

Efficiency Assessment of Radio Program Production Processes Using Lean Concepts

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ABSTRACT

Radio broadcasting uses technologies such as analogue transmission systems and information systems. However, the inefficient workflow delayed content or information dissemination and inefficient broadcasting systems disrupted service transmission. Lean methods can be used to optimize the broadcast workflow by eliminating waste and reducing the cycle time in the process. Therefore, the Lean method is used to evaluate production processes of radio program. This study presents the evaluation results and proposes improvements. A case study was conducted at the Malaysian Institute of Islamic Understanding's radio station using interviews and document analysis. Business process modelling and value stream mapping are also used to identify the efficiency, problems and waste of current processes. Process flow efficiency is analysed in terms of value added and process cycle time. Problems are seen from the point of view of issues that arise in the work system and information system that affect the quality of service. While type of waste in terms of processes, information resources, human resources and assets are identified to be eliminated. Proposed improvements are also modelled for the new process.

Keyword: Lean Concepts, Radio Programs Production Processes, Business Process Modelling, Value Stream Mapping, Lean Tools, Kanban.

I. INTRODUCTION

Since the rise of the Industrial Revolution 4.0, digital technology and the internet have had a significant impact on the effectiveness of information and entertainment delivery to listeners (Prasetyawan et al. 2019). Organizational management needs to make decisions in choosing the concept that has the best potential to achieve significant productivity increase over a set of periods (Powell, et al. 2019). The role of IT in changing the way we work, and efficiency has also influenced the day-to-day processes (Judges

2014). The concept of 'Lean' is considered as a potential approach in improving process efficiency in the organization.

The integration of the Lean concept in a broadcasting organization is seen as an approach that can help the organization adapt in situations that require flexibility (Modarresi et al. 2018) as the radio content produced needs to be published quickly and with quality. Lean is not a term that is common in the broadcasting industry, but it has been accepted and adapted in the field of manufacturing around the world (Marodin et al. 2017). Lean was originally developed as a production system aimed at eliminating wastage at Toyota factories around 1987 by Taiichi Ohno (O'Mara et al. 2014), later evolving into a "Lean manufacturing" management approach introduced by Womack et al. (1990) to improve processes in organizations. The Lean Approach practiced in Toyota Production is a very popular quality management practice in the manufacturing industry. Its main purpose is to minimize waste in production and focus on value-added activities to improve the quality of products or services (Alloubani et al. 2019; Mohd Nizam et al. 2013).

The commercial radio industry needs to manage efficient work processes to meet the demands of listeners through the production of fast and quality programs. The efficiency of radio production depends on the time taken to complete a task that needs to be done with quality. Quality refers to programs produced according to broadcasting standards and creative content that gives satisfaction to radio listeners. Content that can engage the audience can be produced through creative human resources and fresh new ideas.

Inefficiency can be due to waste that exists in the work process during the production of radio programs and directly impact the production of quality program content because a large amount of time wasted should be spent to give publishers time to plan programs that are more creative and able to attract listeners. Radio broadcasting management needs to look at process efficiency in terms of cycle time and lead time as important components and needs to be re-evaluated so that broadcasting can be improved in terms of service quality and listener satisfaction (Maarit et al. 2015). Thus, the inefficiency of the radio program production process can be assessed using the concept of abstraction to identify and eliminate waste as well as provide added value to customers (Womack and Jones 1994). Studies related to the evaluation of the process of using the concept of Lean specific to the process of publishing a radio program are also limited. For example, the study of Maarit et al. 2015 only focused on the concept of rugged on the web and application development team in the field of broadcasting. This study makes a specific assessment of the program publishing process using the concept of shock.

II. LITERATURE REVIEW

Radio continues to be a powerful and influential medium, with an impact on life. Thus, today's radio broadcasts need to be dynamic, informative, and multi-functional in order to be able to be an authoritative communication medium relevant to Generation Z teenagers (Manap et al. 2019). Improving productivity and quality is a major concern of broadcasting organizations. Chapter 2 provides context to the methods, practices and approaches taken by the organization in implementing the concept of Lean

Definitions and History of Lean

According to Hines et al. (2004), The term "Lean" was initially widely used in the Japanese automotive industry, specifically in the company Toyota Motor. Toyota Motor has progressively streamlined the manufacturing process to achieve a high level of product quality, fast production, and robust productivity. This implemented concept has become a practice known as Lean. In Toyota Production System (TPS) the main themes are 'Just-In-Time' and 'Jidoka'. Just-in-time is interpreted as fast and coordinated movement as one part of the workflow of production systems and supply chains to meet customer demand. Its operation is based on the concept of 'heijunka' which aims to evenly and smooth the flow of an item. 'Kanban' signals that the previous process required more supplies or components. 'Nagare', on the other hand, creates the best process to achieve a smooth flow of operations throughout production. 'Jidoka' is interpreted as intelligent automation or automation with human touch. This is derived from Toyota's philosophy that a machine is intended to serve the operator or operator.

Principles, types of waste and Lean Tools

Womack and Jones (1994) state that the concept of Lean can be used throughout the process flow for the purpose of eliminating waste as well as providing added value to customers. In other words, it aims to eliminate waste completely. According to (Dahlgaard 2006; Erwin et al. 2016), the concept of Lean can improve process performance using the most economical approach. There is no denying that Lean's philosophy largely focuses on the elimination of waste or 'Young' in Japanese. To help companies through rapid transformation to meet customer satisfaction, there are 5 principles that represent a continuous improvement cycle that acts as the basis for the successful implementation of Lean.

These principles are as follows:

- i. Identify Value - Identify the value of a product or service from the point of view of the customer that is the ability to provide products or services to customers at the right time at the appropriate

price that can meet the objectives and customer satisfaction. Value can only be determined by the customer even if it is basically a product or service produced by the company.

- ii. Identify the Value Stream - This second principle is needed to identify and create important and unimportant actions that are considered wasteful to help the workflow of manufacturing a product or service to be more efficient.
- iii. Create Flow - Once the Values have been accurately identified and the Value Flow for the product or service has been fully planned, the next stage is to minimize waiting times (minimal queues) and no rework or stoppages in the workflow continuously.
- iv. Establish Pull- Respond to customer requests. After a non-value-added process is released, the production process focuses only on what the customer needs and when it is needed. It will signal the company's ability to respond to customer needs.
- v. Seek Perfection - Perfection exists after all wastage is eliminated from the flow of the process of the product or the flow of service in accordance with the demands and customer needs.

Disability tools can increase productivity and benefit the radio broadcasting organization in terms of: (i) identifying processes, (ii) organizing workspaces, (iii) designing and implementing improved internal processes, (iv) linking supply and demand and (v) continuous improvement (Chen et al. 2007).

Implementation of Lean concepts in the field of services according to past studies

Researcher also identifies four types of waste in the field of services that are related to processes, information, human resources and assets:

- i. Over Processing refers to a process that may exist due to components with poor design or maintenance.
- ii. Waste of information resources is a waste that occurs when the information presented is not easily accessible and less accurate.
- iii. Waste of human resources is when the skills and knowledge of staff are not fully utilized and positioned in the wrong place.

- iv. Waste of assets refers to waste due to material resources, equipment or systems that are not used effectively.

Over processing is also discussed in another study by White et al. (2015), Agrawal et al. (2016), Valsangkar et al. (2016) and Godley et al. (2019). In their study, weak processes caused process time to increase and operating costs also increased. By identifying weaknesses in processes, organizations can improve process efficiency and reduce overall process time (White et al. 2015; Sanders et al. 2015; Agrawal et al. 2016). Waste in process can be overcome by several methods, including rearranging process flow, eliminating processes that do not provide value (White et al. 2015) and reducing waiting time (Valsangkar et al. 2016; Godley et al. 2019). There are many opportunities to improve efficiency and quality simultaneously through the application of technology and systems (White et al. 2015; Maarit et al. 2015). Studies show that finding the root cause in a process and improving process flow is important in reducing process weaknesses.

Waste of information resources has a direct impact on the process. Information in the context of the broadcasting work process is information on activities, publisher instructions, program information, system usage guidelines and customer needs. According to Maarit et al. (2015), access to information through the use of Kanban boards displayed to all staff involved, starting from the idea of publication to implementation provides a clear picture and transparency into the activities implemented continuously. In other words, information on activities and instructions in the organization is conveyed in a way that is easy to understand and accurate to all levels can reduce waste of information. The effect of the delivery of clear and accurate information also stimulates the sharing of materials and eliminates unnecessary activities. In addition, with access to ideas, programs of a program and operational activities at an early stage of the process allows management to set realistic budgets and expectations and this is very suitable for implementation in the field of radio broadcasting. Determining budget approvals and program approvals is also much faster than conventional methods because each approval is based on a flow in the Kanban board and not for individual publications or projects (Maarit et al. 2015).

Waste of human resources also has a significant impact on the flow of work processes. According to Agrawal et al. (2016), staff skills are important to enable an activity to be implemented quickly, efficiently and accurately. In addition, employee discipline is also an important factor in reducing operating time, such as accurate attendance discipline and periodic rest time.

However, human resource wastage should not be viewed only from the point of view of operating or subordinate personnel. Management is also a human resource that needs to play a role in ensuring that there is no waste at all levels of the organization. According to Sanders et al. (2015), the action of implementing rapid management change in organizations implementing Lean to identify the

root cause has successfully eliminated waste. The findings show that management intervention has a direct impact on the work process in the organization. On the contrary, Ahmed et al. (2018), argued that top management commitment has no direct relationship with quality performance, but has an indirect significant relationship with quality performance through the impact of Lean transformation and operational management. Although there are conflicts, management's commitment and intervention in identifying the cause of the problem, helping management change and being a mediator to Lean's thinking can directly or indirectly improve the quality of processes in the organization. It turns out that human resource optimization factors play a major role in improving quality, operational flexibility and process time.

Waste of asset resources in the identified service industry is from the point of view of material resources, systems and technologies that are not fully utilized. White et al. (2015) found many opportunities to improve process efficiency and customer service quality through the application of technology and systems. Restructuring the flow of sample laboratory system technology and the concept of Lean without any additional human resources can increase the average process cycle time. Valsangkar et.al (2016) in his study has implemented changes to the patient database system found that patient waiting time for general surgical procedures decreased in 2013 and the minimum waiting time decreased in 2014 by 3 times compared to 2012. Apparently by fully utilizing assets systems through changes to the database also have an impact in the process time cycle and increase customer satisfaction.

In the context of broadcasting, there are many systems that run simultaneously, but systems that do not communicate with each other cause gaps in the flow of processes that have to be implemented manually. The approach of integrating existing systems into an integrated system is also a good strategy to eliminate waste. For example, system integration leads to a reduction in patient absenteeism (Valsangkar et.al 2016). The electronic Kanban system optimizes processes and allows staff to view tasks and activity streams anywhere and anytime (Maarit et al. 2015). Past studies have shown that there are direct and indirect effects on work process efficiency once types of process wastage, information resources, human resources and assets are identified and eliminated.

III. **RESEARCH METHOD**

This case study was conducted using interview methods and analysis of related documents. Five informants were selected from the radio staff of the Institute of Islamic Understanding Malaysia (IKIM) to undergo an interview session. Each informant has five years of work experience or more to ensure information regarding the current work process obtained. In addition, documents such as process-related forms have been collected and analysed to explain their use.

The study focuses on the process of publishing a radio program as a qualitative analysis. Comparison of the time cycle period of the work process of publishing a radio program before and after the implementation of the Lean concept is considered as quantitative analysis. Triangulation is done using various methods and sources of information to validate the data obtained (Denzin 1978; Fielding and Fielding 1986). Data are also documented in detail. The triangulation technique chosen in this study is to collect data using more than one technique. This study selects a combination of data from interviews and document analysis to strengthen the study (Ruenwai 2006; Creswell 2009). The combination of these techniques can give a clear picture of the issues related to the work process. Robson (2011) also acknowledges that triangulation helps overcome all threats to the validity of the study. Apart from that, data from various sources also form the basis of the research evidence argument (White and Marsh 2006). In fact, this approach is suitable for studies that use research strategies. Among the researchers who use the technique of combining data from document content analysis and interviews are Maarit et al. (2015), White et al. (2015), Agrawal et al. (2016), Valsangkar et al. (2016) and Godley et al. (2019) further strengthen the reasoning with his view, the qualitative method of interview analysis and document content is a valid process for data collection related to case studies. Confirmation of the flow of the program publication process has also been done with the informants to ensure the process follows the correct narrative. Confirmation is done by retelling the process chronologically and showing the current process flow diagram that has been drafted to the informant and the informant gives feedback on the accuracy of the process flow.

This case study aims to assess the efficiency of the production process of radio programs based on the concept of Lean. In addition, this study investigates the forms of waste that exist in the current work process and then proposes a new improved workflow process model on IKIM radio. Improving the broadcasting system process is also identified from the elimination of waste and analysis of the Lean concept. Since this study is limited to radio broadcasts of IKIM radio programs only, these findings do not represent all other local radio stations.

IV. METHODS: PARTICIPANTS AND DATA COLLECTION

In this case study, data were collected through interview methods and document analysis from January to March 2020. Interview questions were formulated based on the objective of the study which is to deepen the process during radio program production as well as internal or external factors that affect the process and risks that exist if related processes not implemented properly. The interview questions contain 2 introductory questions and 31 questions related to the current work process using the Root Cause Analysis (RCA) approach to identify the real cause of the problem (Andersen & Fagerhaug 2006). Root Analysis is used as a tool for continuous improvement. If Root Analysis is used for the first time, this is a reactive method to identify and solve the problem. This means that the analysis is done after a

problem or incident occurs. By gaining experience with root analysis, its use changes from reactive to proactive, so that problems can be anticipated in time (Barsalou 2014). During the interview session the informant was given a thorough explanation of the question before the interview session started. The interview time for each informant ranged from 30 minutes to 1 hour, with a total of 4 hours 30 minutes.

The selection of five informants is based on their experience of working more than five years in the field of radio broadcasting and their involvement in the process of producing radio programs. Informants can be considered as experts in the field involved. The informants comprising the staff of the Publishing, Marketing, Broadcasting Engineering and Information Technology unit. The selection of five informants is also based on 4 main areas related to the production of radio programs.

V. RESULTS & DISCUSSION

In the context of this study, only the program publication process is focused to meet the objectives of the study. Data related to the current process and the time period of the process were obtained from the interview sessions and document analysis. The application of Lean to manage waste in the field of broadcasting can improve the efficiency of the flow of existing processes in turn helping to add value to services to customers. The forms of waste were identified in the current process of IKIM radio program publication. After wastage and issues been identifies from the as-is process, a new process proposal is obtained through process redesign strategies that eliminate existing forms of waste and directly enhance process time. The proposed to-be business process modelling and value stream mapping future state are shown in Figure 1 and Figure 2.

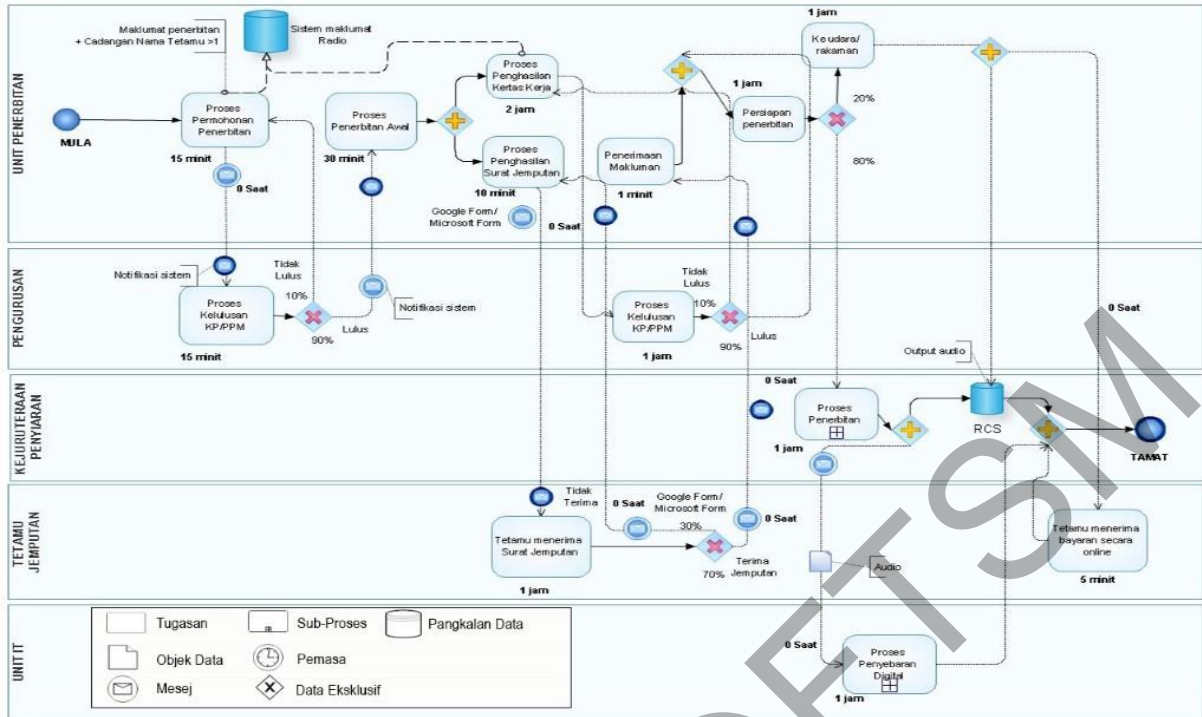


Figure 1 New process of Radio Program Publishing.

Based on the result, the total cycle time of the new program publication process takes 502.2 minutes which is equivalent to 8 hours 22 minutes (difference of 2,387.8 minutes compared to 2,890 minutes of current process).

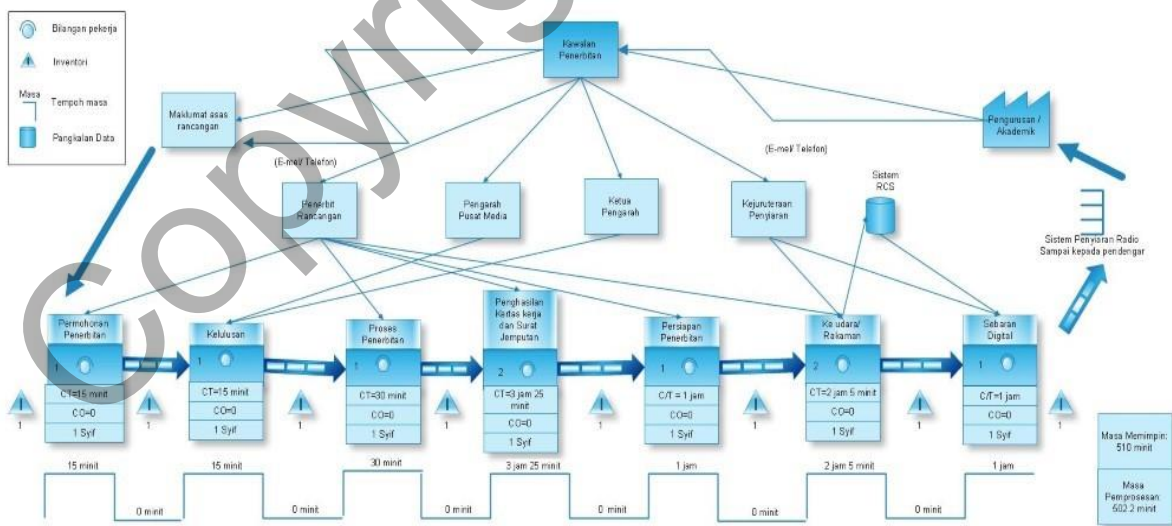


Figure 2 Future state of Program Publishing processes

The total lead time of the program publication process takes 510 minutes which is equivalent to 8 hours 30 minutes. The time differences of the current and new broadcast process cycles are shown in Table 1.

Table 1 Differences in Cycle Time and Lead Time for current and new Program Publishing processes

Radio Program Publishing Process			
	As-is Process	To-be Process	Differences
Cycle Time	2,890 minutes	502.2 minutes	2,387.8 minutes
Lead Time	7,760 minutes	510 minutes	7,250 minutes

The cycle time difference based on the current and new process model diagram is very significant for the program publication process of 2,387.8 minutes. The difference in lead time is 7,250 minutes. These differences are particularly significant in proving an improvement in process efficiency. Based on the findings of the analysis, there are differences between the current business procedures and the proposed business procedures. The differences are explained in Table 5.2.

Suggestions for improvement further explain the potential for increased efficiency in the broadcasting work process. Differential analysis discusses in detail the processes that can be improved. The implementation of the proposed Lean-Kanban concept and automation into the existing work system further strengthens the efficiency of the organization. The benefits that can be obtained are significant and able to give a positive impact to the workflow of IKIM radio.

VI. CONCLUSION

Studies related to process efficiency assessment in the broadcasting industry are very limited in terms of documentation and implementation. Thus, it makes it difficult for the top management of the broadcasting organization to make an assessment to fully adapt Lean into the current workflow. The focus of this study is also not to find the most optimal Lean tool but to assess the process efficiency and automation potential guided by the Lean concept. This study is a practical example of process efficiency analysis using business process approach and Lean. The findings show that the potential for process improvement in IKIM radio broadcasting can be optimized through the Lean-Kanban tool as an effective method. In addition to the Lean tool, the integration of work process automation also has the potential to improve work performance and optimal work output.

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