

Development of A Radio Frequency Identification System for The Manufacturing Packing Process Via The DMAIC Approach

Mohamad Shaufi Ishak¹, Noormaizatul Akmar Ishak², *Azyyati Anuar³, Sharina Saad⁴, Daing Maruak Sadek⁵, Rahmat Yuliawan⁶

¹Lam Research International Sdn. Bhd, Taman Perindustrian Batu Kawan, Cassia, Pulau Pinang, Malaysia

²Faculty of Applied and Human Sciences, Universiti Malaysia Perlis, Pauh Putra Arau, Perlis, Malaysia

³Faculty of Business and Management, Digital Innovation & Social Entrepreneurship, UiTM Cawangan Kedah, Kampus Sungai Petani, Merbok, Kedah Darul Aman, Malaysia

⁴Academy of Language Studies, UiTM Cawangan Kedah, Kampus Sungai Petani, Kedah Darul Aman, Malaysia

⁵Academy of Contemporary Islamic Studies, UiTM Cawangan Kedah, Kampus Sungai Petani, Merbok, Kedah Darul Aman, Malaysia

⁶Faculty of Vocational Studies Universitas Airlangga, Kota Surabaya Jawa Timur, Indonesia
shaufi.ishak@lamresearch.com, maizatul@unimap.edu.my, *azyyati@uitm.edu.my, sharina854@uitm.edu.my, daing729@uitm.edu.my, rahmat.yuliawan@vokasi.unair.ac.id

Corresponding Author: Azyyati Anuar

Abstract: Quality has long been a critical metric for determining a company's competitiveness in the business world. The use of tools, methods, and concepts to improve and regulate product quality has been widespread. The purpose of this research is to solve the missing accessories issue that occurs during the packing process by using the Lean Six Sigma tool DMAIC (Define, Measure, Analyze, Improve, and Control). As part of the Lean Six Sigma quality effort, the DMAIC technique is frequently defined as a problem-solving methodology and a data-driven quality strategy. The actual root cause for these missing accessories is the lack of a proper validation process during the packing process. A brainstorming session was held to develop solutions to this problem, and one suggestion was to employ the radio frequency identification (RFID) validation system. This new implementation was set up during the kitting process by pasting RFID labels for all accessories. These accessories were validated back during the packing process to ensure no missing accessories after the operator sealed the carton box. After implementing the RFID system, the company managed to reduce the cost of manpower and parts that needed to be replaced in case of missing data. It also improves the efficiency of the business, as the addition of a validation RFID system avoids mistakes by detecting missing accessories before the product is delivered to the customer.

Keywords: *Radio frequency identification, DMAIC, lean Six Sigma, manufacturing packing process*

1. Introduction and Background

RFID is part of the automated detection and data capture (AIDC) set of technologies (Lin & Ho, 2009). AIDC techniques categorize items automatically, collect data, and enter that data directly into computer systems with little to no human intervention. An RFID tag or smart tag, an RFID reader, and an antenna are the three essential components of an RFID system. RFID tags feature an integrated circuit and antenna for transmitting data to an RFID reader (also known as an interrogator). The reader converts radio waves into a more usable format. The data collected from the tags are subsequently sent to the host computer system via a contact interface, where they may be saved in a database and analyzed later (Chong et al., 2015).

RFID is a fantastic business tool that can be used in a variety of industries, including supply chain management (SCM). RFID is a rising technology that allows supply chain partners to collaborate more closely by providing real-time knowledge visibility. RFID contributes to supply chain operations by increasing data accuracy, accelerating procedures, permitting traceability and visibility of commodities via supply chains, increasing physical flow speed, and reducing work-in-progress and inventories (Nof, 2012). By using RFID, the quality assurance system (QAS) can identify and even avoid quality issues more efficiently than the conventional quality assurance system can. This is because the QAS was developed and used to inspect the quality of a product; classify the causes of abnormalities by gathering, reviewing, and checking data from the product line; and then decide how the improvement plan can be applied (Lyu, et al., 2009).

RFID technology has gained increasing attention in many fields, such as the manufacturing, agriculture, hospitality, and parking management sectors. By referring to our case study, we are facing customers complaining that some of the parts are either missing or mismatched with their order. This usually happens during the packing process before the product is shipped to the customer. A total of 17 cases were reported from customers from May 2019 until May 2020. Furthermore, it also impacts financial issues in terms of manpower and part replacement, which are sent to support customer complaints. This is a major problem that affects company operations since consumers are hesitant to reward new product introductions (NPIs) because the company has consistently failed to meet customers' quality expectations. Excellent quality is one of the most critical components for any business to achieve to deliver crucial service for customer satisfaction, which breeds customer loyalty.

The significance of this study comes from its ability to address ongoing problems with missing parts in customer orders, which affect satisfaction, efficiency, and profitability. By using RFID technology along with the DMAIC method, the research seeks to minimize inefficiencies, lower complaints, and improve quality control. This could strengthen operational dependability and rebuild customer trust, helping to smoothly launch new products and fostering long-lasting customer relationships. To address these problems, continual improvement is necessary. To solve these issues, ongoing development is necessary. Thus, the main objective is to understand the main root cause of missing accessories and eliminate the missing accessories during the packing process via the DMAIC method.

The discussion in this study is organized as follows: Section 2 presents the literature review, while Section 3 focuses on the methodology, Section 4 outlines the analysis results and Section 5 wraps up with the conclusion and recommendations for future research.

2. Literature Review

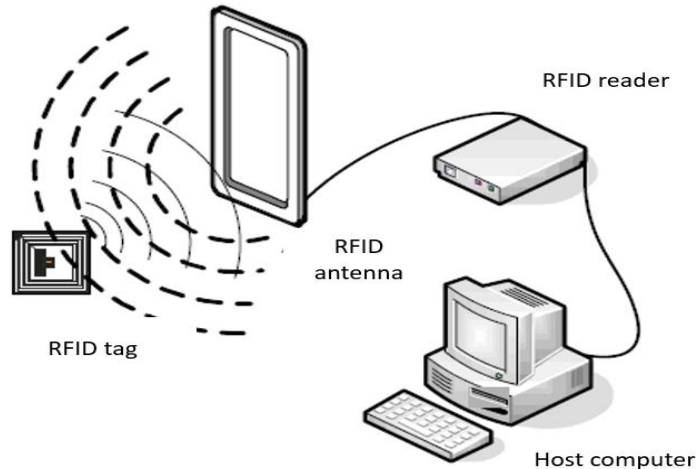
Automatic identification and data capture (AIDC) is a term that refers to a range of technologies that capture data from a person, an object, an image, or a voice without requiring manual entry (Hodgson et al., 2019). AIDC systems are used to manage inventory, delivery, assets, security, and records. AIDC systems are used in a variety of industries, including distribution, manufacturing, transportation, medical, government, and retail (Parlikad et al., 2009). Several types of AIDC technologies have been implemented. These methods include barcodes, magnetic stripes, smart cards, optical character recognition (OCR), and radio frequency identification (RFID).

A basic RFID system includes tags for recording data, readers for recognizing the data on the tag, and an application for identifying the data via the readers shown in Figure 1. RFID tags are information-storage devices that are applied to distinctive goods to allow them to be identified. Tags come in a variety of forms and sizes, depending on the service or purpose. Integrated circuitry, an antenna, and a tag housing are the three primary components of a tag. The integrated circuitry and antenna are housed in the tag housing. The antenna communicates with a reader to transfer data and obtain the appropriate power. The antenna's capacity is determined by the frequency employed, as well as the antenna's size and position. Information is stored in the integrated circuitry. The memory capacity varies depending on the application needs (Kuei, 2005). Another important component of an RFID system is readers. The reader is the device that determines whether information in a tag is valid or provides power to a tag. To activate RFID tags, a reader creates a radio frequency field or an interrogate zone. Scanners and fixed readers are the two types of readers available. The fixed readers are normally placed in a certain location. Fixed readers, which are larger and more complicated, can be utilized in systems that move more quickly, such as a conveyer classification system (Dobkin, 2013).

RFID antennas are a key factor in determining how successfully a reader and a tag interact with one another. The higher the data transfer rate in a specific radio frequency zone, the more antennas there are. A tag and a reader both have RFID antennae. The antenna and internal electronics of a tag or reader are protected by the housing. The location of antennas is one of the most critical considerations. Because the antenna's location impacts the reading rate, the antenna's position is considered while the position and direction of a tag to be affixed to an object are determined. Another key driver of the reading rate is the antenna height. The height of the antenna impacts the reading rate of the tag, which does not need to pass through the reader. Interference

between antennas should be a problem in an RFID system with several antennas since the radio frequency from one reader in the system might impact another reader nearby. To achieve a good reading, each antenna should be placed in a location where a reader will not disrupt another reader (Gjeldum, et; al, 2018). A host computer is a physical system that runs application-specific software. The host computer is made up of many software components that enable RFID reader connections, filter the raw data obtained, and clean the RFID data. The host computer is generally responsible for integrating the RFID system's components and filtering the data obtained (Gjeldum, et; al, 2018). Many industries are already implementing RFID technology to improve efficiency in their operations. Airlines, banking, retail, manufacturing, and transportation/logistics are among these businesses (Raza, 1999).

Figure 1: Basic RFID system



What is the definition of quality? Most of the responses are categorical. Everyone expects the finest in terms of quality, as these individuals would agree. Quality improvement is defined as a goal to attain a level of exceptional performance which is a significant improvement over any prior or current level. In other words, "improvement" may be thought of as a "breakthrough" activity that helps an organization become more efficient (Ishak et al., 2021). Varying authors have different meanings for this phrase, yet they all agree on what it means. Quality improvement, on the other hand, is intimately linked to process improvement, with most activities performed toward improvement, including process improvement (Pica et al., 2017).

In 1987, Motorola's Mikel Harry and Bill Smith developed the DMAIC technique as part of their Six Sigma quality effort. DMAIC stands for Define, Measure, Analyze, Control, and Improve. After a few decades, many companies have implemented the DMAIC approach, which is part of the Six Sigma tools. The DMAIC method shown in Figure 1 may help with a variety of industrial problem-solving situations. Therefore, this research adopts this technique because it focuses on a data-driven approach to problem-solving and procedure improvement (Slack, 2015).

3. Method

DMAIC is utilized to evaluate and assess the present order of the manufacturing packing process. The abbreviation DMAIC stands for define, measure, analyze, improve, and control, which are the five steps of the problem-solving technique. Figure 2 shows the method flow chart of how DMAIC was implemented for this research, and Table 1 explains the definitions and tools used in each process.

Figure 2: The Flow of the Six Sigma DMAIC Improvement Process

THE SIX SIGMA DMAIC IMPROVEMENT PROCESS

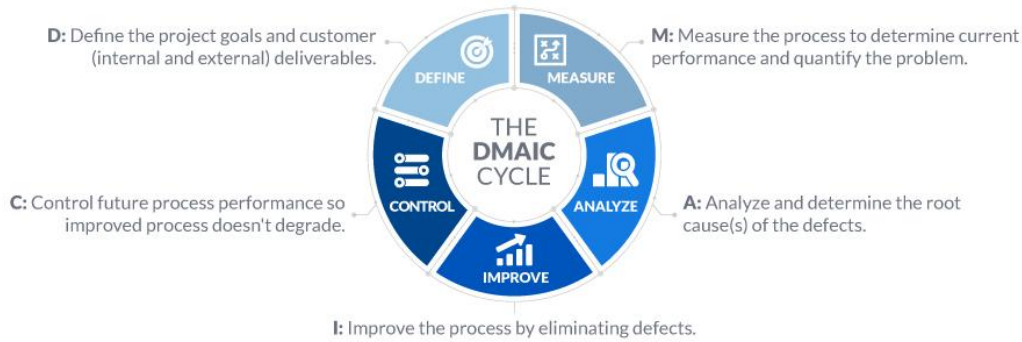


Table 1: Definitions of DMAIC and Tools Used for Data Collection

No.	Steps	Definition	Tools
1	Define	Define the problem, improvement activity, opportunity for improvement, project goals, and customer (internal and external) requirements.	1. SIPOC diagram 2. Voice of customer 3. Process mapping
2	Measure	Measure process performance.	1. Pareto chart
3	Analyze	Analyze the process to determine the root causes of variation and poor performance (defects).	1. Fishbone diagram 2. 5 whys analysis
4	Improve	Improve process performance by addressing and eliminating the root causes.	1. Decision matrix 2. Pilot trial
5	Control	Control the improved process and future process performance.	1. Process control plan 2. Work instruction

This research was conducted in one engineering department of a manufacturing company in Penang State that implemented the DMAIC process in its daily operation. The data were collected by observing and interviewing personnel in the department, as shown in Figure 3. Details of the job scopes of the participants are tabulated in Table 2. The participants were informed about the objectives of the research, and they provided their consent and support to ensure that the research was successful.

Figure 3: Represent the roles and responsibilities of each team

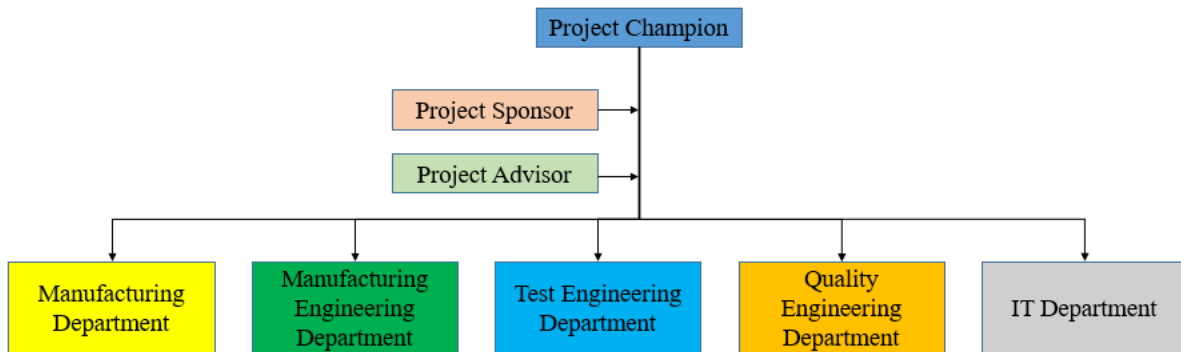


Table 2: Represent the roles and responsibilities of each team

Roles and Responsibility				
Project Champion	Project Sponsor	Project Advisor	Manufacturing Department	Manufacturing Engineering Department
1. Lead by Manufacturing Engineering Department. 2. The reason person from MFE was selected because is all the process and product under their ownership.	1. Project Sponsor responsibility is to provide financial support and funding of this project. Organizations have more chances to work with than cash and individuals. 2. The project sponsor advocates for the project's acceptance and subsequent funding. Besides, it ensures the project's strategic significance. The project sponsor supports and defends the project as a worthwhile use of organizational resources that will help the company achieve its strategic goals. 3. Project sponsors are often individuals of senior management with a high level of influence and power who advocate for initiatives	1. The Project Advisor oversees project management and support activities in order to contribute to the creation and implementation of a variety of projects that are consistent with the organization's goals. 2. The candidate for this position is typically from Lean Manufacturing Department.	1. Manufacturing Department will provide resources as runner and execution.	1. Manufacturing Engineering Department will provide and advise the process to involve related to project.
Test Engineering Department	Quality Engineering Department	IT Department		
1. Test Engineering Department able to contribute their knowledge on hardware and software to be use on this project.	1. Quality Engineering Department will provide data analysis, customer report and feedback.	1. IT Department will contribute on the support for Test Engineering Depart for installation software and hardware related to this project.		

Figure 4: Project timeline

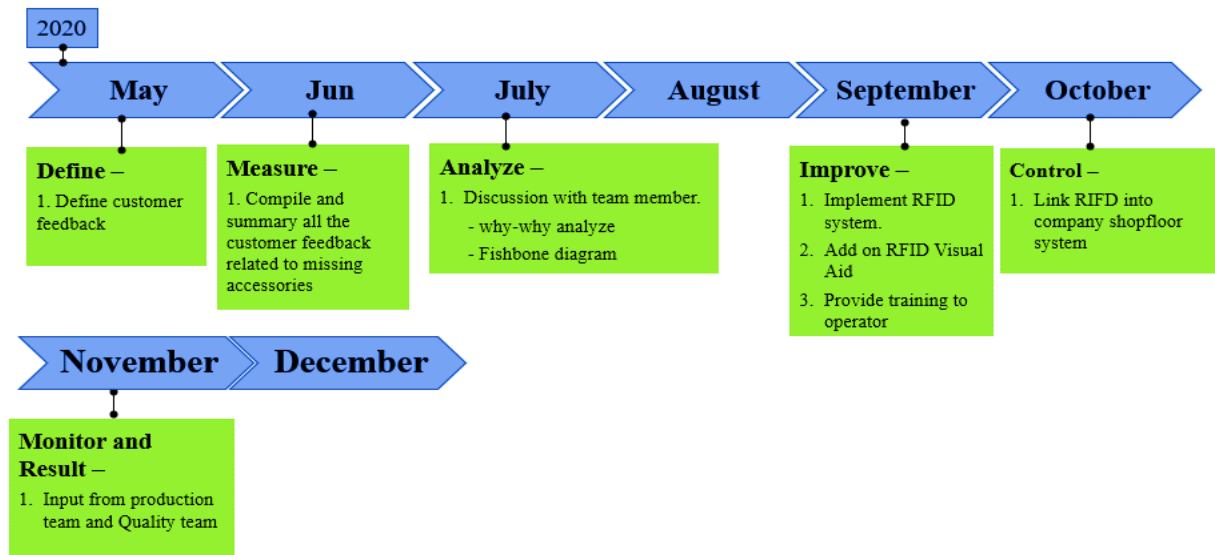


Figure 4 shows the project timeline, which illustrates how the researchers observed the DMAIC process implemented in the department and interviewed the respective participants. It took six months for the researchers to complete the study.

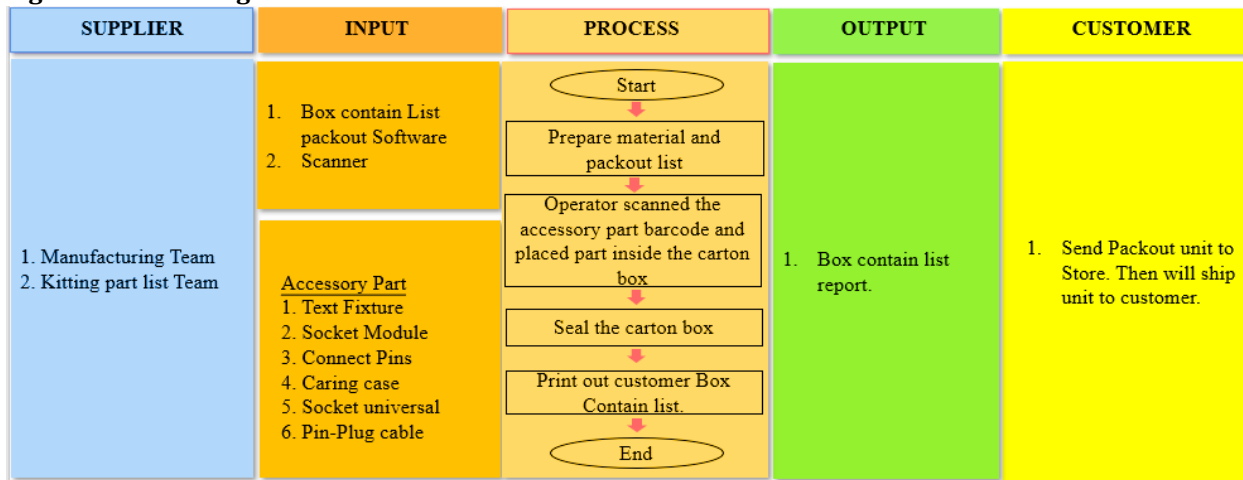
4. Results

The DMAIC starts with the formation of a team for information on the duties and responsibilities of each team member (Figure 3 and Table 2). Additionally, while creating the project's set timeframe, refer to Figure 4. This guarantees that there are no gaps between the various phases of the project. This timeline serves to demonstrate the project timetable and guarantee target achievement.

Define

By creating the SIPOC diagram shown in Figure 5, we can identify the project's critical-to-quality factors to fulfill the research objective. The SIPOC diagram is used to identify all relevant elements of a process improvement project before work begins. These identified suppliers included manufacturing teams and cooking teams internally. The identified inputs included Box Contain List Software and Scanner. Additionally, the list of accessories was also part of the input category. The process is a process flow to pack all the accessories list from beginning until end. The list generated from the software to match with the physical accessories is output. Finally, the identified customer-include process sends the complete finished good to store and deliver to the customer.

Figure: 5 SIPOC diagram



The interviews were conducted at the site of the manufacturing department involved in the process, which needed to be improved. Twenty participants participated in this activity, and most of them had more than five years of experience working in the department. The interviewees were asked semi-structured open-ended questions. The questions included about the inefficiencies in the present process as well as ways to address them. Some of the responses revealed were as follows:

"Too many accessories need to be packed, and it can go to more than 100 types for each order." – Participant 1

"Manual process caused some escape from the operator." – Participant 4

"No check and balance process. all the accessories were kitting at upfront process transfer at end process which is packing." – Participant 7

"The current system might cause the operator to escape and not validate at the end of the process." – Participant 11

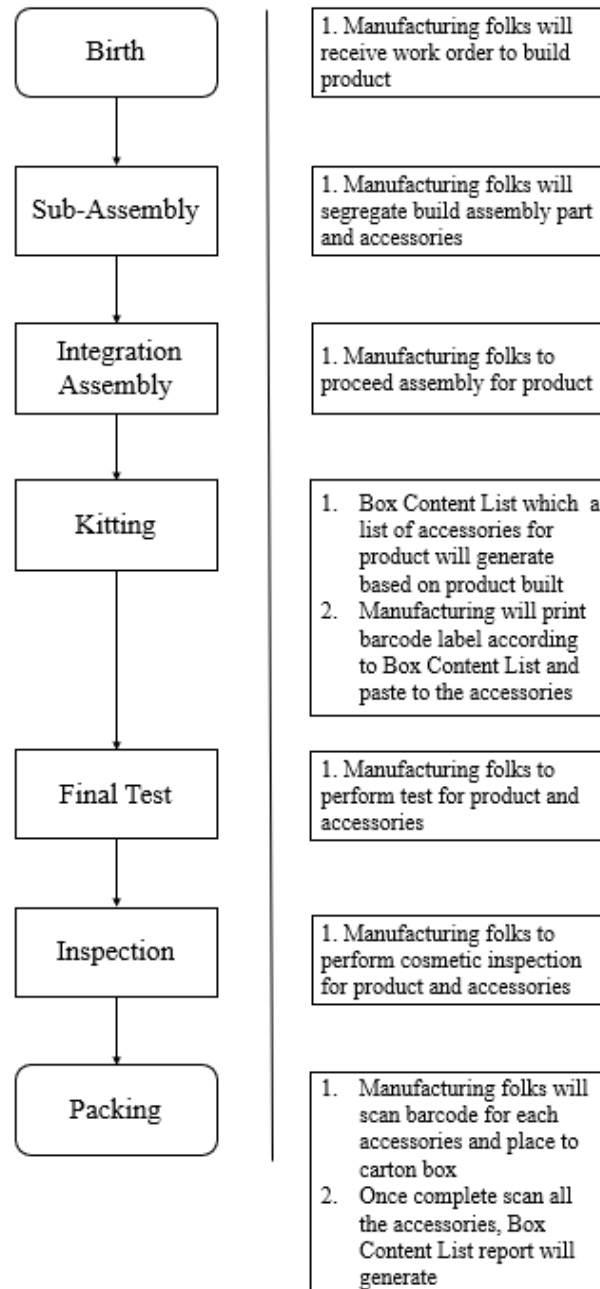
"Need to have an error-proving system to validate upfront until the end process." – Participant 12

"A higher demand for order can cause escape from the operator through manual processing." – Participant 15

The process map in Figure 6 is a graphic representation of the existing production process from beginning to finish. The process map developed during this phase is high-level, containing only the information needed to offer a visual depiction of how the activities that make up the current order processing process work. The whole project team collaborated to design the process map to generate an accurate visual depiction. Based on process mapping, the current packing process is the most critical current packing process that requires the operator to

scan the barcode for each accessory and place it in the carton box. Here, loopholes form the current process, whether operators place accessories in the correct carton box or not. Furthermore, the current control was not poka-yoke or full proof to avoid any missing or mismatched accessories.

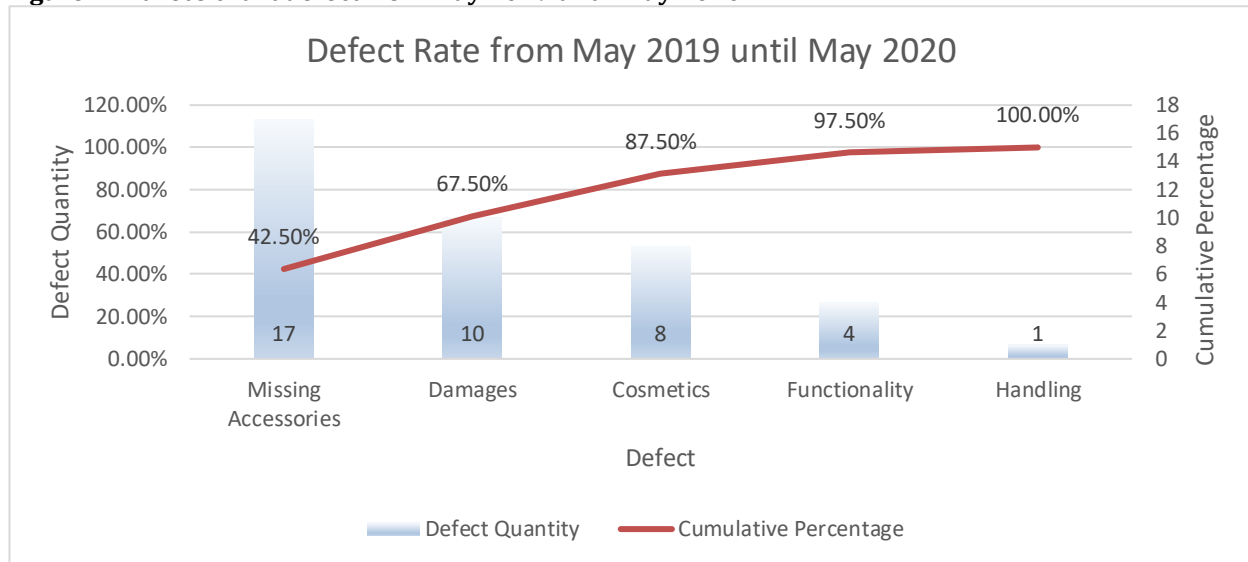
Figure 6: Explanation of process mapping



Measure

The Pareto chart shown in Figure 7 indicates the number and cumulative percentage of defects from customer feedback. The data were collected from May 2019 until May 2020. Based on the Pareto chart, missing accessories are the highest contributor, accounting for 42.5% of the total defects, which is equivalent to 17 issues out of 40 within one year, followed by damage, which contributes to ten issues, and eight cosmetic issues. This top Pareto missing accessories defect should be solved to prevent any escalation issue raised by the customer.

Figure 7: Pareto chart defect from May 2019 until May 2020

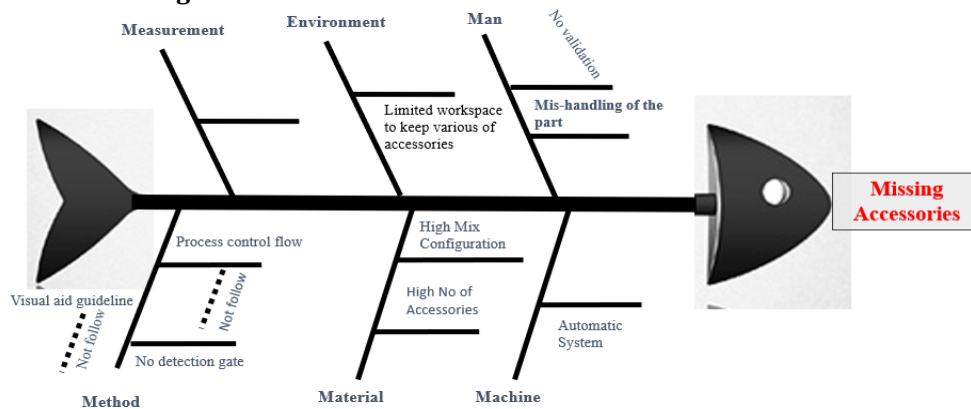


Analyze

A fishbone diagram of the missing accessories is shown in Figure 8. The result is that the first Man factor is the main failure because there is a manual validation process that is handled by the operator. In addition, operators may misplace accessories in other areas of different places during the packing process. The SIPOC diagram in Figure 5 shows that the packing process is critical because the operator that handles this packing process seals the carton box and does not check and balance the process to ensure that they pack accessories correctly.

The second factor is the method factor, which has three major issues: it does not follow the current process control flow, whereby the operator places the accessories inside the box and only scans; it does not follow the visual aid guidelines, whereby the operator scans all accessories at one time and places them inside the box; and there is a manual validation process in place to validate what has been packed inside the box. The machine factor has only 1 issue: there is no automated validation system to detect missing accessories. Fourth, the material factor determines the product's nature under high mixing and low volume, and various configurations lead to this product. The fifth factor is the measurement factor, which has a quantity that is mismatched from the kit list. Finally, because of the environmental factor, there is congested space for the workstation, which may lead to this issue.

Figure 8: Fishbone diagram



The 5-word analysis shown in Table 3 is used to identify the root cause of missing accessories. As a result, the current packing process is a human-dependent process, and the use of a proper validation method would increase the degree of adherence to quality requirements.

Table 3: Why analysis for missing accessories

No.	Question	Answer
Why 1?	Why is the accessory part missing from the carton box?	The operator's mishandling during the packaging process likely resulted in the accessory part being misplaced or omitted from the carton box.
Why 2?	Why is the operator having difficulty placing the part inside the carton box?	The operator is packing a high mix configuration part inside the carton box and overlooks the accessories part.
Why 3?	Why did the operator overlook the placement part on the box?	The operator did not detect any abnormal issues during the manual packing process.
Why 4?	Why did the operator not detect any abnormal issues during the manual packing process?	The packing process relies on human dependence to confirm.
Why 5?	Why does the packing process rely on human dependence to confirm?	Do not have proper validation on the accessories packing process. (No check and balance process)

Improving

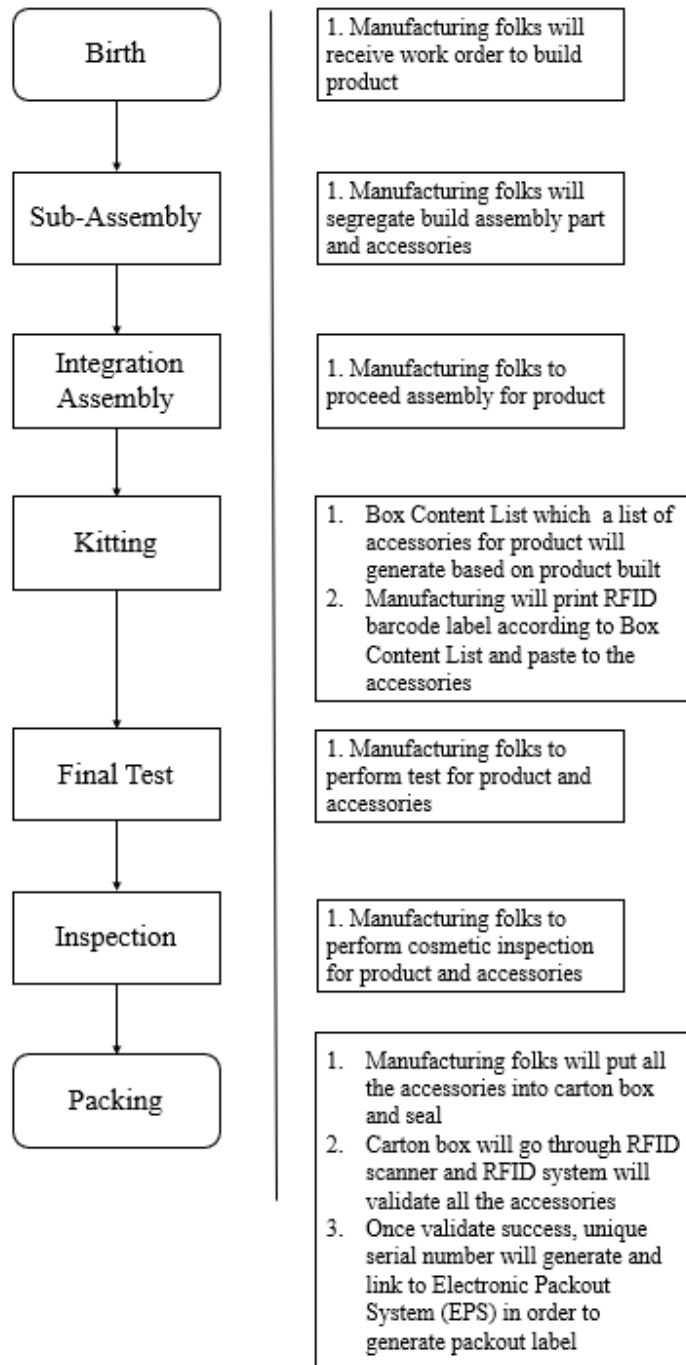
In this phase, the main reason for missing accessories can be identified via root cause analysis. Therefore, in the brainstorming session within the team, a few proposals provided possible solutions to address the main root cause of the missing accessories that shipped to the customer, as shown in Table 4. Two criteria need to be calculated before implementation, namely, the effectiveness or sensitivity of the proposal and the ROI factors. The ROI factor was presented in the form of weight to understand low and medium investment. The first proposal is to hire a second operator for validation. This is the cheapest investment among all possible solutions. However, it is not foolproof. The second proposal is to use weight machine validation on the accessories that are packed. This solution has the disadvantage of false alarms if the accessories that are packed are light in weight, for example, on paper or certificate weights. The results revealed that RFID validation systems have a foolproof system that precisely validates all the accessories that are packed inside the box. The system will generate an RFID report that will save the server if the report needs to be retrieved when necessary.

Table 4: Team proposal with criterion effectiveness and the ROI factor

Possible Solution	Effectiveness/Sensitivity	ROI Factor
2nd Operator Validation	Low	Low
Weight Machine Validation	Medium	Medium
Automated RFID Validation	High	Medium

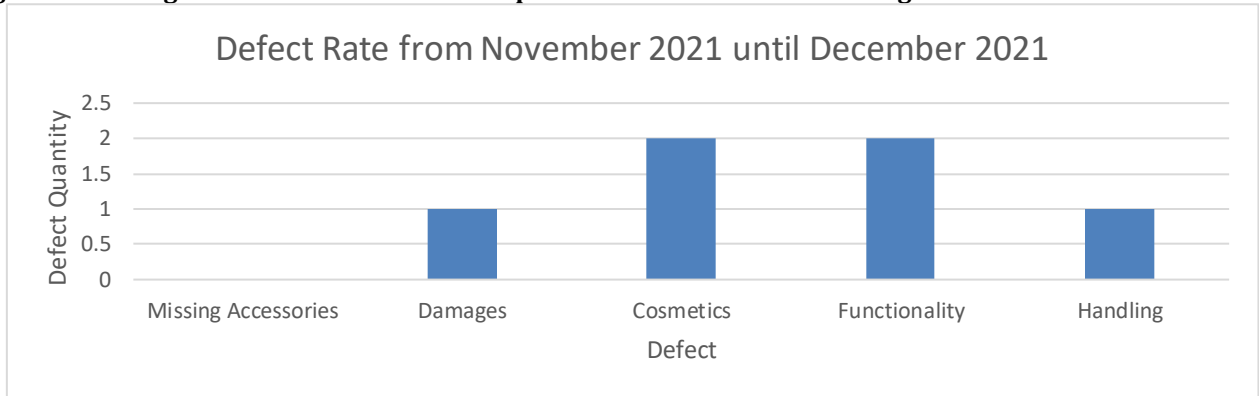
The RFID validation system was set up during the kitting process by pasting RFID labels for all accessories, as shown in Figure 9. These accessories are validated back during the packing process to ensure that there are no missing accessories after the operator seals the carton box. This RFID system is also able to detect any missing accessories, prompts error messages, and blocks the process from proceeding to the next event. In addition, this system has been enhanced to print out a confirmation report with a unique serial number. This unique series of reports is scanned in the Electronic Packout System (EPS) to generate package labels, and the entire history of the product is tracked in the production shop floor system.

Figure 9: The process flow is improved by adding an RFID validation system



The pilot evaluation of the RFID system was carried out for one quarter from November 2020 until February 2021. The results revealed a positive impact; within a pilot evaluation, there were no repeated missing accessories highlighted externally or internally. A histogram is plotted in Figure 10 to address the current improvement. Within the pilot evaluation period, the team also initiated and updated the product FMEA.

Figure 10: Histogram chart to address the improvement of defects on missing accessories



Control

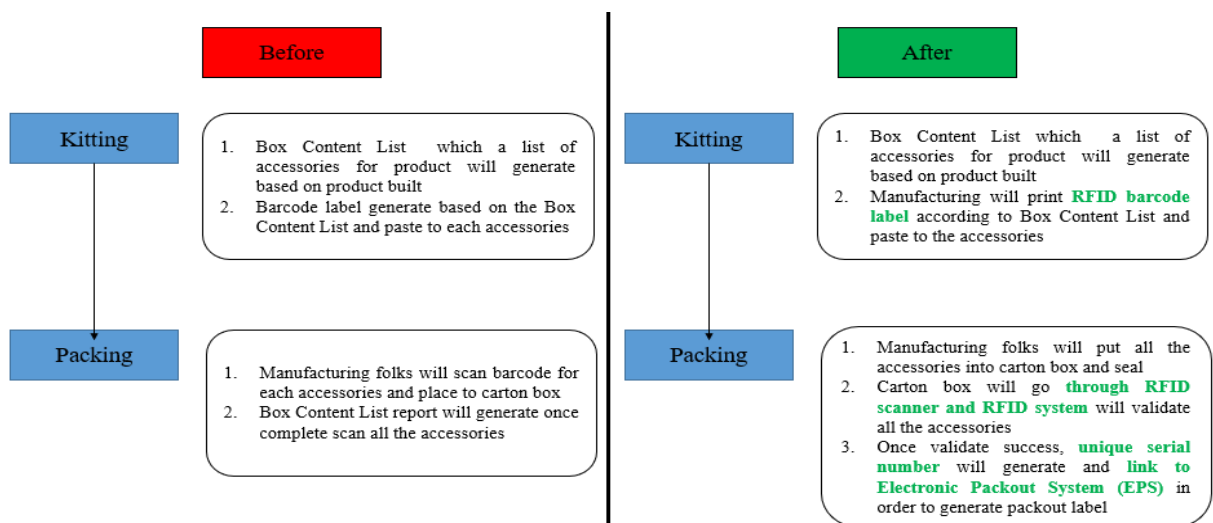
For the control phase, the process control plan (PCP) has been revised based on the improvement result taken in the previous phase. This document also serves as a reference for future continuous process improvement. In addition, work instructions (WIs) are also prepared and used as training documents for operators in the future.

The successful improvement of the RFID system in the packing process has been recognized by customers as a result of the zero issues highlighted in missing accessories. Furthermore, this is also correlated with employee satisfaction because the implementation of RFID systems can reduce the manufacturing lead time during the packing process. Previously, operators needed to scan each accessory and place it in a carton box. Now, the operator can save packing time by placing all the accessories into a carton box without scanning each part, and the system RFID automates scanning and detecting if any missing accessories occur.

5. Conclusion

The conclusion was simplified before and after the implementation of the RFID validation system, as shown in Figure 10. The packing process was the main contributor and led to the missing accessories issue, which had the highest number of complaints by customers from May 2019 until May 2020. After reviewing the current process, it was found that the current practice was not foolproof and that the manufacturing operator easily escaped and potentially did not place the accessories in the designated carton box. Furthermore, there is no system validation after manufacturing places accessories inside the carton box.

Figure 11: Before and after implementation of the RFID validation system



It was proven by using a 5-whys analysis and a fishbone diagram tool. In summary, the actual root cause occurs because a human-dependent process without a proper validation method may lead to missing accessories. To overcome this issue, a brainstorming session within the team was organized, and a few proposals came out with possible solutions to address the main root cause of the missing accessories that were shipped to the customer. One of the proposed solutions is to implement RFID system validation. RFID validation systems have a foolproof system that precisely validates all the accessories that are packed inside the box. After monitoring the pilot implementation of the RFID system validation, the results revealed a positive impact, and no repetition for missing accessories was highlighted externally or internally. To make this process sustainable, the process control plan (PCP) has been revised to include RFID system validation. In addition, work instructions (WIs) are also prepared and used as training documents for operators in the future.

The RFID validation system helped in solving the problem of missing accessories. In addition, the study demonstrates the effectiveness of RFID technology in minimizing human error and enhancing operational reliability within the packing process. By showing how technological interventions can reduce errors, the research provides valuable insights into how RFID systems can improve quality assurance and customer satisfaction in manufacturing environments. However, some limitations were noted. First, the initial cost taken to implement the RFID system was high for the companies, and this may not be preferred by small manufacturing companies especially those that are starting. Moreover, depending on how much of it is embraced by operators, the project depends on their compliance with the new processes, and hence constant monitoring and formation are expected. One weakness to mention is that the RFID interferes with electrical metallic items and electromagnetic interference could limit the functionality in such an environment. The findings of this study could be used for further research on the identification of cheaper ways of implementing the technology or other supplementary technologies that would complement the RFID system. Future research should also explore the ideas of a sustainable environment for the RFID system and how effective this manufacturing system is in various environments. Furthermore, studies on the RFID application combined with other innovative technologies such as the IoT and blockchain can shed more light on inventory tracking and identification. Furthermore, comparing the effects of RFID implementation on the optimization of the company's performance and the customers' satisfaction levels over a longer period would give richer findings regarding the advantages and disadvantages of implementing RFID and twenty-two possible development needs.

In addition, two implications have been identified for this study. For theoretical implications, the study demonstrates the importance of integrating RFID technology in quality assurance processes, reinforcing theories related to automation and error reduction in manufacturing. It provides empirical evidence supporting the idea that technological interventions can mitigate human error, thus contributing to the broader understanding of technology's role in enhancing operational reliability. For practical implications, implementing RFID validation systems in the packing process leads to significant improvements in operational efficiency and customer satisfaction. By ensuring that all accessories are correctly included, this practical application minimizes errors and enhances quality control, demonstrating RFID technology's value in real-world manufacturing environments.

Meanwhile, the study's primary limitation is its focus on a single manufacturing process, which may not be generalizable to other contexts. Additionally, the duration of the pilot implementation might not capture the long-term challenges or adjustments required for sustained success. Future research should address these limitations by exploring diverse manufacturing settings and longer implementation periods. Future studies should explore the long-term impacts of RFID system implementation across various manufacturing settings and industries. Investigating the integration of RFID with other emerging technologies, such as IoT and machine learning, could provide deeper insights into enhancing manufacturing efficiency and accuracy. Additionally, examining the cost-benefit analysis over extended periods could offer valuable data for broader adoption and sustained success.

Acknowledgment: The authors would like to express their sincere gratitude to the Kedah State Research Committee, UiTM Kedah Branch, for the generous funding provided under the Tabung Penyelidikan Am. This support was crucial in facilitating the research and ensuring the successful publication of this article.

References

- Chong, A. Y.-L., Liu, M. J., Luo, J., & Keng-Boon, O. (2015). Predicting RFID adoption in the healthcare supply chain from the perspectives of users. *International Journal of Production Economics*, 159, 66–75.
- Dobkin, D. M. (2013). History and practice of RFID. In *The RF in RFID* (pp. 7–47). <https://doi.org/10.1016/b978-0-12-394583-9.00002-8>
- Gjeldum, N., Mladineo, M., Crnjac, M., Veza, I., & Aljinovic, A. (2018). Performance analysis of the RFID system for optimal design of the intelligent assembly line in the learning factory. *Procedia Manufacturing*, 23, 63–68. <https://doi.org/10.1016/j.promfg.2018.03.162>
- Hodgson, S., Nabhani, F., & Zarei, S. (2010). AIDC feasibility within a manufacturing SME. *Assembly Automation*, 30(2), 109–116. <https://doi.org/10.1108/01445151011029736>
- Ishak, M. S., Jusoh, M. S., Rosli, A. G., Yusuf, D. H., & Ismail, M. S. (2021). Defining-measuring-analyzing-improving-controlling (DMAIC): Process and improve stability in the carbon steel industry. *Journal of Physics: Conference Series*, 2129(1), 012029. <https://doi.org/10.1088/1742-6596/2129/1/012029>
- Kuei, C. (2005). Principles of supply chain management – A balanced approach. *International Journal of Quality & Reliability Management*, 22(3), 329–330. <https://doi.org/10.1108/02656710510582525>
- Lin, C. Y., & Ho, Y. H. (2009). RFID technology adoption and supply chain performance: An empirical study in China's logistics industry. *Supply Chain Management: An International Journal*, 14(5), 369–378.
- Lyu, J., Chang, S. Y., & Chen, T.-L. (2009). Withdrawn: Corrigendum to “Integrating RFID with quality assurance system – Framework and applications.” *Expert Systems with Applications*, 36, 10877–10882.
- Nof, S. Y. (2012). Supply chain engineering: Useful methods and techniques, by Alexandre Dolgui and Jean-Marie Proth. *Production Planning & Control*, 24(6), 546–547.
- Parlikad, A. K., McFarlane, D., Harrison, M., & Thorne, A. (2009). The role of AIDC technologies in product recovery: An information quality perspective. *International Journal of Product Lifecycle Management*, 4(1/2/3), 129. <https://doi.org/10.1504/ijplm.2009.031670>
- Pica, L., Šolc, M., Kliment, J., Divoková, A., & Mikloš, V. (2017). Application of Six Sigma using DMAIC methodology in the process of product quality control in metallurgical operation. *Acta Technologica Agriculturae*, 20(4), 104–109. <https://doi.org/10.1515/ata-2017-0020>
- Raza, N. (1999). Applications of RFID technology. In *IEE Colloquium. RFID Technology*. <https://doi.org/10.1049/ic:19990674>
- Slack, N. (2015). PDCA cycle. In *Wiley Encyclopedia of Management* (pp. 1–1). <https://doi.org/10.1002/9781118785317.weom100162>