Application of Digital Solution in Increasing Sales and Customer Satisfaction with A System Dynamic Approach

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Abstract— The Industrial Revolution 4.0 is a new paradigm in an industry that combines automation technology with cyber technology. Indonesia is a maritime country that requires the acceleration of information from one region to another. The existence of the digitalization era is the beginning of the fast and dynamic transfer of information that helps many parties in sending or receiving information. This also makes business actors make business adjustments and follow the trends of the digitalization era. The purpose of this study was to determine the increase in sales and customer satisfaction from the implementation of Digital Solution services. The system dynamic method is a methodology for understanding a complex problem with the aim of getting a deep understanding of the workings of a system. The results of the dynamic system simulation with a timeline for 24 months and a scenario of a 50% increase in intervention, an increase in sales for existing customers of 45,600 Liters/month, and an increase in annual sales volume of 1,519,490 Liters so that Digital Solution has a positive impact on increasing sales and increasing satisfaction. Customers 1.1% every month because it improves after-sales service working time efficiency.

Keywords— Digital Solution, Monitoring, System Dynamic.

1. INTRODUCTION

Indonesia is a maritime country that requires the acceleration of information from one region to another. The existence of the digitalization era is the beginning of the fast and dynamic transfer of information that helps many parties in sending or receiving information. This also makes business actors make business adjustments and follow the trends of the digitalization era.

According to Savitri (2019), the industrial revolution 4.0 is the fourth industrial era since the first industrial revolution in the 18th century. The era of the industrial revolution 4.0 is marked by a blend of technology called the boundary between physical, digital, and biological, or collectively as a cyber-physical system (CPS). With the presence of technology-based activities, there is potential to improve all activities carried out in the company so as to result in improvements in all areas of operations management. Soerjono (2015) a ship is a large vehicle for transporting passengers and goods in the sea, rivers, and so on, just like a canoe or smaller boat. A decision support system is an interactive computer-based system that can help decision-makers to solve unstructured problems (Saputra, 2019).

The purpose of this study was to determine the increase in sales and customer satisfaction from the implementation of Digital Solution services.

1.1 State of The Art (SOTA)

The following is a summary of previous research that the author cites relating to the dynamic system method and summarized in the State Of The Art (SOTA) so as to find out what is new or novelty from the research conducted by the author.

Tabel 1.1: State of The Art (SOTA)

		Dian Pratiwi Sahar, Ahmad Rusdiansyah, Nurhadi Siswanto (2015)	Nastiti Puji Lestari, Ishardita Pambudi Tama, Dewi Hardiningtyas (2014)	Kurniawanti, Yaning Tri Hapsari (2019)	Irna Ekawati, Lisa Nesti (2019)	P Asasuppakit, P Thiengburanathum (2020)	Hassan Pourfallah Koushali, Reza Moshtagh, Reza Mastoori (2015)	Chaoning Zhang, Caiyan Qin (2014)	M Poornikoo, MA Qureshi (2019)	Atmogo, D.Y; Santoso, S (2021)
Type of Industry	Maritime	√		√						√
	Manufacturer		√						√	
	Plantation				√					
	Agriculture						√			
	Transportation					√		√		
Research variable	Monitoring					√				√
	Productivity	√	√	√						
	Efficiency				√					
	Management						√	√	√	
Research methods	Waterfall									√
	Fuzzy Logic								√	
	Dynamic System	√	√	√	√	√	√	√	√	√

Source: National & International Journal Reference, 2022

From the summary in the State of The Art (SOTA) table, the author has the opinion that this research is unique and innovative in the application of digital solution services in increasing company sales productivity and increasing customer satisfaction, and supporting efforts to implement digitalization in the maritime industry.

2. System Dynamic Methods

Khotimah (2015) System dynamics is a methodology for understanding a complex problem. This methodology focuses on policy making and how the policy determines the behavior of problems that the system can dynamically model.

The purpose of the system dynamics methodology based on the causal (effect) philosophy is to gain a deep understanding of the workings of a system. The stages in the dynamic systems approach are:

a. Identification and definition of the problem

b. System conceptualization

c. Model formula

d. Simulation model

e. Model verification and validation

f. Policy analysis

g. Policy implementation

2.1 Causal Loop Diagram Simulation

John D. Sterman in Dini (2018), Causal Loop Diagram (CLD) is a form of mapping that shows the causal relationship between variables and arrows of causality.
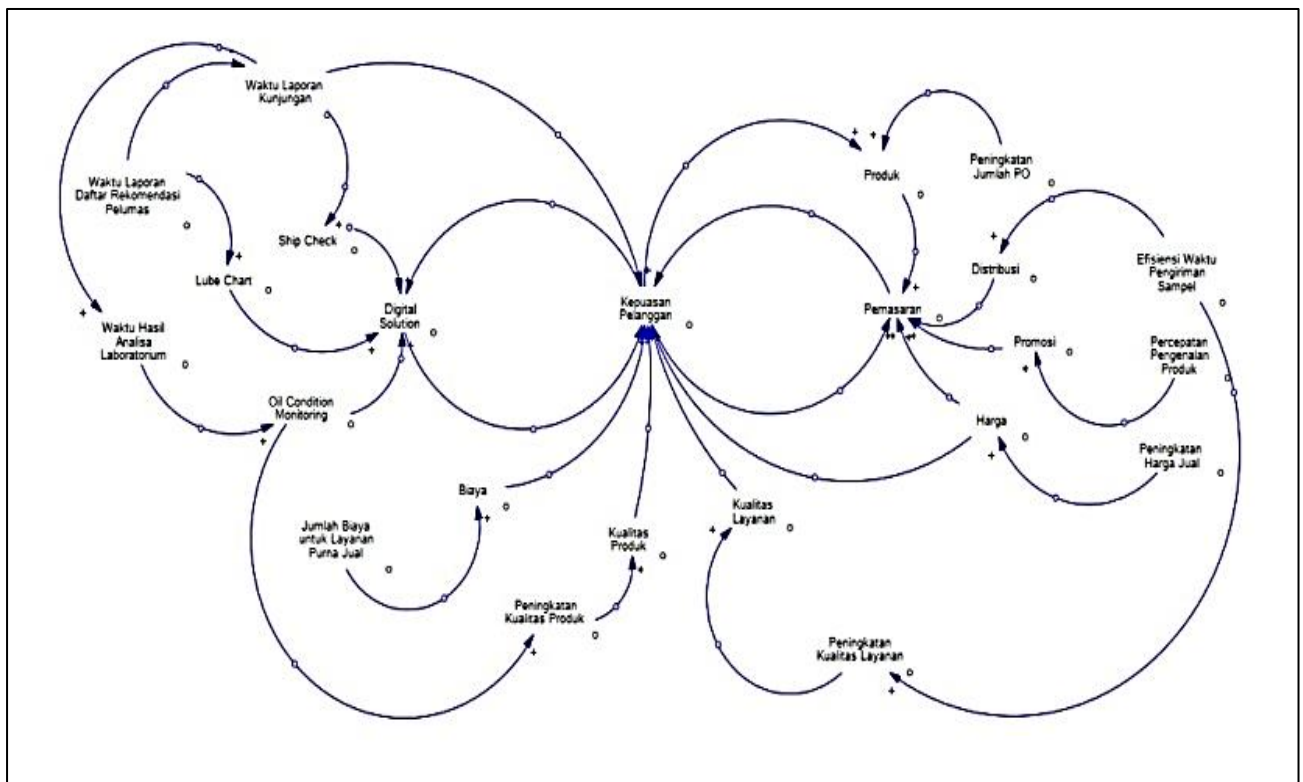

Figure 1: CLD Simulation

Source: Vensim PLE 2022 preliminary data processing

Figure 1 shows the relationship between variables having a relationship between one and another with the dimensions of each variable.

2. DISCUSSION

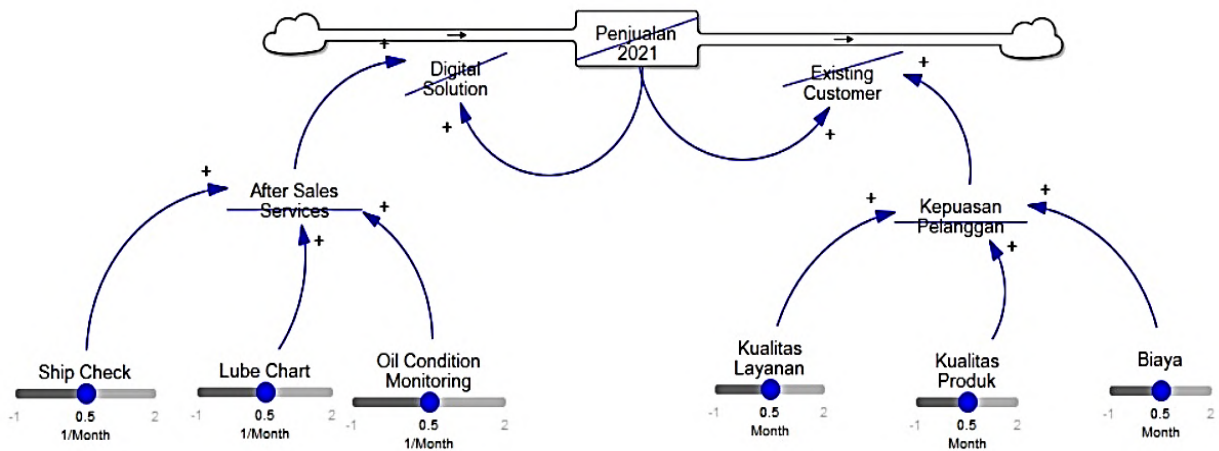### 2.1 Stock and Flow Diagram (SFD)

Jhon D. Steman in Dini (2018), Stock Flow Diagrams (SFD) as a central concept in system dynamics theory. Describes the physical structure, where stock is an accumulation that can increase and decrease, while flow is a process that causes stock to increase or decrease.
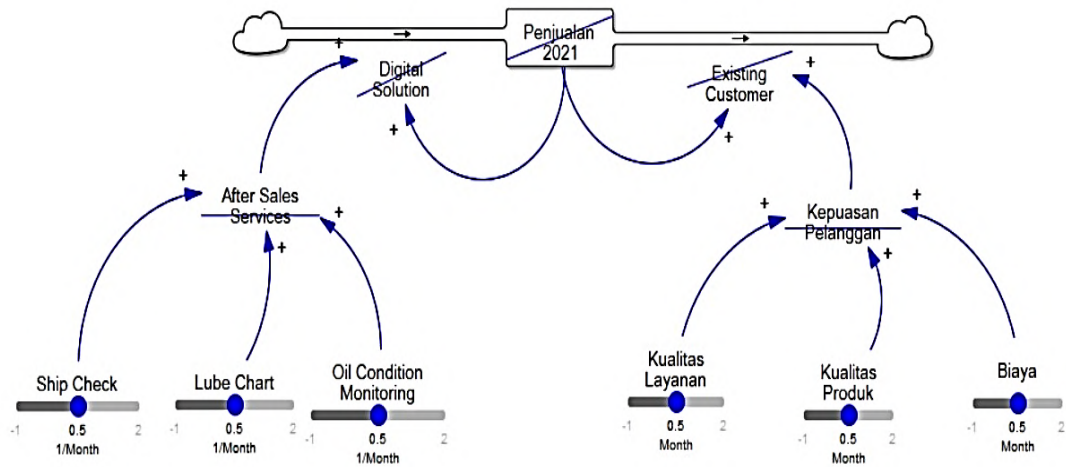
Figure 2: Stock Flow Diagram (SFD) Before Digital Solution

Source: Vensim PLE 2022 Data Processing

Figure 2 is the initial condition before the intervention scenario was carried out where customer satisfaction had a stable trend and the existing customer graph showed a decline that could occur with the possibility of decreasing company sales.


Figure 3: Stock Flow Diagram (SFD) with 50% Scenario

Source: Vensim PLE 2022 Data Processing

Figure 3. shows that after the intervention, 50% of the implementation of digital solutions had an impact on increasing customer satisfaction and existing customers so that the company's sales graph also increased from before.
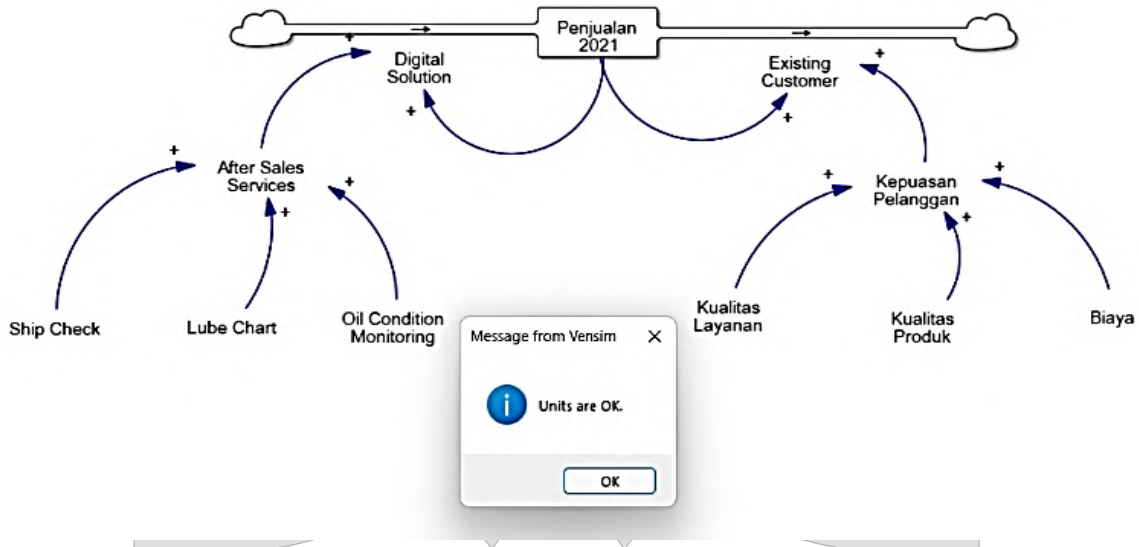
3.2 Simulation Model

1. Model Validation Stock and Flow Diagram (SFD)
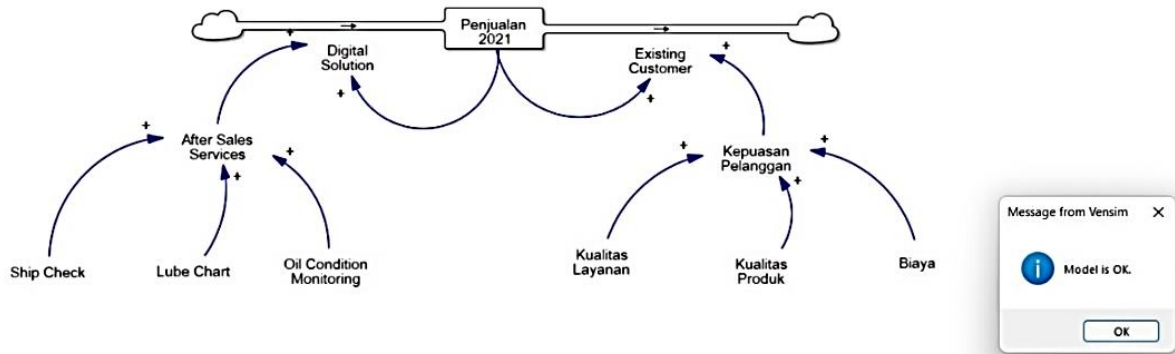
Figure 4: Stock Flow Diagram (SFD) Model Validation

Source: Vensim PLE 2022 Data Processing

2. Unit Validation Stock and Flow Diagram (SFD)

Figure 5: Stock Flow Diagram (SFD) Unit Validation

Source: Vensim PLE 2022 Data Processing

3. Structural Validation Test

Structural validity test aims to test the stability of the structure or behavioral values between the model and the real system. This test can be done by looking at two interrelated variables, namely comparing the actual logic and the simulation results.

Prior to the existence of digital solution services, the level of customer satisfaction was at 0.10% with a baseline annual sales volume of 8,228,000 liters which will show the graph of existing customers showing a decline so that the company's sales may decline.
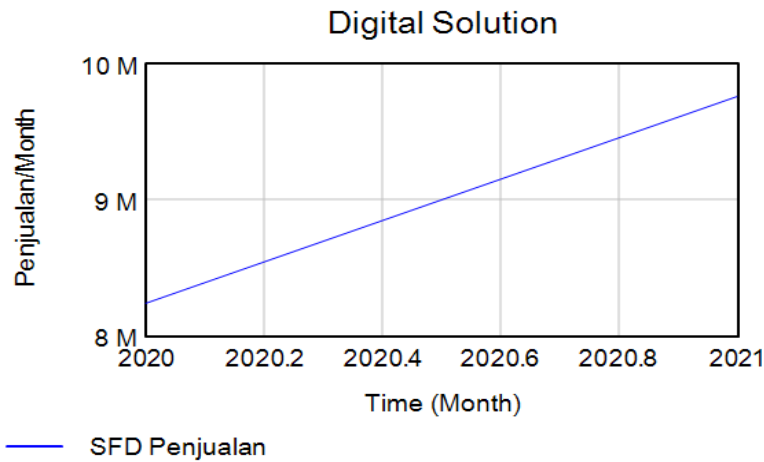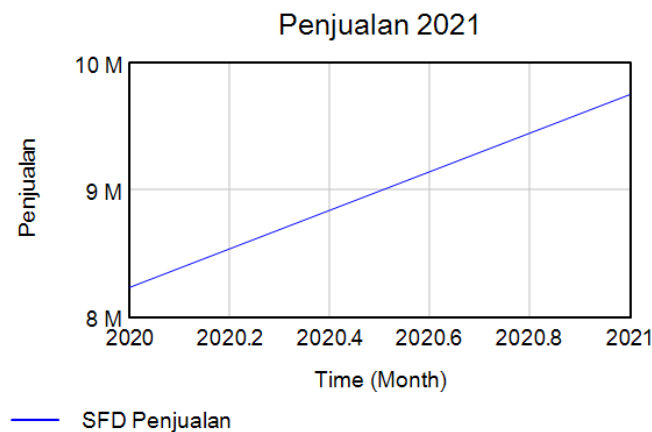
Figure 6: Conditions after Digital Solution

Source: Vensim PLE 2022 Data Processing
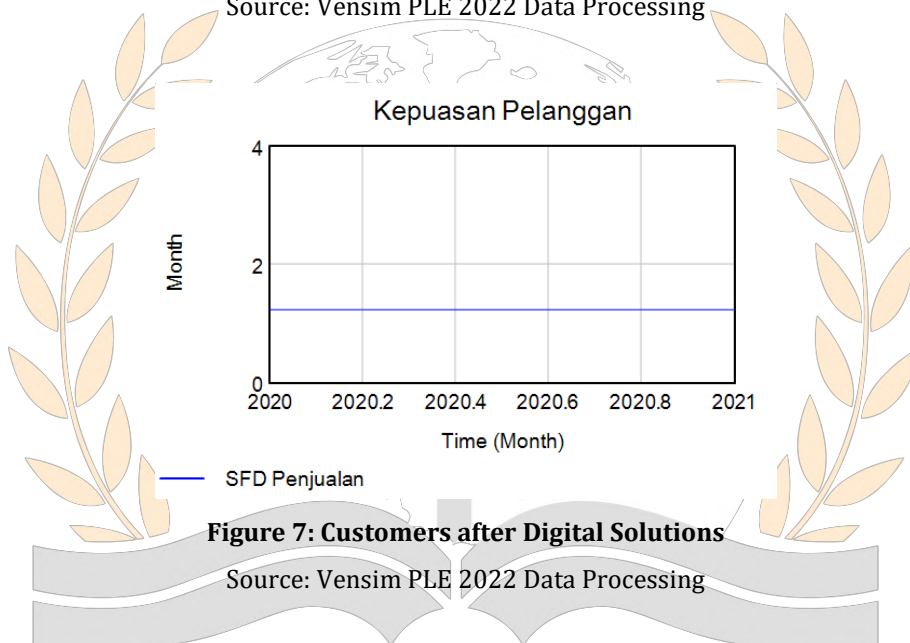
Figure 7: Customers after Digital Solutions

Source: Vensim PLE 2022 Data Processing

Figure 8. Sales Conditions after Digital Solution

Source: Vensim PLE 2022 Data Processing

After data processing using Vensim PLE with a timeline for 24 months and after a 50% increase in intervention scenario was carried out, there was an increase in sales for existing customers by 45,600 Litres/month and an increase in annual sales volume of 1,519,490 litres so that Digital Solutions had an impact. Positive on increasing sales and increasing customer satisfaction 1.1% every month because it improves after-sales service time efficiency.

3. CONCLUSION & SUGGESTIONS

Conclusion

1. There was an increase in sales for existing customers by 45,600 Liters/month and an increase in year sales volume of 1,519,490 Liters. Digital Solution has a positive impact on increasing sales and increasing customer satisfaction 1.1% every month because it increases the efficiency of after-sales service time.

2. The increase in sales volume is influenced by customer satisfaction with the presence of a Digital Solution that can provide speed of acceptance to customers.

Suggestions

1. Digital solutions have a positive impact on increasing sales so this needs to be maintained and developed so that it can continue to increase customer satisfaction and company sales.

2. The author hopes that further research development can involve or integrate such supply chain processes so that customers can more easily monitor other services.

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