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Vessel Traffic Services at the Port of Zamboanga as Perceived by the Stakeholders: Bases for an Organized Traffic Service

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Abstract

Aim: This study aimed at determining the vessel traffic services in terms of traffic organization services, information services, services intended to support the efficient flow of traffic, navigation services, and monitoring services. Likewise, it determined the significant difference in the vessel traffic service indicators as perceived by the stakeholders. Based on the results of the study, proposed organized traffic services were prepared.
Methodology: Descriptive research was employed in this study. This research utilized a questionnaire constructed by the researcher for the indicators of the vessel traffic services. The questionnaire was validated by the experts, reliability tested, and subjected to factor analysis. The respondents of this study were the 69 stakeholders comprising the Philippine Coast Guard, PPA Representatives, Seafarers, and Harbor Pilots/tugboat operators. Statistical tools used were mean, rank, and One-Way Analysis of Variance (ANOVA) for inferential statistics set at a .05 level of significance. The data were tallied, classified, and subjected to appropriate statistical tools.
Results: The findings showed that, generally, the proposed vessel traffic services were agreeable to the respondents with all the indicators in terms of traffic organization services, information services, services intended to support efficient flow of traffic, navigational services, and monitoring services. Significant differences existed in the vessel traffic services in all the indicators. The perceived vessel traffic services seemed to indicate that the services rendered in terms of traffic organization services, information services, services intended to support the efficient flow of traffic, and navigational services were good enough to meet the needs of the passengers that would contribute to maximum safety of life at sea and systematic delivery of implementation. There were significant differences in the perceived indicators of the vessel traffic services.
Conclusion: The services rendered in terms of traffic organization services, information services, services intended to support the efficient flow of the traffic, and navigational services are good enough to meet the needs of the passengers that will contribute to the maximum safety of life at sea and for the management to improve and have systematic delivery and implementation of the said services rendered by the vessel traffic services management.

Keywords: Vessel Traffic Services, port, perceived, stakeholders

INTRODUCTION

For the past 5000 years, one of the main modes of transportation and trade has been shipping. Historically, shipping began as small-scale trade along rivers in Mesopotamia and the Mediterranean. Today, it is a global industry, with cargo moving through more than 3000 main commercial ports globally. Over 95% of all items are imported and exported via seaborne transport in Sweden alone.

In recent decades, there has been a steady increase in the number of products transported, primarily due to the growth of economies such as China and India. The global fleet has grown by more than half over the last 10 years, reaching 1.6 billion deadweight tonnes (dtw) as of January 2013.

Port architecture and its environs have evolved globally in tandem with the growth of both the volume and scale of marine activity. The introduction of deep-water routes, specialized terminals, and Traffic Separation Schemes

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(TSS) has resulted in an increase in the amount and size of maritime traffic, which has also caused changes to port infrastructure globally. To promote economical and secure maritime trade, deep-water routes, specialized terminals, and Traffic Separation Schemes (TSS) have been implemented.

As components of the maritime transport system in a port approach, there are several services to support vessel traffic and to increase the safe and efficient flow of traffic into and out of port. One of these services is the Vessel Traffic Service (VTS).

Zamboanga Port, whose strategic location lies at the southernmost portion of the Philippine archipelago, western tip of the island of Mindanao, being adjacent to the Basilan Strait and nearby Sulu Archipelago and South China Sea, has close proximity to Sabah, Malaysia, Brunei Darussalam, and Indonesia, thus, its appellation as the Philippines' gateway to the Brunei-Indonesia-Malaysia-Philippines (BIMP) East Association of Southeast Asian Nations (ASEAN) Growth Area (BIMPEAGA). These countries thus, have the opportunities for greater economic growth, particularly in trade, investments, and tourism in the region because of their strategic location and physical endowments and transportation is mostly by sea.

Today, Zamboanga Port caters to both domestic liner cargo vessels and ferries coming from the island provinces and foreign vessels participating in Southeast Asian Nations (ASEAN) Growth development, which continuously increases their number of calls. The Philippine Ports Authority PMO Zamboanga statistics show that the number of vessel calls from year 2010 to 2019 (before the pandemic) has had a 28.18% increase.

The VTS is a maritime shore-based service to assist vessel traffic in a specific area. The service is provided by VTS operators (VTSOs) using Very High Frequency (VHF) radio to provide information that is important for safe navigation within the area.

A Vessel Traffic Service (VTS) is normally implemented by a "Competent Authority", i.e., a national maritime administration, "to improve the safety and efficiency of vessel traffic and to protect the environment" (IMO, 1997). Although defined and regulated at the international level by IMO guidelines and regulations, the VTS itself is implemented through national maritime administrations and realized at a local level by VTS managers (VTSM) and VTS supervisors (VTSS) (IALA, 2012a).

There are five service levels: traffic organization service (TOS), information service (INS), service intended to support the efficient flow of traffic, navigational advice and assistance (NAS), and monitoring service (IALA, 2012a), that a VTS center can offer in a specific area. While a VTS can offer all three service levels, depending on how the service is implemented locally, the legal mandate of the service does not provide sufficient means to actively manage the vessel traffic within the VTS area, as the decision-making authority always remains on board. As a consequence, the current role of the VTS in traffic management is often restricted to providing the "right" information at the "right" time (Praetorius, Bruno & Lützhöft, 2010). Most traffic management, such as ensuring separation from other ships is, therefore, conducted on board a vessel, only considering the immediate surroundings and pursuing highly individual goals, which can occasionally conflict with the overall safety and fluency of the overall traffic in the area. Although the VTS has the authority to enforce compliance, the operators are required to provide the service by transmitting information through the VHF, without knowing whether and how this information will be used on board.

Governments may establish VTS when, in their opinion, the volume of traffic or the degree of risk justifies such services. SOLAS Chapter V Safety of Navigation Regulation (12) IMO resolution A.578 (14) adopted the Guidelines for Vessel Traffic Services in 1985, which stated that VTS was particularly appropriate in the approaches and access channels of a port and in areas having high traffic density, movements of noxious or dangerous cargoes, navigational difficulties, narrow channels, or environmental sensitivity.

Maritime safety, efficient maritime transport, and navigational systems, as well as the safety of humans and the environment, are among the priority concerns of those engaged in the maritime industry such as the Philippine Ports Authority. The Port Management Office of Zamboanga, as a recently converted international port, provides services to foreign cargo ships as well as domestic cargo and passenger vessels that enter and leave Zamboanga.

The researcher believes that a study on vessel traffic management services as perceived by the different stakeholders offers great support through the establishment of an organized vessel traffic service at the Zamboanga Port would be beneficial not only in the safety and efficiency of vessel traffic but also in the protection of the marine environment. Hence, this study.

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Objectives

This descriptive study aimed at determining the traffic services of vessels when approaching, entering, departing, navigating, operating or anchoring/mooring in the port of Zamboanga as bases for an organized Vessel Traffic Service.

Specifically, the study sought answers to the following questions:

1. What are the vessel traffic services as perceived by the respondents in terms of:
   (a) Traffic Organization Services;
   (b) Information Services;
   (c) Services Intended to Support the Efficient Flow of Traffic;
   (d) Navigational Services; and,
   (e) Monitoring Services?
2. Are there significant differences in the vessel traffic services as perceived by the respondents in terms of:
   (a) Traffic Organization Services;
   (b) Information Services;
   (c) Services Intended to Support the Efficient Flow of Traffic;
   (d) Navigational Services; and,
   (e) Monitoring Services?
3. Based on the result of the study, what organized vessel traffic services are needed?

Hypothesis

There are no significant differences in the vessel traffic services as perceived by the respondents in terms of Traffic Organization Services, Information Services, Services Intended to Support the Efficient Flow of Traffic, Navigational Services, and Monitoring Services.

METHODS

Research Design

The study utilized the descriptive research design. Descriptive research, according to Creswell (2002), involves collecting data in order to test hypotheses or answer questions concerning the current status of the subjects in the study. Descriptive research reports on the way things are. According to Manjunatha (2019), descriptive research is "aimed at casting light on current issues or problems through a process of data collection that enables them to describe the situation more completely than was possible without employing this method." Furthermore, "descriptive research can simply be defined as the attempt to determine, describe, or identify what is, whereas analytical research tries to figure out why it is that way or the manner in which it came to be."

Population and Sampling

Simple random sampling was used to determine the respondents of the study, the stakeholders consisting of the Philippine Coast Guard, PPA Representative, Seafarers, and Harbor Pilots/Tugboat Operators.

Instrument

The data needed for the investigation were obtained through a researcher-constructed questionnaire on the organized vessel traffic services with five indicators, namely: Traffic Organization Services with (9 items); Information Services (10 items); Services Intended to Support the Efficient Flow of Traffic (10 items); Navigational Services (10 items); and Monitoring Services (10 items), for a total of 49 items. The questionnaire was validated by the experts, reliability tested and subjected to factor analysis.

The questionnaire was distributed to the respondents, who were the Philippine Coast Guard, PPA Representative, Seafarers, and Harbor Pilots/Tugboats Operator.

Data Collection

Detailed instructions were given to be sure that the respondents understood well what they should do so that the questionnaire would be properly accomplished, and no items left not answered.

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Treatment of Data

The data gathered from the respondents were tallied, classified, and subjected to appropriate statistical tools through the Statistical Package for the Social Sciences (SPSS) software. Statistical tools used were mean, rank, for descriptive statistics and One-Way Analysis of Variance (ANOVA) for inferential statistics set at a .05 level of significance.

Ethical Considerations

The researcher ensured that all research ethics protocols were followed for the protection of all the people involved in the study.

RESULTS and DISCUSSION

Vessel Traffic Services at the Port of Zamboanga as Bases for an Organized Traffic Services in Terms of Traffic Organization Services, Information Services, Services Intended to Support the Efficient Flow of the Traffic, Navigational Services, and Monitoring Services as Perceived by the Respondents

As shown in Table 1, when taken as an entire group, the Philippine Coast Guard, PPA Representative, Seafarers, Harbor Pilots/Tugboats were "all agreeable" to the services rendered of the vessels traffic services in Zamboanga. The mean was within the 3.40-4.19 range.

In traffic management services (M = 4.05, SD =.05), Information Services (M = 3.84, SD =.58), Services intended to support for the efficient flow of traffic (M = 3.19, SD =.65), Navigational Services (M = 3.70, SD =.81), and Monitoring Service (M = 3.91, SD =.69).

(A) Traffic Organizational Services

In traffic organization services, only the PPA representative "strongly agreed" (M=4.31, SD=.53), while the Philippine Coast Guard, the seafarers, and the harbor pilots "agreed" with the proposed services need by the Port of Zamboanga. The mean fell within the 3.40 to 4.19 range.

(B) Information Services

In Information Services, all the respondents were "agreeable" to the services needed. Philippine Coast Guard (M = 3.91, SD =.70), PPA Representative (M = 4.19, SD =.46), Seafarers (M = 3.67, SD =.62), Harbor Pilots/Tugboats (M = 3.57, SD =.58).

(C) Services intended to support the efficient flow of traffic.

Philippine Coast Guard "agree" (M = 4.11, SD =.68), PPA Representative (M = 4.19, SD =.46) "strongly agreed", Seafarers (M = 3.63, SD =.69) "agreed", and Harbor Pilots/Tugboats (M = 3.63, SD =.42) with all the proposed services to be offered by the Port of Zamboanga.

(D) Navigational Services

In Navigational Services, Philippine Coast Guard (M = 3.88, SD =.93), PPA Representative (M = 4.19, SD =.71), Seafarers (M = 3.48, SD =.71). All the means indicated the perceived navigational services as "agreeable"; however, the Harbor Pilots/Tugboats perception was "moderately agreeable" (M = 3.24, SD =.60) to the services need by the Port of Zamboanga.

(E) Monitoring Services

Monitoring Services was perceived by all respondents as "agreeable", Philippine Coast Guard (M = 4.18, SD =.67), PPA Representative (M = 4.19, SD =.62), Seafarers (M = 3.78, SD =.65), and Harbor Pilots/Tugboats (M = 3.46, SD =.50) to the services need by the Port of Zamboanga.

Generally, the needed vessel traffic services of Zamboanga were agreed to by the respondents as shown in Table 1; however, some of the services rendered were "moderately agreed" as perceived. These particular services delivered by the Zamboanga port need attention. The management should note that the port management office has to improve the vessel traffic services provided for safety and efficiency of navigation, Safety of life at sea, protection of marine environment and/or adjacent shore area, work sites, and offshore installation from possible adverse effects of marine traffic in a given sea. Literature supports that VTS systems and operations can be used to enhance the efficiency and safety of navigation thereby increasing the economic capability of seaport (Efeturi,2021)

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Table 1

Means of the Vessel Traffic Services at the Port of Zamboanga as Bases for an Organized Vessel Traffic Services in Terms of given variables as Perceived by the Respondents

Category	Respondents	Mean	SD	Description
(A) Traffic Organization Services.				
	Philippine Coast Guard	4.01	0.53	Agree
	PPA Representative	4.31	0.53	Agree
	Seafarers	4.06	0.49	Agree
	Harbor Pilots/Tugboats	3.82	0.35	Agree
	AWM	**4.05**	0.50	Agree
(B) Information Services				
	Philippine Coast Guard	3.91	0.70	Agree
	PPA Representative	4.19	0.46	Agree
	Seafarers	3.67	0.62	Agree
	Harbor Pilots/Tugboats	3.57	0.58	Agree
				Agree
	AWM	**3.84**	0.58	
(C) Services intended to support the efficient flow of traffic				
	Philippine Coast Guard	4.11	0.68	Agree
	PPA Representative	4.24	0.55	Strongly Agree
	Seafarers	3.63	0.69	Agree
	Harbor Pilots/Tugboats	3.63	0.42	Agree
	AWM	**3.91**	**0.70**	Agree
(D) Navigational Services				
	Philippine Coast Guard	3.88	0.93	Agree
	PPA Representative	4.15	0.71	Agree
	Seafarers	3.48	0.71	Agree
	Harbor Pilots/Tugboats	3.24	0.60	Moderately Agree
	AWM	**3.70**	**0.81**	Agree
(E) Monitoring Services				
	Philippine Coast Guard	4.18	0.74	Agree
	PPA Representative	4.19	0.62	Agree
	Seafarers	3.78	0.65	Agree
	Harbor Pilots/Tugboats	3.46	0.50	Agree
	AWM	**3.91**	0.69	Agree
	Over-all Mean.	**3.88**	**0.66**	**Agree**

Significant Difference in the Perceived Vessel Traffic Services at the Port of Zamboanga among the Philippine Coast Guard, PPA Representative, Seafarers, and Harbor Pilots/Tugboats

A significant difference existed in the vessel traffic services of the Port of Zamboanga in Traffic Organization Services, F (3,65) =2.951, p=.035), Information Services F (3,65) =4.612, p=.005), Services intended to support the efficient flow of the traffic F (3,65) =4.941, p=.004), Navigational Services F (3,65) =4.968, p=.004), and Information Services F (3,65) =5.129, p=.003). This goes to show that the perception of the respondents differed.

Table 2 shows the data.

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Table 2
Significant Differences in the Vessel Traffic Services at the Port of Zamboanga

Source of Variation	Sum of Square	df	Mean Square	F	Sig.
(A) Traffic Organization Services					
Between Groups	2.086	3	.695	2.951	.035*
Within Groups	15.312	65	.236		
Total	17.398	68			
(B) Information Services					
Between Groups	4.012	3	1.337	4.610	.005*
Within Groups	18.857	65	.290		
Total	22.87	68			
(C) Services intended for the support of the efficient flow of traffic					
Between Groups	5.342	3	1.781	4.941	.004*
Within Groups	23.424	65	.350		
Total	28.766	68			
(D) Navigational Services					
Between Groups	8.393	3	2.789	4.968	.004*
Within Groups	36.606	65	.563		
Total	44.999	68			
(E) Monitoring Services					
Between Groups	6.216	3	2.072	5.129	.003*
Within Groups	26.259	65	.404		
Total	32.475	68			

*p<.05

Thus, a multiple comparison was run for significant differences results. Multiple comparison showed that in traffic organization, PPA Representatives had significantly higher mean perceptions than the harbor pilots/tugboats. In information services, the PPA Representatives had a significantly higher mean perceptions than the seafarers and harbor pilots/tugboats. In services intended to support the efficient flow of the traffic, the PPA Representatives had a significantly higher mean perceptions than the seafarers and harbor pilots/tugboats. In navigational services, the PPA Representatives had a significantly higher mean than the seafarers and harbor pilots/tugboats. In monitoring services, the Philippine Coast Guard had significantly higher mean than the harbor pilots/tugboats. According to Zheng et. al (2019), the main objectives of port governance is the improvement of port efficiency and effectiveness.

Table 3 shows the data.

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Table 3
Multiple Comparison

DV	Category	Category	Mean diff.	Std. Error	Sig.
(A) TOS					
	PPA	Harbor Pilots/Tugboats	.48920	.16677	.043*
(B) IS					
	PPA	Seafarers	.52778	.17954	.043*
		Harbor Pilots/Tugboats	.61944	.18506	.015*
(C) SISEFT	PPAPP				
	PPA	Seafarers	.61667	.20010	.030*
(D) NS					
	PPA	Harbor Pilots/Tugboats	.00625	.25785	.010*
(E) MS					
	Philippine Coast Guard	Harbor Pilots/Tugboats	.72022	.27139	.020*

Based on the results of the study, proposed Organized Vessel Traffic Services were developed. This consists of the Rationale, Objectives, Strategies for the proposed services, Persons Involved and Expected Outputs

Conclusion

In view of the research findings, the following conclusions were drawn:

1. Generally, the perceived vessel traffic services in the Port of Zamboanga are "agreeable" to the respondent. This seems to indicate that the services rendered in terms of traffic organization services, information services, services intended to support the efficient flow of the traffic, and navigational services are good enough to meet the needs of the passengers that will contribute to the maximum safety of life at sea and for the management to improve and have systematic delivery and implementation of the said services rendered by the vessel traffic services management.

2. A significant difference exists in the vessel traffic management services in terms of the traffic organization services, information services, services intended to support the efficient flow of the traffic, navigational services, and monitoring services. This seems to show that their perception of the different vessel traffic management services is not similar.

The PPA representative has a higher mean perception than the harbor pilots in traffic organization services and information services for seafarers and harbor pilots in the efficient flow of traffic and navigational services; and finally, the Philippine Coast Guard has a significantly higher mean perception that the harbor pilots/tugboats.

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REFERENCES

Chang, Q., Zhevy, S., Geerlings, H., & Makhloufi, A. El. (2019). Port governance revisited: How to govern and for what purpose? Transport Policy, 75, 1-10.

Creswell, J. (2002). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Upper Saddle River, NJ: Merrill Prentice Hall.

Efeturi, A. M. (2021). Improving the safety of navigation through Vessel Traffic Services (VTS) at Lagos Port Complex, Nigeria.

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Ethridge, D.E. (2004). *Research Methodology in Applied Economics*. John Wiley & Sons, p.24

IALA. (2012a). IALA Vessel Traffic Manual 2012 (5th ed.). International Association of Marine Aids to Navigation and Lighthouse Authorities.

IMO. (1997). Guidelines for Vessel Traffic Services. Resolution A.857 (20). International Maritime Organization.

IMO. (2002a). SOLAS Regulation V/11 Ship reporting systems.

IMO. (2002b). SOLAS Regulation V/12 Vessel traffic services.

IMO. (n.d.). SOLAS Chapter V Safety of Navigation Regulation 12.

IMO. (n.d.). IMO resolution A.578 (14).

Manjunatha, N. (2019). Descriptive research. Journal of Emerging Technologies and Innovative Research (JETIR), 6(6), 863. Retrieved from www.jetir.org

Praetorius, G., Bruno, K., & Lützhöft, M. (2010). Enacting reliability: First steps to define safety in the VTS domain. Proceedings of the International Conference on Human Performance at Sea, HPAS 2010 at Glasgow

Zhang, Q., Zheng, S., Geerlings, H., & El Makhloufi, A. (2019). Port governance revisited: How to govern and for what purpose? Transportation Research Part A: Policy and Practice, 77, 46-57.