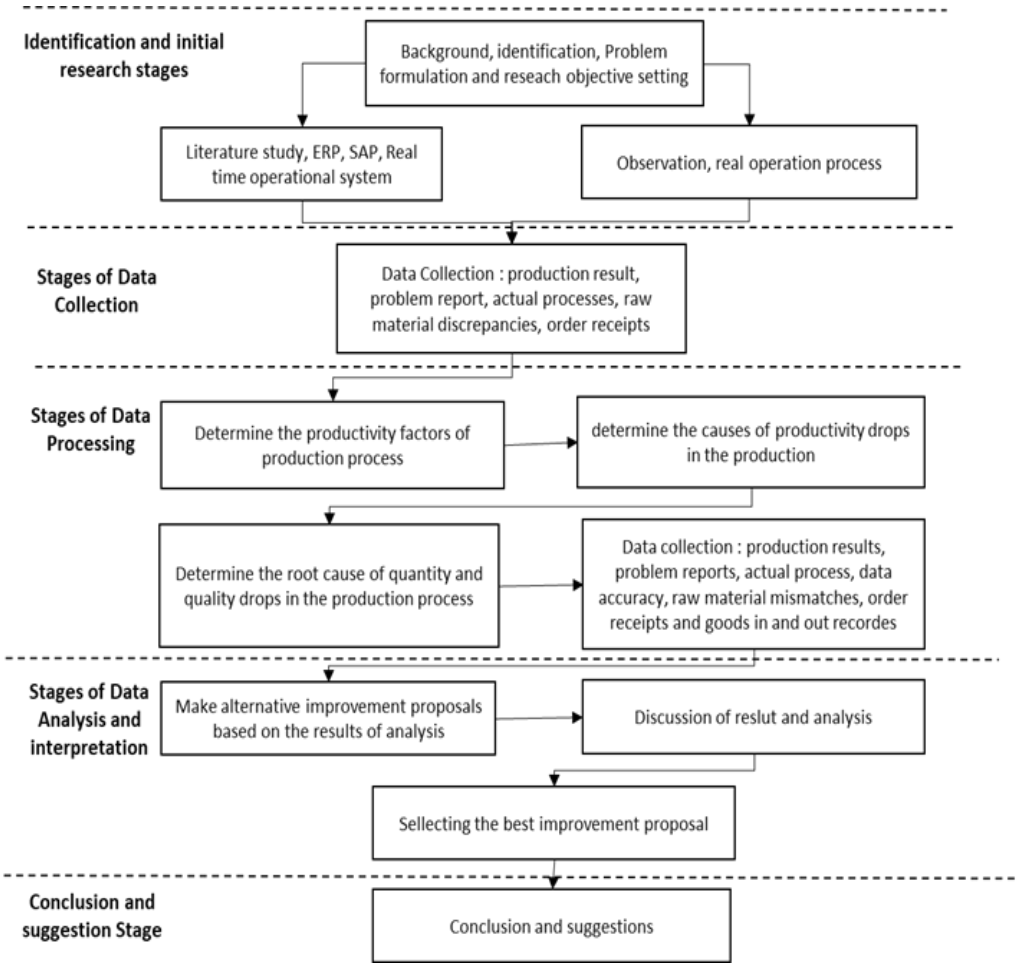

Fig. 3 Framework of research.

3. Results and Discussion

SAP Operational Process Flow

SAP Operational Process Flow must describe the actual process that occurs in the company, starting from receiving goods from suppliers until the goods are sent to the customer. All process flows must be recorded, or transactions carried out, so that the entry and exit of goods can be tracked and data can be used by the company to make a decision, Here Fig. 4 explains the flow of SAP System implementation:

Factors Causing the Quantitative Gap

Fig. 4 Flow Mapping Factors Causing Actual vs SAP Gap, explains the factors that have the potential to cause a production quantity gap as follows:

1. Kanban Scan Result Error

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a) The physical kanban is damaged, especially in the QR code section due to the effect of the steam process on the line.
b) Wrong kanban QR code caused by incomplete kanban identity or mixed identity sequence during the process of setting part numbers, unique part numbers, and sequence numbers (active circulation kanban numbers).
c) Kanban errors due to many being damaged due to lack of maintenance/tracking of Kanban.

2. QR Kanban Scan Process Error
   a) The type of goods with the kanban identity does not match due to errors in the kanban preparation method.
   b) PIC scan negligence, namely forgetting to do the kanban scan process.
3. Fix Scanner Error
   a) The network cable is not installed (detached).
   b) The connection status connecting to the fixed scanner is offline.

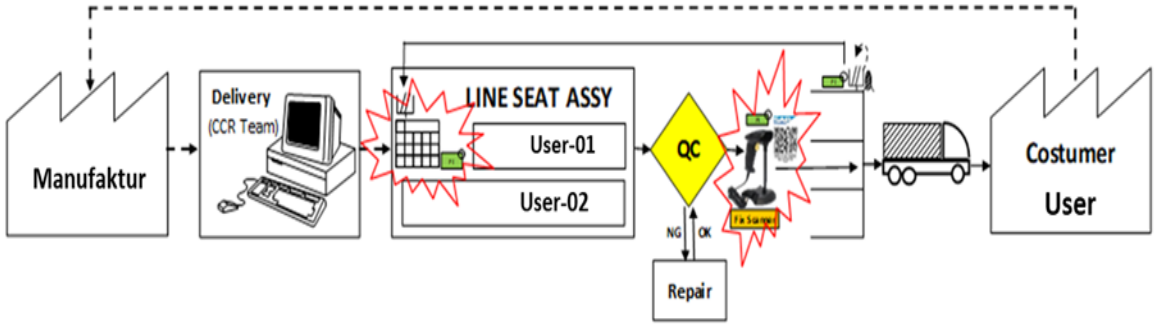

Fig. 4 Flow mapping factors causing gap actual vs SAP.

Problem Cause Analysis

At this stage, the process of analyzing the causes of problems for each activity item in the QR Kanban scan process is carried out. The following Fig. 5 Analysis of 4M1E Gap Actual vs SAP as in Fig. 5.

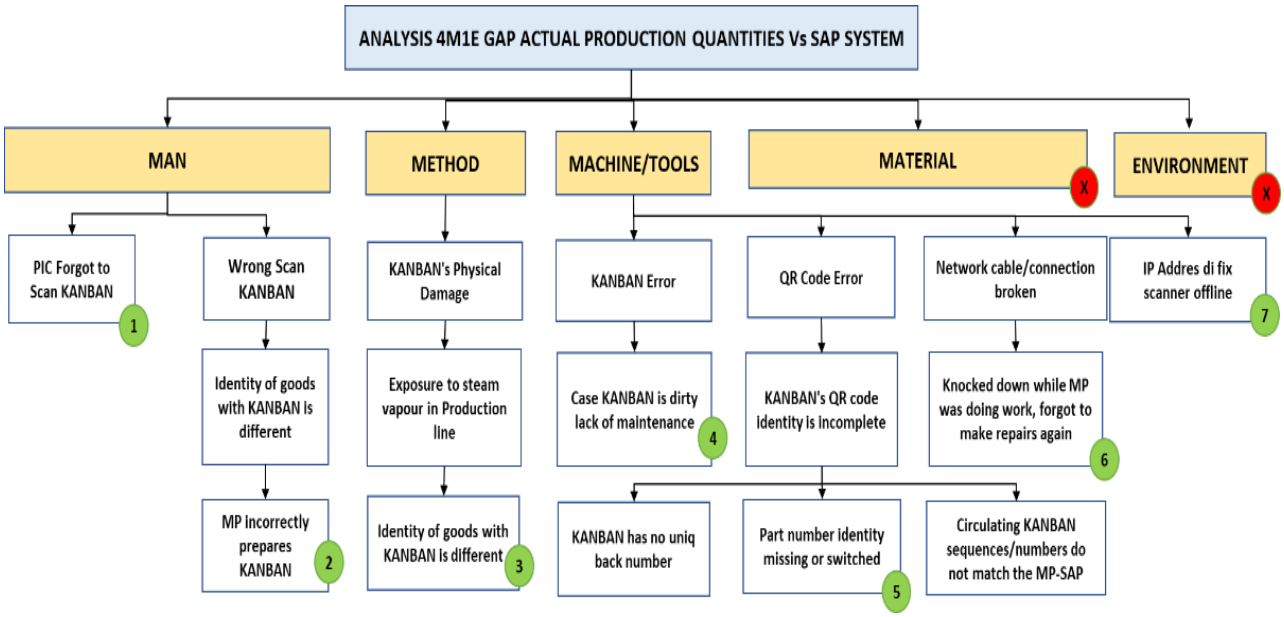

Fig. 5 4M gap analysis actual vs SAP.

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Problem Improvement

After obtaining the results of the 4M1E Analysis of the production quantity gap problem between the SAP system and the Actual, then fix these items so that they do not recur where the details of the counter measures are shown in Table 1.

Table 1 Improvements to problems and solutions

No	Factor		Problems	Countermeasure	Picture	Pic	Target	Progress
1	Man	1	PIC Forgot to Scan KANBAN	Re-confirmed that the operator has carried out the SOP according to the existing WI		Group Head & PIC Scanner	April	
		2	MP incorrectly prepares KANBAN.	Provide MP upgrades to prepare KANBAN and create item/seat identity information along with MLOK updates every month.		Group Head	April	
2	Method	3	The identity of goods with KANBAN is different	Created a standard position for KANBAN placement during the assy process		Group Head	April	
		4	Case KANBAN is dirty and lack of maintenance	Make an inventory of KANBAN at least once a month to monitor damaged, dirty KANBAN so that new KANBAN and Case are made.		Group Head	Every month	
3	Machine /Tools	5	Part number identity missing or switched.	Update KANBAN with Print out QR KANBAN, check KANBAN is active online and SAP.		Group Head	Every month	
		6	Knocked down while MP was doing work, forgot to make repairs again	Before starting the activity, make sure to check first and the network cable connection is installed properly with the scanner.		Group Head	Every day	
		7	IP Address fix scanner offline	Perform IP Address correction control on each Fix Scanner daily		Group Head	Every day	

After the implementation of improvements to the causes of problems between the actual production process and SAP, the production process can be more accurate, previously there was a GAP of 63% after the implementation increased the accuracy of SAP usage to 83%, a detailed explanation can be seen in Fig. 6.

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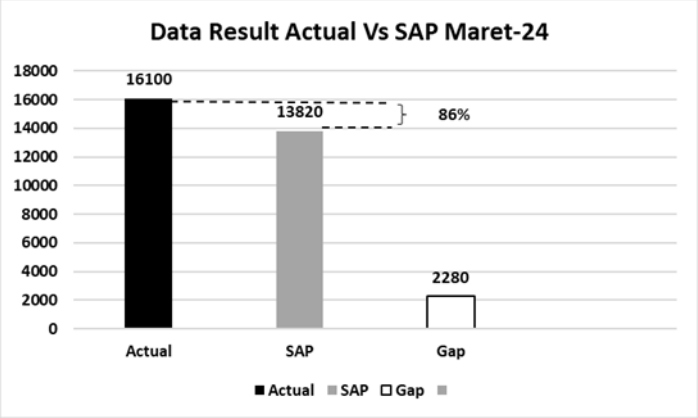

Fig. 6 SAP usage vs actual production after production process improvement.

Discussion

The results of SAP accuracy help companies in increasing errors between actual transactions and SAP performance, can find out the factors that cause the performance of SAP implementation that has been running so far, by making improvements from the Man, Method, Machine and Work Instruction factors can provide suggestions for improvements to problems that cause transactions not to run optimally, consistency and commitment from users and related parts can maintain the system that has been done. The limitations of this research are still in the implementation when there is a change in machine layout and changes in manpower when there is a change of employees so it takes time to adjust the work of new employees.

Knowing the problems that occur requires a plan to address them, improvements begin by analyzing the failure factors of the Man factor, namely PIC Forgot to Scan KANBAN and MP incorrectly prepares KANBAN by making improvements Re-confirmed that the operator has carried out the SOP according to the existing WI and Provide MP upgrades to prepare KANBAN and create item/seat identity information along with MLOK updates every month with a completion plan in April 2024 can be achieved. Method Factor Improvement The Identity of goods with KANBAN is different and is completed by Creating a standard position for KANBAN placement during the assembly process carried out by the Group Head with a completion target of April 24. The Machine or Tools factor causes the problem Case KANBAN is dirty and lacks maintenance & Part number identity missing or switched is improved with Part number identity missing or switched and Update KANBAN with Print out QR KANBAN, check KANBAN is active online and SAP is carried out by the Group Head every month, and for the Knocked down while MP was doing work, forgot to make repairs again and IP Address fix scanner offline is done every day by doing Before starting the activity, make sure to check first and the network cable connection is installed properly with the scanner and Perform IP Address correction control on each Fix Scanner daily.

The results of SAP accuracy help companies in increasing errors between actual transactions and SAP performance can find out the factors that cause the performance of SAP implementation that has been running so far, by making improvements from the Man, Method, Machine and Work Instruction factors can provide suggestions for improvements to problems that cause transactions not to run optimally resource requirements Improvements to these problems require the allocation of resources, facilities and employees at the Heda Group level in their implementation so that the implementation of improvements is more optimal and quickly resolved, potential challenges in implementation require commitment and consistency and are users and related parts can maintain the system that has been done. The limitation of this research is still on implementation when there is a change in machine layout and changes in labor when there is a change in employees so it takes time for new employee work adjustments. The company must carry out the necessary risk mitigation strategies in overcoming and anticipating resource shortages by training employee and Group Head skills when there is a shortage of employees or employee transitions and alternative systems as a temporary substitute so that company activities remain stable in an emergency.

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4. Conclusion

In car seat manufacturing companies, there are significant challenges in the SAP operation process, primarily due to discrepancies between the recorded quantities of goods in the SAP system and actual production levels. This inconsistency leads to suboptimal control over production and financial outcomes. While SAP serves as an accounting tool, it is more complex, requiring integrated processes for effectiveness. Companies must make comprehensive improvements to optimize the system and ensure accurate data handling. The company must make comprehensive improvements to optimize the system and ensure accurate data handling. The potential for improvement requires the addition of a more fully integrated system. The existence of an Industrial Internet of Things (IIOT) device will make all activities in the company starting from the inventory system, and production process, supporting departments such as QC supervise and cooperate with production so that product quality assurance is better maintained and controlled, Engineering & Maintenance can provide more reliable machinery and equipment facilities and ensure the production process without machine damage and downtime so that production targets are achieved properly.

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