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Approaching Time Service Information System Planning As an Effort to Reduce National Port Logistic Cost

(Case Study: Tanjung Priok Port of PT. Pelindo II, Tbk)

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Abstract:- Indonesia has ranked 46th in the 2018 Global Rank Logistics Performance Index (LPI) issued by the World Bank as a statistical measure of logistics (Logistic Performance Index, World Bank, 2018). With these conditions, Indonesia's logistics performance has been serious concern by the government to reduce logistics costs. One of them is by increasing standardized port performance by increasing port services. The focus of the government in improving port performance is by developing The Pilotage & Towage or often referred to as Marine Operating System *(MOS/SIPANDU)* which is one of the port services. Therefore, the objective of this research is that the development of this information system able to improve the optimization and effectiveness of approaching time services as an effort to improve port performance in terms of waiting & approaching time. And of course, the information system for approaching time is also one of the government's efforts to improve national logistics efficiency by fulfilled one of the Logistics Performance Index (LPI) indicators, namely Tracking & Tracing and Timeliness. In this way, Marine Operating System (MOS/SIPANDU) easily able to monitor port operational performance of both the government and operator terminal as an evaluation material for improving service performance at the port. This research was conducted to PT. Pelindo II's operational employee which operated on Tanjung Priok Port which is the Busiest Port in Indonesia as a Port Operator Terminal which focused on the assurance of approaching time services by conducting observation, field study and interview to related party for the perfection of this research. The author uses a qualitative method based on phenomena that occur in realizing port logistics efficiency and of course as Indonesia's efforts as the World Maritime Axis. In order to improve port performance that is not yet standardized, the government has prepared an Integrated Port Network (IPN) program based on 4.0 industry technology by involving several stakeholders, including the Ministry of National Development Planning Agency, the Ministry of Transportation and BUMN Synergy as Terminal Operators for the achievement of Indonesia as a World Maritime Country.

Keywords:- *Logistics, National Logistics System, Integrated Port Network (IPN), Ports, Approaching Time, Information Systems.*

I. INTRODUCTION

A. Background of Study

Geographically, Indonesia is the largest archipelago country in the world with 17,499 islands which unfold along 1/8 (one-eighth) of the equator with abundant natural resources and producing strategic commodities both imports and exports. As the largest archipelago in the world, i.e. 17,499 islands, Indonesia sea transportation is the most widely used route in the development of logistics in Indonesia. With this condition that Indonesia is very dependent on maritime transportation. So that in the logistics chain, identified three (3) main issues as constraints to logistic decline are based on (Figure 1), seafaring network is not optimal, Port performance is no standard yet, and inefficient land transportation and cargo imbalance (Bappenas, 2019).

Fig 1:- Three Challenges to Reducing National Logistics Costs (Bappenas, 2019)

Therefore, to improve port performance services that have not yet been standardized, the government focuses on improving port services as one of the port improvement initiatives, one of them is application of approaching time service information system which is one of the ship services. The uncertainty of the waiting time and approaching time as one of the impacts of the approaching time facilities is still manual. While the waiting time and

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approaching time is an indicator of the success of port services (Regulation of Head of Tj. Priok Authority Office No. UM.008 / 36/4 / OP.TPK.118, 2018). Improve the performance of port which standart automatically will have an impact on efficiency to the port which affects the improvement of logistics efficiency in terms of service time, fuel and even Logistic Performance Index (LPI) as a benchmark statistically which become calculation of the contribution of logistics costs. Based on (Figure 2) that the above conditions of logistics performance in Indonesia is currently a serious concern by the government to make efforts in terms of reducing logistics costs. There are seven (7) indicators for assessing the Logistic Performance Index (LPI, 2018) covering Custom, Infrastructure, International Shipment, Logistics Competence, Tracking & Tracing and Timeliness.

Country	Year	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timeliness
Estonia	2018	36	3.31	3.32	3.10	3.26	3.15	3.21	3.80
Israel	2018	37	3.31	3.32	3.33	2.78	3.39	3.50	3.59
Panama	2018	38	3.28	2.87	3.13	3.31	3.33	3.40	3.60
Vietnam	2018	39	3.27	2.95	3.01	3.16	3.40	3.45	3.67
Iceland	2018	40	3.23	2.77	3.19	2.79	3.61	3.35	3.70
Malaysia	2018	41	3.22	2.90	3.15	3.35	3.30	3.15	3.46
Greece	2018	42	3.20	2.84	3.17	3.30	3.06	3.18	3.66
Oman	2018	43	3.20	2.87	3.16	3.30	3.05	2.97	3.80
India	2018	44	3.18	2.96	2.91	3.21	3.13	3.32	3.50
Cyprus	2018	45	3.15	3.05	2.89	3.15	3.00	3.15	3.62
Indonesia	2018	46	3.15	2.67	2.89	3.23	3.10	3.30	3.67
Turkey	2018	47	3.15	2.71	3.21	3.06	3.05	3.23	3.63
Romania	2018	48	3.12	2.58	2.91	3.18	3.07	3.26	3.68

Fig 2:- LPI Global Rangkings 2018

With the application of the approaching time service information system or often referred to as Marine Operating System it will be impacted the increasing one of the LPI indicators, namely Tracking & Tracing and Timeliness. Therefore, more growth of commercial ports managed by BUMN, one of them is PT. Pelindo II, Tbk, certainly there will be more commercial ship arrivals which will make business opportunities for approach and wait time. As an example in this study, which is located in the port of Tanjung Priok which is the largest and busiest port in Indonesia. Then, ship services must be continuously improved and repaired in order to all incoming and outgoing vessels can receive services quickly and accurately. Hence, Pelindo II as the terminal operator of the Tanjung Priok Port decided to make improvements to pilotage & towage services by developing a pilotage & towage information system application, with the expectation that the development would be able to reduce the operational time of ship services when the ship enter and berth the pier quickly, precisely and attempted improving the safety of ships also goods are in and out of the port. Not only that, the application of this approaching time service information system as a company's effort to improve business process of port service based on digital technology that will have an impact on the efficiency of port operating costs is one of the factors of national logistics cost efficiency.

B. Problem Formulation

From above study introduction, the author divided the problem into two (2), as follows:

- What is the application of the *marine operating system* (MOS/SIPANDU) able to facilitate to accommodate work order approaching time quickly and precisely?
- What is the model of *marine operating system* (MOS/SIPANDU) development able to improve the performance of standardized port with lower waiting time & approaching time?

C. Objective of the Study

The aim of this study, as follows:

- With the development of the *marine operating system* (MOS/SIPANDU) is able to improve the optimization of the ship piloting/ towaging services that have an impact on improving port performance.
- With the development of the *marine operating system* (MOS/SIPANDU) will increase the effectiveness of the piloting / towaging ship service.

D. Benefit of the Study

With this research, the author aims to provide benefits, as follows:

- By identifying the impact of the information system, it will help the government or Port Operator Terminal of PT. Pelabuhan Indonesia II (Persero) monitoring Port Operation Performance as an evaluation material for improving service performance at the port
- Recommended as an input to the design of design initiative with support through Integrated Port Network policy

II. LITERATURE REVIEW

A. Port

According to Government Regulation R.I No. 69 of 2009 concerning Ports, the meaning of a port is a place consisting of land and surrounding waters with certain limits as a place of government activity and economic activity, used as a docking for ships, berth, up and down of passengers, and / or loading and unloading of goods equipped with shipping safety facilities and port support activities, as well as a place for intra and inter of transportation modes shifted. In the business sector related to port according to Acts Number 17 of 2008, it consists of 2 (two) business groups, namely:

- Provision and / or service of dock for mooring
- Provision and / or service of refueling and clean water services.
- Provision and / or service of passenger and / or vehicle ups and downs.
- Provision and / or service of dock for carrying out loading and unloading of goods and containers.
- Provision and / or services of warehouse and stockpiling facilities, loading and unloading equipment, and port equipment.
- Provision and / or service of container terminal, liquid bulk, dry bulk, and Ro-Ro.
- Provision and / or service of loading and unloading of goods.
- Provision and / or service of goods distribution and consolidation center
- Provision and / or service of scouting - postponement of ship.

Port Operational Service Performance Indicators are service variables, usage of port facilities and equipment. Indicators of ship service performance are waiting time, approaching time, berth time, berth occupancy ratio and turn around time.

B. Piloting Ship

According to the Decree of the Minister of Transportation no. 24 KM of 2002 concerning Implementation of Scouting, Chapter I article 1 paragraph 1, "Scouting is an activity in assisting the Captain of the ship, so that navigation can be carried out safely, orderly and smoothly by providing information about the state of local waters that are important for the safety of the ship and its environment". According to Government Regulation number 11 of 1983 is "The main task of the scouting work unit is to carry out and oversee the safety and smoothness of the movement of ships in and out as well as maintaining the orderly law of shipping and sailing in territorial waters the guide must be operationally responsible to the harbormaster.

Fig 3:- Ilustration of Piloting Ship Service
(source : www.ipc.com)

Ship services can be pictured by the illustration of a cargo ship about to enter the port. The cargo ship must be anchored outside the port, then harbormaster as an officer responsible for the licensing of incoming / outgoing vessels supervised by the ministry of transportation who has the obligation to check the completeness of documents as a condition for ships entering the port. The aim is to determine whether the ship is seaworthy and has met shipping safety requirements. Besides customs, immigration officers, as well as health and quarantine services do their work here. While awaiting inspection from the relevant officer, and waiting for information from related port to leaning on the pier, when the information from the pier states that there is an empty place to lean on, then the cargo ship immediately departs for the port and dock. To maintain the safety of the crew and the safety of the ship, the engine of the ship must switch off running on a bound position between the two tugboats in front and behind. People who guide ships to enter and exit the port are called scout services. The trip of the goods ship enters from the port to the dock, then the ship is tethered and released at sea off, this process is subject to a delay service fee and scout services.

C. Enterprise Architecture

EA is an approach that appears to take a complex knowledge about organizations and technology (Schekkerman, 2011). EA is seen as a blueprint for optimal and on targeted placement of resources in the IT environment to support business functions. Blueprint is

outputs from EA that provide a general view of how the the elements (platforms, networks, applications, logic application) which are appropriate determined and especially how the relationships between those elements. Business alignment and information technology become the most important issues in business, therefore EA is very important for organizations to support business harmony and information technology (Razak et al., 2011).

D. Business Process Improvement

Business process improvement (BPI) is a systematic approach to help organizations optimize fundamental processes to achieve more efficient results. This methodology was first documented in 1991 written in H. James Harrington's Business Process Improvement book, that the good methodology the Design Process and Business Process Reengineering is based on Business process improvement (BPI).

E. Frame of Reference

The frame of reference in this study is as follows:

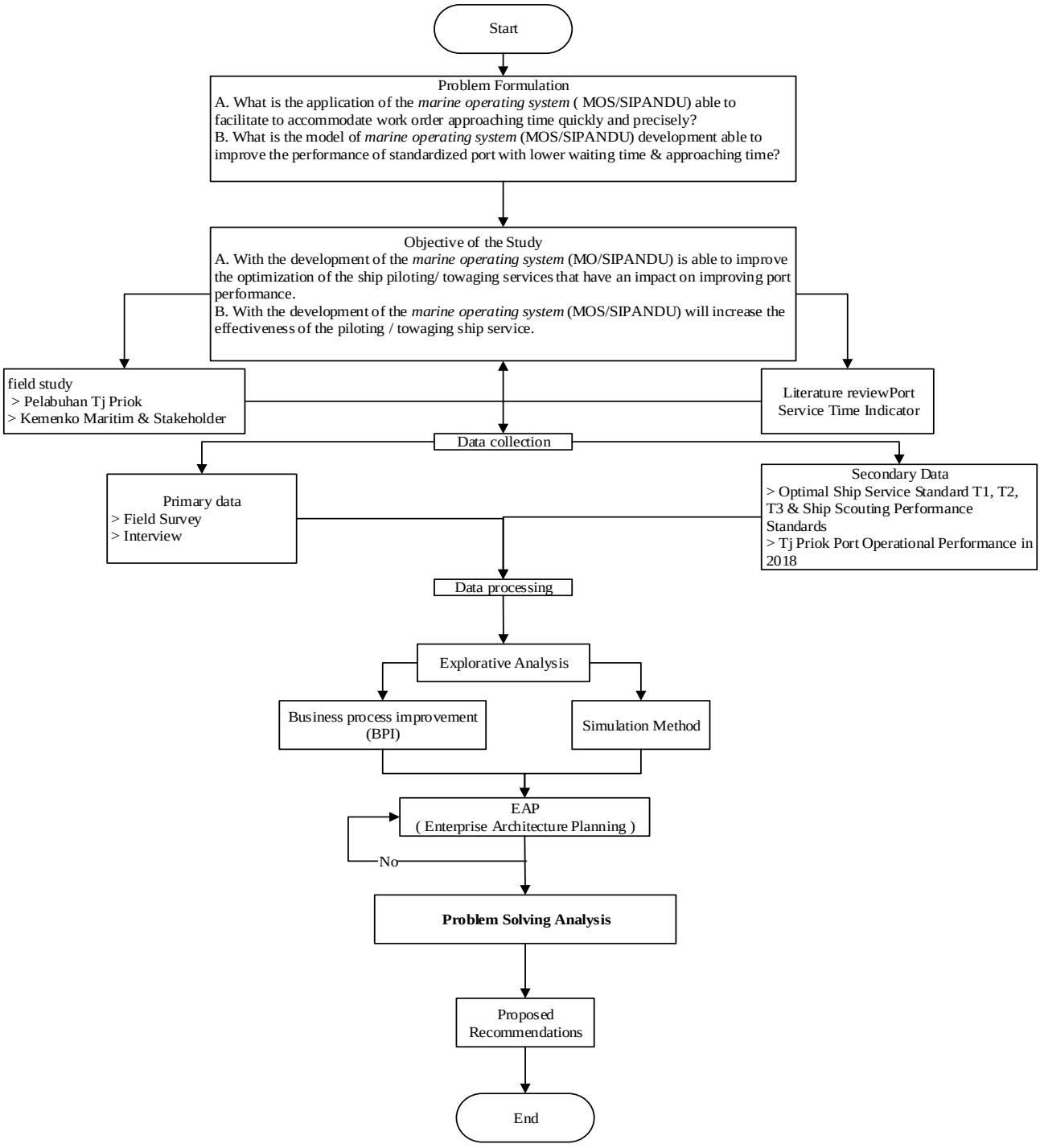


Fig 4:- Framework

III. RESEARCH METHODOLOGY

A. Types and Objects of Research

This type of research is exploratory research with a qualitative-inductive approach based on field case studies at Tanjung Priok Port by developing a model of service, one of which is an approaching time of ship that has an effect on improving port service performance that will have an impact on port national logistics as one of the company's efforts in revamping the digital technology-based port service business process.

Sugiyono (2007: 49) explains that explorative research method is a research aimed at mapping an object relatively depth or in other words explorative research is research conducted to look for causes or things that influence the occurrence of something and are used when we don't know yet exactly and specifically about our research object.

According to Moleong (2004: 5), the inductive approach is used for several reasons, such as:

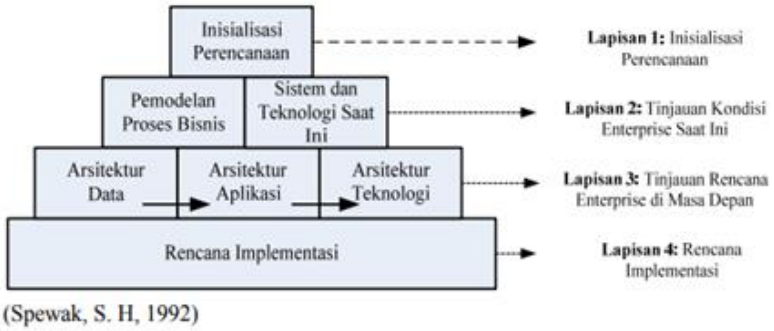
- The inductive process is more able to discover the multiple realities contained in the data;
- This approach can make the relationship between author and respondents more explicit, recognizable and accountable;
- More decipher the situation in full and can make decisions about whether or not to another situation;
- More able to find a shared influence that sharpens the relations

Objects in the research of approaching time service information system planning as a changed in approaching time system which currently requests and service of approaching time is done by met and written on paper or manually by PT. Pelindo II that will be proposed as a recommendation to re-design the information system to actualize the standardized port.

B. Research Methodology

The research method used is the approach made by Steven H Spewak in building architecture enterprise by emphasizing data and business processes. Enterprise Architecture Planning (EAP) is the process of defining architecture in the use of information in supporting business, as well as plan to implement that architecture. That the use of the term architecture consists of data architecture, application architecture and technology architecture. These Architecture as befits a blueprint, description or model. Basically EAP is not designing the business and architecture, but defining the business need and architecture. In general is discussing about the definition of the architecture what is needed and the support plan is defined as when the architecture will be implemented (Spewak, 1992).

These seven main components are grouped into four (4) layers (Spewak, 1992), which are referring in the figure below:



(Spewak, S. H, 1992)

Fig 4:- Components and Layer of EAP

Layers on EAP are consist of four layer as follows:

- *Planning Initialization*

This layer aims to identify about the rules that are referred to in university related to enterprise architecture planning. The key output expected in the development of this scouting information system will describe the activities that will be implemented as a plan for a better change process going forward. Outcome is measured in the medium term as a tool to portray how much the level of achievement of output changes in the development of this information system, which will certainly involve the interests of many stakeholders that have an impact on port performance. The main outputs that will result from this change are: a) Application services supporting scouting service activities that can be accessed by any user who needs it in real time or space; b) SIPANDU application platform piloting ship service the latest and renewable is developed. Meanwhile, the Outcomes that will be generated from this change project are:

- The availability of the SIPANDU application as the latest service application for all levels of operators and user agents;
- Increasing the effectiveness and efficiency of port operator administrative workloads;
- The implementation of governance and executing of piloting ship is more efficient and integrated.

- *Review of Current Enterprise Condition*

The current condition of the approaching time service system is depicted in the figure and table below :

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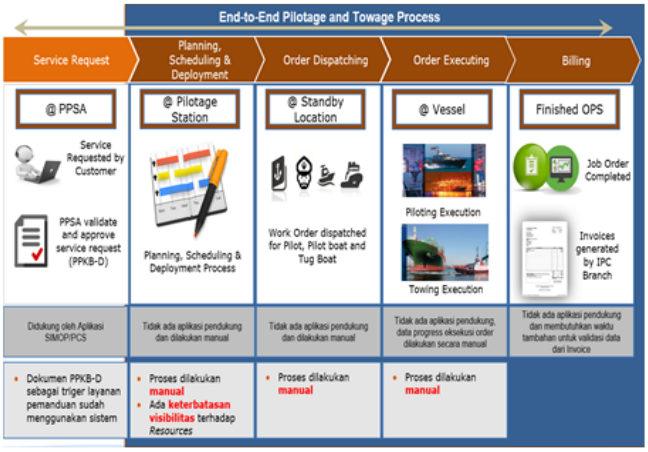


Fig 5:- Plot of Business Process of Reengineering "Arrival Ship" (existing)

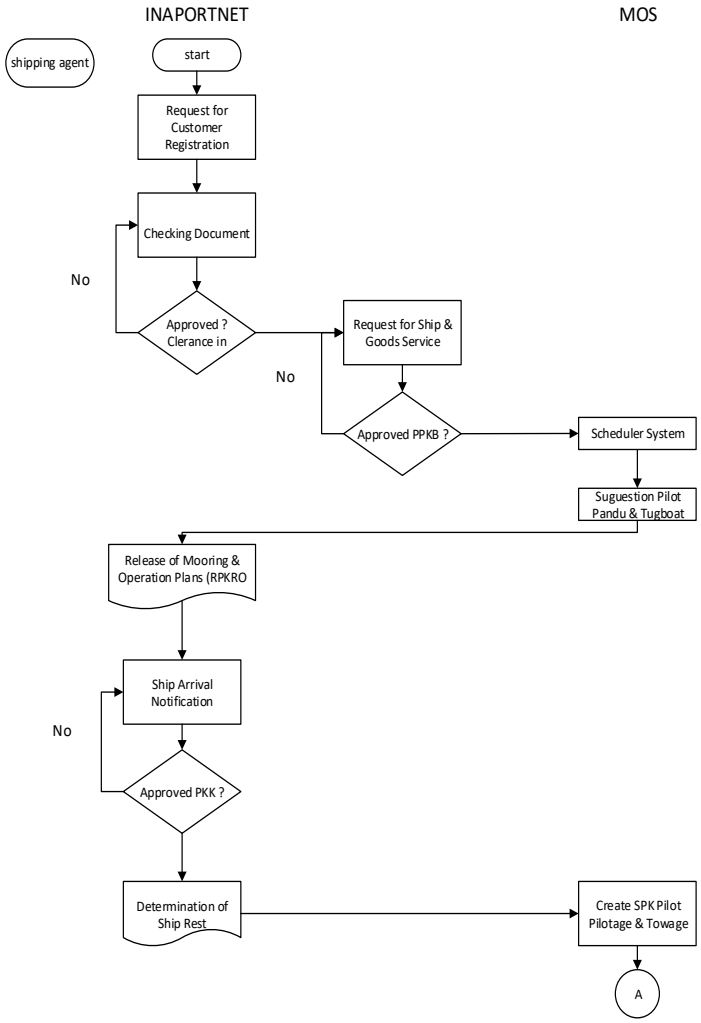
➢ *Review of Future Enterprise Plans*

The development of scouting service information system (SIPANDU) in the future will be able to do the following:

- *Free Movement, Monitoring, Controlling, Reporting and Interconnecting System*
- *Planning Scheduling Deployment*
- *Resources Management and Optimizer*
- *Order Dispatching and Order Executing*

➢ *Implementation Plan*

The implementation plan is implemented with the stages of the project process, that are the pilot projet approximately six (6) months, the first three (3) months of initiation process and the last three (3) months is stabilization phase. By using a sample paradigm prototype model data, that is a method in developing a system that uses an approach to create a program quickly and gradually so that it can be immediately evaluated by the user.



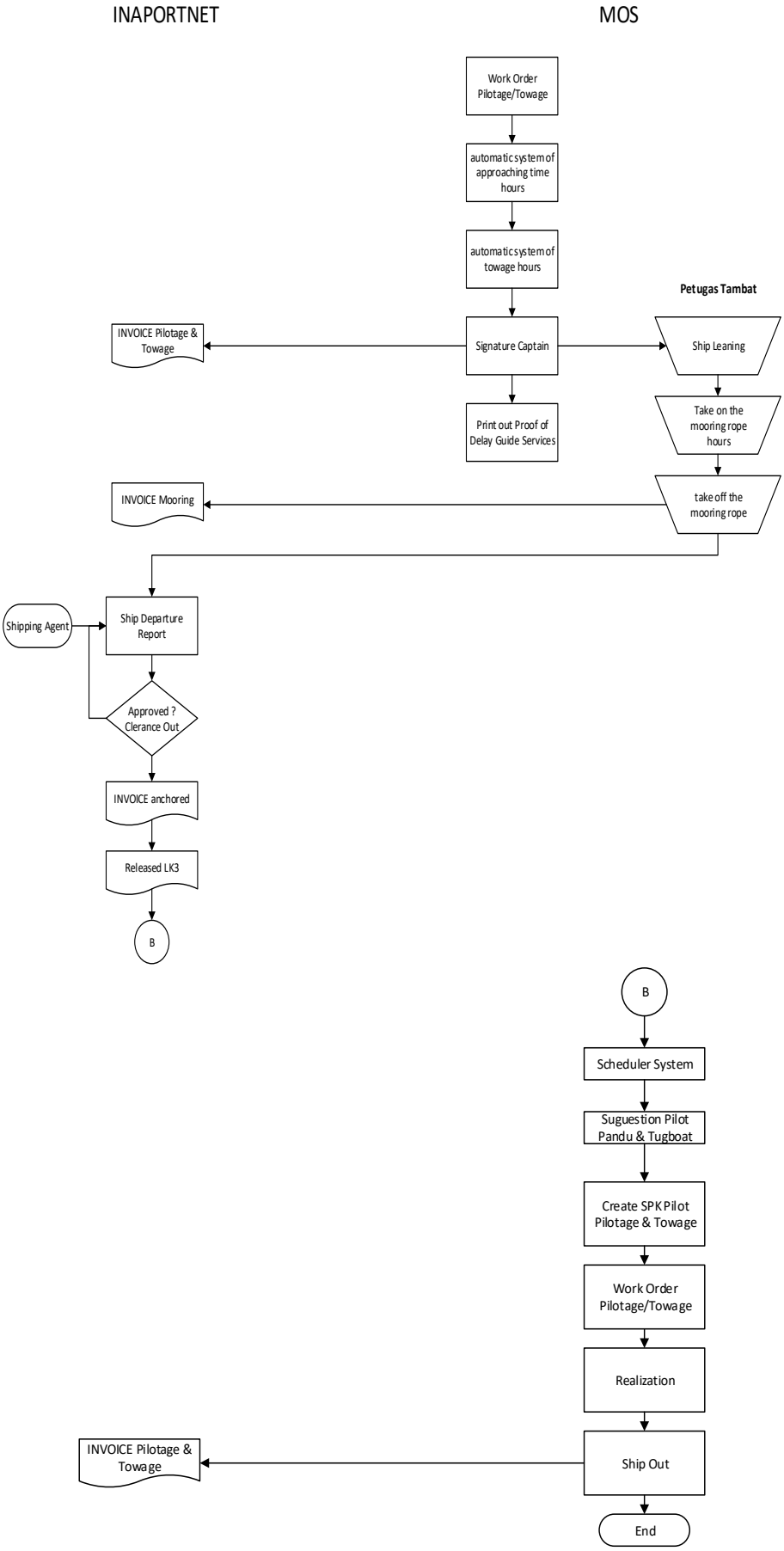


Fig 7:- Flowchart of Ship Service Concepts

IV. RESULT AND DISCUSSION

A. Plot of Process of Ship Departure and Arrival Service

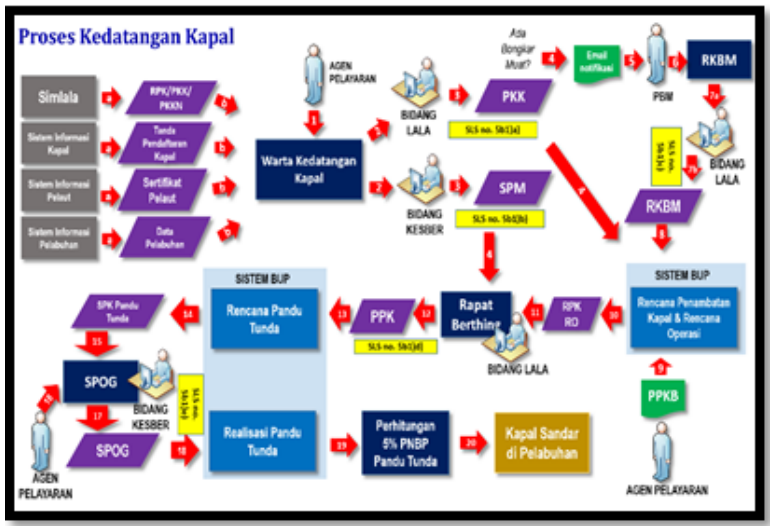


Fig 8:- Plot of Business Process of Reengineering "Arrival Ship" (existing)

The process of applying for ship arrival services performed by shipping agents is only given a maximum limit of 1x24 hours for verification which will be changed to "ship news". Then, the shipping agent must complete the ship news data with the maximum limit same as the process of submitting the ship service which will be submitted to the Port Operator in the form of PKK and to harbormaster in the form of SPM in the condition that the ship has not arrived at the port. After being verified the PBM can submit a Loading and Unloading Activity Plan from PKK data that has been verified by the Port Operator and subsequently verified by the RKBM as the data need for loading and unloading activities. Furthermore BUP sends RPK-RO data based on data from the PKK to the Port Operator along with the PPKB submission. Then a berthing meeting was held to discuss the determination of ship berth as PPK release data. Then BUP perform plan of approaching time of ship. SPK Pandu issuance from BUP is released if PPK has been determined by the Port Operator. After the release of the SPK Pandu, and then SPOG publishing or the movement since the Pandu SPK is published. Then after the SPOG is published, approaching time of ship service can be implemented in accordance with the service obligation until the ship berth at the port in accordance with PPK data which is the location of the mooring as a place for berthing chosen ship.

Fig 9:- Plot of Business Process of Reengineering "Departure Ship" (existing)

Based on that stipulated in the Regulation of the Director General of Sea Transportation Number: HK.103 / 3 / II / DJPL-15 concerning Procedures for Service of Ship and Goods that Shipping Agencies are required to submit a request for outbound ship services for a maximum of six (6) hours. After the ship request has been submitted then LKK will be released which will be verified by the Port Operator then will be calculated a calculation of berthing

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ship service which must be paid by the Shipping Agent. If the Shipping Agent has paid the berth service fees then automatically LK3 will be verified, meaning that the SPB or called Sailing Approval Letter is issued so that harbormaster can permit the ship to leave. Issuance of SPK Pandu for ships departure no more than 30 (thirty) minutes since the *Sailing Approval* (SPB) (Sailing Approval Letter) was issued. Then the scout performs his responsibility to provide approaching time services until the ship exits the port.

Due to the piloting ship service process still manual, there is no supporting application so there is limited visibility of resources. This is a challenge for port operators, PT. Pelindo II to optimize approaching time services to be more effective and efficient as well as to increase shipping safety factors that have an impact on reducing port logistics costs. The development of approaching time service information system (SIPANDU) is able to do as following:

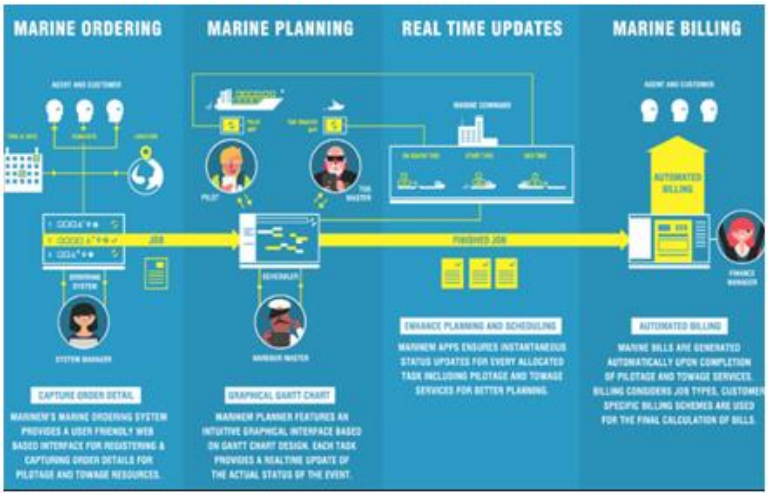

Fig 10:- Schema of Concept of Implementing Information System of marine operating (MOS/SIPANDU)

With the development of information system of ship approaching time (SIPANDU) or Marine Operating System (MOS) will have an impact on the business process of ship services so that there is process of efficiency and of course the effectiveness of optimization in business processes, the following is a business planning analyst after being analyzed with existing systems so as to produce service business process efficiency which is pictured in the diagram below:

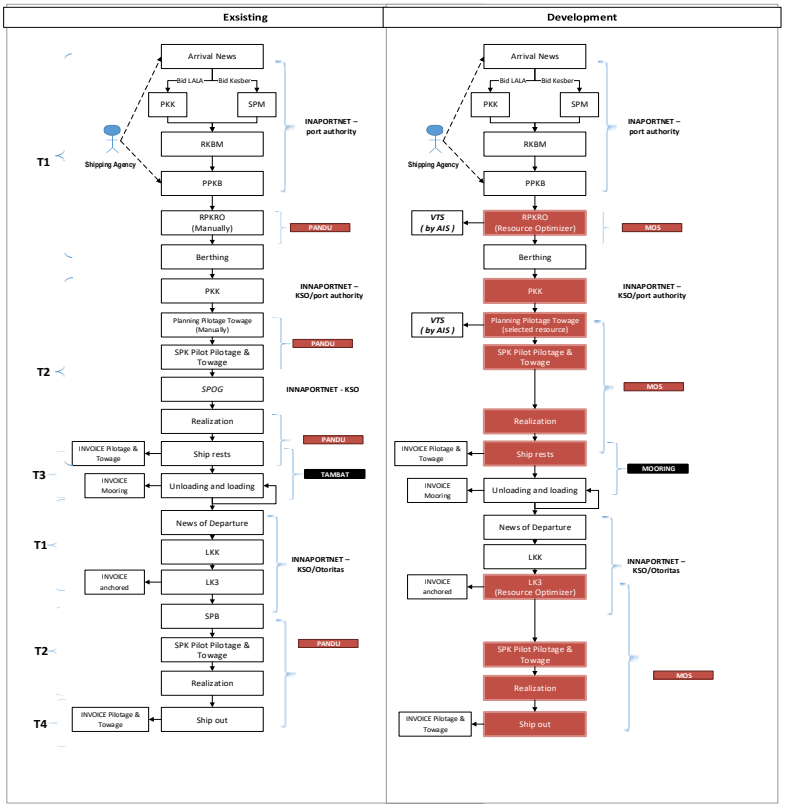

Fig 11:- Diagram of ship services (Before & After)

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With the development of a Marine Operating System (SIPANDU) or that each scout officer will be given an IPAD appliance installed on a Marine Operating System (MOS) or SIPANDU application so that scout work orders will be sent in real-time, likewise as a position detection or scout pilot locations. The Marine Operating System (MOS) or SIPANDU will affect the overall business process of ship services that are seen in the RPKOP stage or called The Berthing Ship & Operations Plans that are systemically integrated in VTS or called the Vessel Traffic System which knows the density of vessels through AIS technology as a ship detector or good tracker so that the ship berthing plan will not clash with the schedule of incoming ship traffic or leaving the port. And of course it will help send the information to the Marine Operating System (MOS) or SIPANDU as a trigger planning scheduler for approaching time services so that approaching time services can be served on time and on target according to the available resources according to port traffic conditions.

Not only that, at the PKK stage or called Ship Arrival Notification automatically as a trigger on the marine operating system (MOS) or SIPANDU system in the resource planning of approaching time, who is on duty scout pilot/tugboat will be automatically recorded in the system the scheduler, which the existing is still manually performing ship approaching time, that is assigning related scout pilot/tugboat which make the work is less efficient and effective.

Then, after planning PIC of ship approaching time also pilot or tugboat the automatic marine operating system (MOS) or SIPANDU will release a *Surat Penunjukkan Kerja* or SPK Ship Approaching Time sent by each scout pilot as the basis for the assignment of piloting ship. While the SPOG stage, or called *Surat Persetujuan Olah Gerak* is harbormaster responsibility which was originally act as a letter of port of entry permit "REMOVED" because as efficiency factor in the of service business process governance the implementation of marine operating systems (MOS) or SIPANDU. SPOG released by the harbormaster is maximum of one (1) hour after the SPK of ship approaching time released, that in terms of time they are able to execute process efficiency as much as ± 1 hour. After the SPK has been released, the realization of ship approaching time can occur by guiding the ship into the port until it is fully berth for loading and unloading processes and vice versa when ship departure conditions, stages in LK3 or referred to as *Laporan Kedatangan dan Keberangkatan Kapal* (the Ship Arrival and Departure Report) as a trigger of marine operating system (MOS) or SIPANDU on resource planning of ship approaching time in guiding ships out of port. The selected resources of approaching time will automatically receive SPK Pandu as the basis for scouting work by the marine operating system (MOS) or SIPANDU. Without passing through the SPB stage or *Sailing Approval* (the Sailing Approval Letter) under the auspices of the harbormaster as a permit. Same is the case with specific SPOG for ship permit to enter the port. After the SPK Pandu automatically releases the piloting ship to out of port service, it must be performed by the scout pilot and tugboat safely.

When piloting ship both scout pilot and tugboat has fulfilled their service duty until they are able to perfectly berth on the dock and able to guide the ship depart of the port, then automatically marine operating systems (MOS) or SIPANDU will be recorded in real time and reported the approaching time to the Shipping Agent to pay the fee is more accurate.

Conditions are expected after the implementation of a digital information system for ship approaching time services will obtain the following;

Before SIPANDU	After SIPANDU
1. The service by met and written (manual).	1. The service by system application (paperless).
2. Ship movement cannot be detected and registered.	2. Activity more safety, the ship movement is detected and recorded.
3. Cannot notice the ship approaching time which serves the ship, there must be communication with planner to determine the service.	3. The service run automatically by SIPANDU system all data tracked and monitored.
4. Request for payment done manually and inaccurate.	4. certainty of execution guarantee, certainty of service time, there is no bill correction (accurate).
5. 1 time order service takes 2-3 hours.	5. Service order much faster.

Table 1:- Condition of Approaching Time Service before and After SIPANDU/MOS Implemented

In the business process, improvement that is developed in MOS (Marine Operations System), then will be conducted a simulations based on secondary data on the performance of approaching time at Tanjung Priok port which will be compared with the results of data based on Pilot Project Digitalisasi Sistem Layanan Pandu Kapal (Pilot Project Digitizing the Approaching Time Service System). Below is the basis for calculating the cost / tariff for aproaching time services (Scouting), as follows:

(Fixed Rates) + (Additional Rates *GT)
(IDR 213.248,-) + (IDR 59.200,-*GT@ship)

Table 2:- Approaching Time Fee

(Fixed Rateds*3.5)+(Additional Rates*GT*3.5)
(IDR 2.006.000,-*3.5)+(IDR 8.000*GT@ship*3.5)

Table 3:- Tugboat Fee
Source: www. ipc.com

Moreover, to prove the success of the piloting ship performance standards at Tanjung Priok Port, then the TJ Priok Port Authority standardizes achievement in order to achieve a standardized ship service performance that will have an impact on lower logistics costs. Automatically efficiency will affect the time which affects the number of ships served. Below is the stipulation of the standardization of piloting ship services, which are:

STANDAR KINERJA OPERASIONAL KAPAL
DIVISI KEPANDUAN PT. PELINDO II (PERSERO) CABANG TANJUNG PRIOK

NO	NAMA TERMINAL	WT (JAM)	AT (JAM)
1	JICT	1	2
2	TPK KOJA	1	1.8
3	NPCT1	1	2
4	MAL	1	1.7
5	IPC TPK	1	2
6	PTP	1	2
7	IKT	1	2

Fig 12:- Performance Standards for Operational of Ship Approaching Time
Source: Regulation of Head of Tj Priok Port Authority Office No. UM.008/36/4/OP.TPK.118

The waiting time is determined that the maximum is 1 hour, as well as the approaching time that the maximum is 2 hours. Then, the data based on the 2018 guiding performance is managed with a simulation sample of three (3) months in manual conditions and three (3) months in Pilot Project conditions as a basis for calculations explaining that the effect of changing the manual system to digital will have an impact on lower costs logistics.

From the above data based on field realization proves that the influence of information system development is able to have an impact on the high cost of approaching time, about 10% increase in the performance achievement of approaching time services based on waiting time and approaching time. This means that it becomes Pelindo's income and also time efficiency so that more ships can be served by terminal operators. The following is a graph of three (3) months of waiting time achievement in manual approaching time conditions:

Eksisting Manual

Month	Qty Ship	Waiting Time			Approching Time			Cost Pandu	Cost Tunda	Sub Total
		x<=1hour	x>1hour	% WT	x<=2hour	x>2hour	% AT	Rp (Rupiah)		
FEB	2344	1743	601	74%	1814	530	77%	6,199,269,994	30,446,985,394	36,646,255,388
MAR	2665	2084	581	78%	2078	587	78%	7,132,839,843	34,536,408,243	41,669,248,086
APR	2694	2194	500	81%	2158	536	80%	7,122,094,182	33,633,149,091	40,755,243,273
Sub Total										119,070,746,747

Pilot Project by System

Month	Qty Ship	Waiting Time			Approching Time			Cost Pandu	Cost Tunda	Sub Total
		x<=1hour	x>1hour	% WT	x<=2hour	x>2hour	% AT	Rp (Rupiah)		
OKT	2694	2217	477	82%	2150	544	80%	7,529,990,186	34,421,745,897	41,951,736,083
NOV	2601	2147	454	83%	2180	421	84%	7,248,337,495	33,424,194,920	40,672,532,415
DES	2481	2123	358	86%	2061	420	83%	7,384,753,819	33,926,847,817	41,311,601,636
Sub Total										123,935,870,134
Selisih										4,865,123,387

Table 4

V. CONCLUSION & SUGGESTION

Prior to the application of the SIPANDU application system, requests and services for ship approaching time were executing by met and written on paper (manual), not well archived on work recording books, requests bill is manual and inaccurate, which often found ship movements undetected and unregistered also there is no certainty in the provision of services and there is potential for correction of service notes. With the use of SIPANDU, it is hoped that all ship approaching time services have been performed on a digital basis, meaning that handling from submission of requests to the end of activities is done by using the available application system, no more submission a request in written (paperless)s, it is to avoid face-to-face meetings. The pattern of movement of ships is tracked and recorded, that shipping safety is maintained, there is certainty guarantee of measured implementation time, lower operational costs, and service fee bills is faster and more accurate. Absolutetly, it also has an impact on the efficiency of the business process of ship services that can be seen in the SPOG & SPB stages which are eliminated because of the digitization factor of the *marine operating system* (MOS/SIPANDU).

Utilization of this application system has been proven to provide value-added services that are reliable both qualitatively and quantitatively. Thus, the approaching time service at the Tj Priok port can be more effective, more efficient, which results in lower logistics costs. Therefore, it is hoped that the interwoven communication and coordination between all the personal in charge of implementing the application support can be maintained properly in order to conduct a review and socialization of the new application system.

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