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Lean Supply Chain System in Indonesian Banking Industry

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Abstract. The goal of this research is to identify, inspect, and assess the existing system, performance, limitations encountered, and lean supply chain solutions that may be used in the banking industry's account opening process. The qualitative exploratory analytical research approach was utilized, using a sample of state-owned banks such as Bank Mandiri, Bank Negara Indonesia (BNI), and Bank Rakyat Indonesia (BRI). The process of developing a lean supply chain strategy include identifying problems using SIPOC and VSM tools, analyzing problems using VALSAT tools, improving processes using FMEA tools, and controlling processes using SQC tools. The system of account opening that is now in use in the banking industry is partial, the performance of the banking industry's account opening system is not ideal, some of the issues that have arisen as a result of the banking industry's account opening system include, among other things, an increase in the number of employees and a lack of ergonomic in the design of the teller machine, and Process Activity Mapping may be used in the banking industry as a lean supply chain strategy.

Keywords: Lean Thinking, Supply Chain Management, Banking Industry, Value Stream

Introduction

Covid–19 will be known in the first quarter of 2020 [1], [2], [3], [4], [5]. Currently, account opening is shifting toward digitization through the use of e-banking, account website administration, and e-wallets, which were later expanded to improve account management efficacy [6], [7], [8], [9], [10]. There are several factors that contribute to the acceleration of national economic development, including: the extension of credit to consumers until 2022, the prohibition of residuum-based payments, the acceleration of new business start-ups, particularly in the SME sector, and the implementation of a digitalization system in the SME sector [11], [12], [13], [14], [15].

The banking industry's problems in the midst of the Covid-19 pandemic include a high proportion of credit and a respectable number of replacement liabilities despite a rise in the level 1 capital buffer, as well as disruption in the quality of human resources at the regional level [16], [17], [18], [19], [20]. Lean management is a factor that is becoming increasingly important in terms of customer satisfaction and supplier performance [21], [22], [23], [24], [25]. First, the supply chain, specifically assessing the company's level, the company's expertise in implementing supply chains, particularly matters connected to the implementation of supply chain management, would all have the same influence, although having an important point of view. Implementing a synergistic supply chain management strategy will foster a strong commitment to supply chain implementation across the firm [26], [27], [28], [29], [30].

Based on the above explanation, it is clear that research on lean supply chain system techniques in financial institutions is critical in order to strengthen the Indonesian economy in the middle of the Covid-

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19 epidemic, particularly in the banking industry. The research focuses on the lean supply chain system approach in the banking business, with the goal of creating a value chain and impacting customer loyalty by enhancing efficiency in banking operations, particularly the account creation process.

Literature Review and Proposition

Several businesses in various countries throughout the world are implementing supply chain management to improve their business processes, including [31], [32], [33], [34], [35], [36], [37]. Manufactured goods and services industries that have mastered supply chain management [38], [39]. Lean thinking in the financial industry [40], [41], [42], [43], [44], [45]. Lean six sigma in the financial industry [46]. Manufacturing industries that practice lean production [47], [48].

The following is the research proposal:

1. The banking industry's lean supply chain system has yet to be incorporated.
2. The performance of the banking industry's lean supply chain system is still subpar.
3. Implementing a lean supply chain system in the banking business is fraught with difficulties.
4. VALSAT is a technology used in the banking industry to build lean supply chain systems.

Research Method

The approach employed in this study is exploratory analytical qualitative, with the research variable items being explored. This study aims to find a descriptive explanation and investigates the propositions employed in further depth based in the result and interpretation of the data in the field. Case studies of banking service business processes, namely account opening, were used in the research.

Figure 1. Thinking Framework

The research design process is divided into various stages, which include:

1. In the first stage, an identification process will be carried out to capture the existing conditions at the research locus using two tools: the SIPOC (Supplier – Input – Process – Output – Customer) diagram to see the value chain that occurs in the banking industry and Value Stream Mapping to map the waste that occurs in the banking industry, which will be analyzed later.
2. In the second step, an analysis process utilizing VALSAT tools will be carried out in order to identify critical waste that must be fixed promptly in order to strengthen the value chain pf banking sector services.
3. After mapping with VALSAT tools, the third stage will be assessed with Failure Mode and Effect Analysis (FMEA) to aid management in making decision regarding future improvement measures. The outcomes of the improvement will be re-verified by senior management; if the result are satisfactory, they will processed to the final level, which is the control stage. If the improvement outcomes are not satisfactory, the FMEA procedure will be used again.
4. Control is the final level. Quality Control (QC) instruments are used to guarantee that the banking industry's requirements are met.

Result and Discussion

Identify

The flow process of opening individual customer accounts at state-owned banks, particularly BNI 46, Mandiri Bank, and BRI is identified during the identify phase. SIPOC diagrams (Supplier – Input – Process – Output – Customer) and Value Stream Mapping are among the methods employed.

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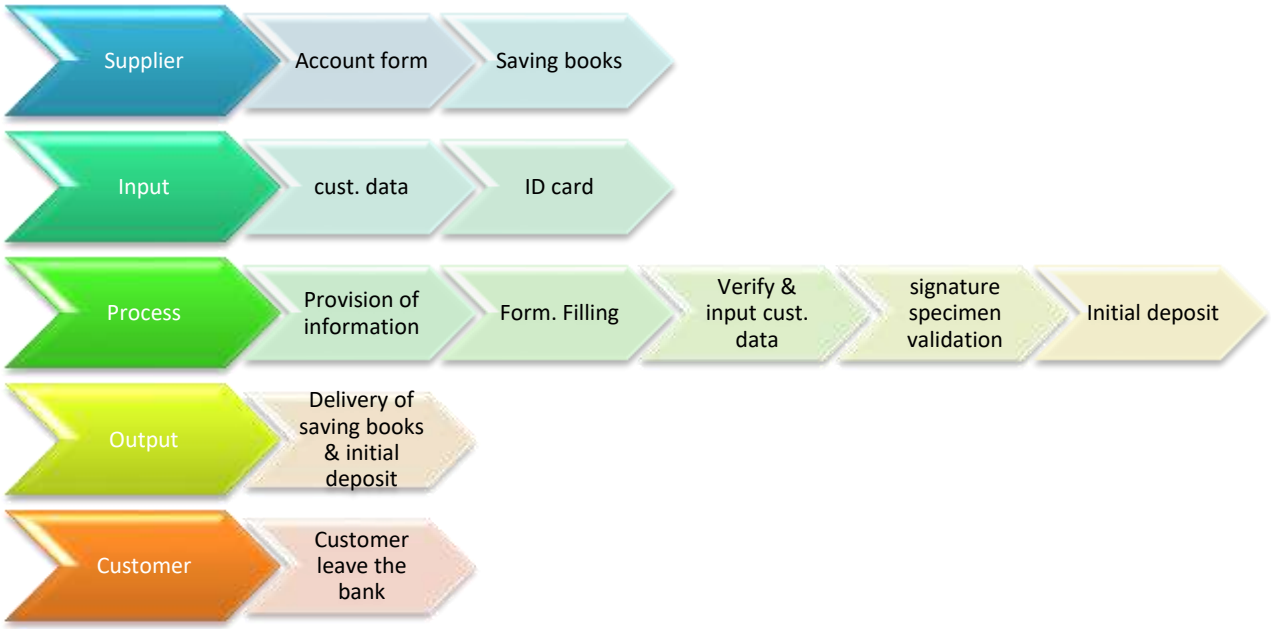

Figure 2. SIPOC Diagram of Account Opening Process

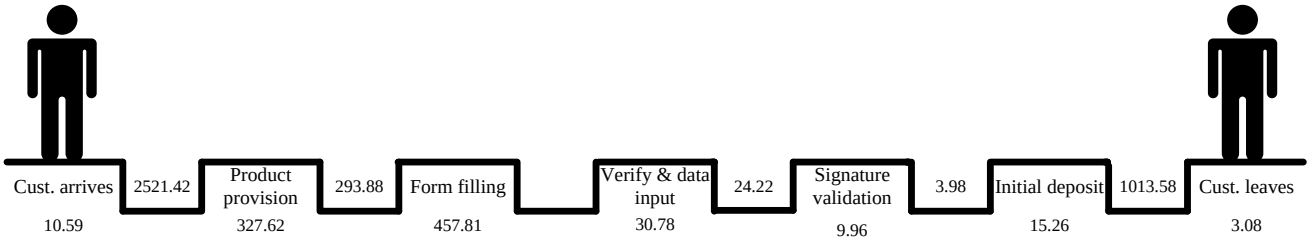

Figure 3. Value Stream Mapping of Account Opening Process BNI 46, Mandiri Bank, and BRI

Table 1. Value Stream Mapping of Account Opening Process

Activities	Banks						Average	
	BNI 46		Mandiri Bank		BRI			
	Percentage	Time	Percentage	Time	Percentage	Time	Percentage	Time
Value Added	17.92%	14.43 minute	18.51%	13.05 minute	18.06%	15.28 minute	18.16%	14.25 minute
Necessary but Non Value Added	0.52%	0.42 minute	0.57%	0.4 minute	0.61%	0.52 minute	0.57%	0.45 minute
Non Value Added	81.56%	65.67 minute	80.92%	57.04 minute	81.33%	68.79 minute	81.27%	63.83 minute
Lead Time		80.52 minute		70.5 minute		84.58 minute		78.53 minute

Analyze

The waste that happens throughout the flow process of opening accounts at BNI 46, Mandiri Bank, and BRI is measured at the analyze phase. VALSAT is the software utilized (Value Stream Analysis Tools). Waste is measured by providing questionnaires to customer service representatives on duty while being monitored. Customers service officers for BI 46, Mandiri Bank, and BRI carried out the questionnaire, and their data was collected. Each bank was sampled three branch offices, with each branch office having two customer service officers, for a total of two x three banks x three branch offices equaling 18 customer service personnel. Students equipped with research tools collect the data.

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Table 2. Value Stream Mapping aof Account Opening Process

No.	Waste	Activities	L	M	H	Final Score
1	Overproduction	Stockpiling of savings books	10	18	18	6.462
2		A line has formed to establish a new client account	2	12	108	
3	Waiting	Before being served by customer service, customers must wait in line	3	15	90	9.154
4		Customers are perplexed by the form's excessive number of fields	1	12	117	
5	Excessive transportation	The gap between the assistance tools and the customer service representative is pretty short	3	12	99	8.846
6		The teller and the customer service representative are only a short distance apart	2	15	99	
7	Inappropriate processing	Checking the customer's completed form before it is submitted into the application	1	39	36	6.154
8		Examination of a sample of the customer's signature	3	27	54	
9	Unnecessary inventory	Inventory accumulation in the savings book	9	15	36	5.154
10		Individual client account opening forms are stacked one on top of the other	5	24	45	
11	Unnecessary motion	When sending the account opening paperwork to the consumer, the officer undertakes a search procedure	10	12	36	6.846
12		Excellent service must be provided by customer care representatives	3	9	108	
13	Defect	The officer explains how to complete the individual client account opening form in detail	2	6	126	6.538
14		The signature specimen on the customer's ID does not match what is mentioned on the ID card	15	3	18	

Table 3. Recognize the Seven Stream Mapping Tools

Waste	**Process Activity Mapping**	**Supply Chain Response Matrix**	**Production Variety Funnel**	**Quality Filter Mapping**	**Demand Amplification Mapping**	**Decision Point Analysis**	**Physical Structure (a) Volume (b) Value**
Overproduction	90	18		10	18	18	
	108	12		2	12	12	
Waiting	90	90	3		15	15	
	117	117	1		12	12	
Excessive transportation	99						3
	99						2
Inappropriate processing	36		39	1		1	
	54		27	3		3	
Unnecessary inventory	15	36	15		36	15	
	24	45	24		45	24	
Unnecessary motion	36	10					
	108	3					
Defect	2			126			
	15			18			
Total	**893**	**331**	**109**	**160**	**138**	**100**	**5**

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Table 4. Process Activity Mapping of Account Opening Process

No	Process	Activities	Device	Distance (m)	The amount of employees	Activities (second)					Description
						Operation	Transportation	Inspection	Delay	Storage	
1	Customer arrives at the bank	Before being served by customer service, customers must wait in line	Seat						2521.28		NVA
2		The customer develops specifications	ID Card & Stamp			10.59					VA
3	Product provision by customer service	The consumer approachers the officer in charge of customer service	ID Card & Stamp	5	1		293.88				NVA
4		Customer care representatives answer questions about products	Product brochure		1	327.61					VA
5	Form filling by customer	The account opening form is submitted to the customer by the customer care representative	Account opening form		1	6.17					VA
6		The account opening form is completed by the consumer	Account opening form		1	451.65					VA
7	verification & data input	The consumer delivers the completed form & stamp to the customer support representative	Account opening form & stamp		1	5.00					VA
8		The customer service representative confirms the information on the form & stamps the final sheet	Account opening form & stamp		1			16.73			NVA
9		Customer data is entered into the application by the customer service officer	Account opening form		1	16.76					VA
10		The customer support representative walks over to the printer to get the account opening form documented	Account opening form	1	1		3.24				NVA
11		The account opening form's first and last pages are photocopied by the customer care representative	Account opening form		1	9.01					VA
12		The photocopied documents are kept in the storage cabinet by the customer support representative	Cabinets for storing documents & copies	0.5	1					4.24	NVA

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13		The customer service representative takes & transmits the saving books & signature specimen to the customer	Savings books & signature specimen		1	5.62					VA
14	Signature validation	The consumer signs the signature specimen on the savings book's first page	Savings books & signature specimen		1	4.33					VA
15		The customer care representative verifies the authenticity of the client's signature in the savings book's & on the ID card	Saving books & ID Card		1			3.98			NVA
16	Initial deposit	The consumer gives the Customer Service officer the first deposit	Money, Saving books & ID Card		1	3.06					VA
17		The customer service representative approaches the teller to make a first deposit	Money, Saving books & ID Card	5	1		330.49				NVA
18		The customer service representative is waiting for the cashier to assist her			1				22.95		NVA
19		The teller officer makes the initial deposit, enters the amount into the application, & prints the transaction in the savings book's	Money, Saving books & ID Card		1	8.58					VA
20		The teller officer hands over the customer's savings book's & documentation of the first deposit transaction to the customer care officer	ID Card, Saving books & transaction evidence		1	3.62					VA
21		On the transaction evidence & savings book, the customer care officer examines the nominal appropriateness	ID Card, Saving books & transaction evidence		1			3.06			NVA
22	Customer leaves the bank	Customers are approached by customer service representatives to produce savings book, transaction evidence, & ID Card	ID Card, Saving books & transaction evidence	5	1		321.80				NVA
23		The consumer obtains an ID card, a savings book, & transaction evidence from the customer service officer	ID Card, Saving books & transaction evidence		1	3.08					VA
24		On the transaction proof & savings book, the consumer examines the nominal appropriateness	Saving books & transaction evidence					2.97			NVA
25		The consumer exits the bank when the transaction is completed					332.30				NVA
		TOTAL				**855.09**	**1281.72**	**26.75**	**2544.23**	**4.24**	**4712.03**

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Improve

The waste-causing elements at BNI 46, Mandiri Bank, and BRI will be examined in the improve section, particularly during the account opening procedure. The following activities will be analyzed in the account opening process at BNI 46, Mandiri Bank, and BRI:

1. Customers must wait in line before receiving service from customer service (delay waste)
   Waiting times varied from 37.24 minutes (Mandiri Bank) to 45.12 minutes (BRI). This waste os difficult to prevent, so the frequency of occurrence score is 8, it is extremely influential, so the severity for quality is 10, and it must be discovered, so the chance of detection score is 2. As a result, the final Risk Priority Number is $10 \times 8 \times 2 = 160$. The remedy to this waste is to hire more people to assist consumers in filling out paperwork before meeting with customer care representatives, hence shortening the time it takes to register an account.
2. The consumer approaches the officer in charge of customer service (transportation waste)
   The travel time ranges from 4.35 minutes (Mandiri Bank) to 5.4 minutes (BRI). This waste is extremely difficult to avoid, so the frequency of occurrence score is 10, it is fairly impactful, essential enough to warrant a severity of quality score of 6, and it is almost certainly found, so the probability of detection score is 2. As a result, the total Risk Priority Number is $10 \times 6 \times 2 = 120$. The remedy to this waste is to redesign the customer service officer's position in order to reduce the distance that clients must travel, which has consequences, for lead time reduction.
3. The customer care representative walks over to the printer to document the form that the customer has completed (transportation waste).
   Transportation time ranges from 0.05 minute (BNI 46) to 0.06 minutes (BRI). This waste is difficult to prevent, so the frequency of occurrence score is 9, fairly impactful, essential enough that the severity for quality score is 4, and certainly discovered, so the likelihood of detection score is 1. As a result, the final Risk Priority Number score is $9 \times 4 \times 1 = 36$. The answer to this waste is to adjust the layout of the printer position within reach of the customer service officer, so eliminating the distance that customer service officers must walk, which has consequences for lead time reduction.
4. The customer care representative approaches the teller to make a deposit (transportation waste)
   The travel time varies between 5.05 (Mandiri Bank) and 6.09 minutes (BRI). This waste is difficult to prevent, so the frequency of occurrence score is 9, it is extremely influential, essential, so the severity for quality score is 7, and it will almost certainly be noticed, so the chance of detection score is 1. As a result, the final Risk Priority Number is $9 \times 7 \times 1 = 63$. The remedy to this waste is to redesign the teller position so that customer service officers walk less distance, which has consequences for lead time reduction.
5. Customer service representatives wait their turn to be served by teller officers (delay waste)
   The wait time ranges from 0.35 minutes (Mandiri Bank) to 0.41 minutes (BRI). This waste is extremely difficult to prevent, so the frequency of occurrence score is 10, so influential that the severity for quality score is 7, and it must be recognized, so the likelihood of detection score is 1. As a result, the ultimate Risk priority Number score is $10 \times 7 \times 1 = 70$. The answer to this waste is to increase staff to speed up the first deposit procedure performed by custiner care officersm, hence reducing the lead time of the account opening process.
6. The customer care representative approaches the customer and hands over the savings book, transaction evidence, and ID card (transportation waste).
   The travel time ranges from 5.01 minutes (Mandiri Bank) to 5.62 minutes (BRI). This waste is difficult to prevent, so the frequency of occurrence score is 9, it is extremely influential, essential, so the severity for quality score is 7, and it will almost certainly be noticed, so the chance of detection score is 1. As a result, the final Risk Priority Number is $9 \times 7 \times 1 = 63$. The remedy to this waste is to redesign the teller position so that customer service officers walk less distance, which has consequences for lead time reduction.
7. The transaction is finished, and the consumer exits the bank (transportation waste)
   The travel time varies form 4.93 minutes (Mandiri Bank) to 6.01 minutes (BRI). This waste is difficult to prevent, sos the frequency of occurrence score is 10, it is extremely influential, critical,

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so the severity for quality is 8, and it must be recognized, so the chance of detection score is 1. As a result, the final Risk Priority Number score is $10 \times 8 \times 1 = 80$. The remedy to this waste is to redesign the customer service position to limit the distance that consumers must go while leaving the bank, which will have an impact on lead time.

Control

The control procedure will be carried out in this part based on the findings of the Risk Priority Number that was completed during the enhance stage.

Table 5. Account Opening Process Based on Risk Priority Number

No	Activities	RPN	Control Action
1	Customers wait in line to be served by customer service representatives (delay waste	160	Adding employees to help consumers in completing out account opening forms
2	The consumer goes to the customer care representative (transportation waste)	120	Modifying the arrangement of the customer service officer's position in order to reduce customer mileage
3	The transaction is completed, and the consumer exits the bank (transportation waste)	80	Modifying the arrangement of the customer service officer's position in order to reduce customer mileage
4	Customer service representatives wait their turn to be served by teller officers (delay waste)	70	Increasing the number of teller workers to expedite the first deposit procedure
5	The customer service representative approaches the teller to make a first deposit (transportation waste)	63	Changing the structure of the teller position such that customer service personnel walk the least amount of distance
6	The customer care representative approaches the customer & hands over the savings bool, proof of transaction, and the customer's identity card (transportation waste)	63	Changing the structure of the customer service officer's position such that the customer service officer travels the least amount of distance
7	The customer care representative approaches the printer to document the form that the customer has completed (transportation waste)	36	Changing the configuration of the printer position so that the customer support representative can access it

Conclusion

The following are the conclusions made from the research findings:

1. The banking industry's account opening system is still in the process of being fully adopted.
2. In the banking business, the performance of the account opening system is suboptimal.
3. Obstacles encountered in the banking industry's account opening system include, among other things, a shortage of staff (tellers and customer service) as well as a lack of ergonomic arrangement of tellers, customer service, and supporting facilities.
4. Process Activity Mapping is a method that may be used in the banking sector to help adopt a lean supply chain strategy.

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