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COVID-19's Impact on the Shipping Industry: Case Study of the Sanur-Nusa Penida Route, Bali-Indonesia Shipping

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ABSTRACT: The coronavirus disease (COVID-19) has triggerred a global health and economic crisis with far-reaching implications for maritime transport and trade. Restrictions imposed in response to the pandemic have caused disruptions affecting ports, shipping, and supply chains. The island of Bali, one of the provinces of Indonesia, is used as a case study of the impact of the pandemic on the local economy in a region that relies on shipping and tourism. The Indonesian government has employed large-scale social restrictions or *Pembatasan Sosial Berskala Besar* (PSBB) to regulate and allow people to return to their 'normal' activities. The first objective of this paper is to determine the impact of the PSBB on the shipping industry on the Sanur – Nusa Penida route. The second objective is to find out the level of service during the implementation of the PSBB which presents a new normal in continuing the shipping industry and its challenges. The results revealed there was a decrease in the number of passenger motorboats (PM) operating per day by 84.62%, a decrease in PM trips by 86.54%, and a decrease in the number of passengers by 96.05%. Following the satisfaction index, the overall satisfaction index for PM mode users (57.29%) can be defined as quite satisfactory (51%-65%).

KEYWORDS: Covid-19, Impact, Level of Service, Passenger Motorboats, PSBB, Sanur-Nusa Penida

INTRODUCTION

Ocean transport underpins global supply chain linkages and economic interdependence with shipping and ports accounting for more than 80 percent of global goods trade by volume and more than 70 percent by value [1]. As a result, when disruptive factors such as a pandemic occur, the sector functions as a transmission channel sends shockwaves throughout the supply chain and the region. Disrupted transportation networks and supply chains can significantly damage world trade and economic activity. Like the small island of Nusa Penida and the surrounding small islands that rely on tourism, they rely heavily on sea transportation for their livelihoods [2].

In 2016, the average increase in shipping was 31% from the port of Sanur to various small island ports of Nusa Penida, Lembongan, Ceningan, and Gili Lombok were dominated by foreign tourists by 56% (see Figure 1). In 2015 there were 281,468 passengers, increasing to 439,061 passengers in 2016. Local passengers (domestic & local tourists), in 2015 returned 260,122 passengers and in 2016 returned 281,468 or increased 4.7% [3]. Due to its popularity and success, the number and size of new ships launched every year are increasing. As there were more new and larger ships, reduced fares, bulky itineraries, and other factors, the number of tourists has also increased. Not only operators (shipping companies) benefit from this tremendous increase, but also ports of call, salesforce (agents), workforce, and supply as a whole.

Figure 1. Passenger Motorboat (PM) Bali Route

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However, the global outbreak of Coronavirus (COVID-19) has had a major impact on global shipping, affecting all shipping sectors from passenger ships to container ships and oil tankers. The coronavirus (COVID-19) crisis has escalated to an unprecedented level, triggering a global health and economic crisis with far-reaching implications for maritime transport and trade. Restrictions imposed in response to the pandemic have caused disruptions affecting ports, shipping, and supply chains [1].

Joko Widodo, the president of the Republic of Indonesia, once said that we should be able to open an opportunity because no place is immune to the virus. The best thing the world can do—and any industry can do—is to reduce the ability of the viruses to spread and develop in the environment by implementing strict health protocols that change over time to prevent, detect, and respond according to certain conditions. Many countries have responded to the pandemic by imposing lockdowns or by restricting travel. In Indonesia, although the number of positive cases of Covid-19 is still going up, the government has decided to loosen the nation's movement by employing restrictions on large social events (PSBB) through the Minister of Health Regulation Number 9 of 2020 [4], in contrast to the lockdown where people are not allowed to go outside home.

To carry out this new normal, the government has prepared several regulations to allow people to safely return to their 'normal' activities. Among the regulations issued is the Minister of Transportation Regulation Number 41 of 2020. It allows the government to regulate and control transportation modes from land, train, sea to air modes [5]. Furthermore, the Covid-19 Handling Task Force has issued the latest regulations regarding the travel of domestic people. One of them is the rules regarding sea transportation travel during the Covid-19 pandemic. The Policy includes comprehensive prevention, detection, and response strategies from the moment of ticket booking up to the ship's journey and disembarkation. This rule is stated in the Task Force Circular or *Surat Edaran* (SE) Number 12 of 2021 which is effective from April 1, 2021 until an undetermined time limit. In more detail, the following are the rules for travel with the latest sea transportation as summarized from [6]: Sea transportation travelers are required to show a certificate of negative test results from the RT-PCR test or rapid antigen test or GeNose C19 test as a condition of travel. The sampling period for the RT-PCR or rapid antigen test must be taken within a maximum of 3x24 hours before departure. Meanwhile, the GeNose C19 test must be carried out before departure at the port that provides it. The specific requirements to travel to the island of Bali by sea transportation is to show a certificate of negative results from the RT-PCR test or rapid antigen test whose samples were taken within 2x24 hours before departure; while the GeNose C19 test, the conditions are the same, done before departure at the port that provides it. Particularly for routine trips using sea transportation which aim is to serve limited location shipping between islands or between domestic ports within one agglomeration area, it is not required to show a letter of RT-PCR test results or rapid antigen test or GeNose C19 test as a condition of travel. Even so, specifically for routine trips, random checks or random tests may be carried out if required by the Regional Covid-19 Task Force. We can call this community activity or shipping movement from Sanur to Nusa Penida an activity in the agglomeration/urban area.

To date, various problems and challenges have been faced, but after more than a year into the pandemic, the shipping industry remains on the sidelines with no sign of recovery, while other industries have revived. Furthermore, the requirements for continuing business are stricter for the shipping industry than for other transportation industries, such as airlines, trains, and buses. Some people or regulators argue that the shipping industry is all about recreation and vacation. In this particular case of this research, the statement is true, considering the facts on the field showing that 90% of visitors who visit Nusa Penida are tourists, both domestic and foreigner; while airlines help provide livelihood needs. However, both industries are responsible for providing services for leisure and work (due to the large number of direct and indirect employees working for the shipping industry). It is helpful to see how the overall picture is involved in the complete supply chain of the shipping industry. Shipping activities support employment in various sectors, from the land transportation sector, food and beverage, lodging, hotels, professional services, and various providers and service providers in all corners. Moreover, several cities and companies are supported by the shipping industry to provide everything for the industry. In this pandemic situation, they are also struggling and may have permanent economic repercussions if boat trips are not allowed as soon as possible.

The purpose of this paper is to present a background regarding the shipping industry, to analyze the main impact of COVID-19 on the shipping industry by using the island of Bali as a broad example. This paper will then introduce some of the necessary frameworks to enable the resumption of the shipping industry. The research question that this paper tries to answer is why the shipping industry is worth continuing and what does it take to start over.

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RESEARCH METHOD

Data Collection

Data were collected in the form of primary data and secondary data. To obtain primary data, a survey was conducted by distributing questionnaires to PM users in the study area. The respondents used were travelers who had traveled on the Bali-Nusa Penida route before the Covid-19 pandemic and during the Covid 19 pandemic. The survey involved respondents taking into account age, gender, education level, occupation, income, and travel destination. Secondary data is obtained from the relevant agencies, which in this case is the Bali Provincial Transportation Service.

Importance Performance Analysis (IPA) Method

Importance Performance Analysis (IPA) method, or what is often known as quadrant analysis, was widely introduced by Martilla and James. This analytical method aims to measure the relationship between consumer perception assessments and priorities for improving the quality of a product or service. Due to its relatively easy application and easy-to-use presentation of the results for performance improvement, the IPA method has been widely used in various fields of study. The main function of this method is to provide information about service factors that greatly affect customer satisfaction and loyalty. In addition, this method also displays service factors, which, based on consumer assessments, should be prioritized for service improvement due to unsatisfactory existing conditions. In this method, the measurement of the level of importance and the level of satisfaction is combined into a two-dimensional graph. This in turn makes it easier for the reviewer to explain the data and present practical proposals. For analysis purposes, the data used are data obtained from surveys using questionnaires. In the questionnaire, users are asked to provide a perceptual assessment of a service that has been carried out into several assessment indicators [7], [8].

Customer Satisfaction Index (CSI)

To determine the condition of consumer satisfaction based on a comparison of statements of importance and a perceptional assessment of the performance of the service attributes presented, an index is calculated, known as the Customer Satisfaction Index. The CSI value is calculated in the following steps [9]:

a. Determining the average importance score, Mean Importance Score (MIS). MIS is obtained from the average score of the level of importance / expectations of service consumers.

$$MIS = \frac{(\sum_{i=1}^{n} Yi)}{n}$$

Where:
n : number of respondents
Yi : the importance of the i-th indicator

b. Determining the weighted factor, Weight Factor (WF). The weight is the percentage of MIS value per indicator to the total MIS of all indicators.

$$WF = \frac{MISi}{\sum_{i=1}^{p} MISi} x100\%$$

Where:
p : indicator of importance p
MIS : *mean importance score.*

c. Determining the weighted score, Weight Score (WS). WS is the product of WF and the average level of performance (MPS).

$$WSi = WFi \; x \; MPS$$

Where:
MPS = *mean performance score*

d. Determining Customer Satisfaction Index (CSI)

$$CSI = \frac{\sum_{i=1}^{p} WSi}{HS} x\ 100\%$$

Where:
S : *Highest scale* (highest scale used)

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The CSI value in this study is divided into five criteria from dissatisfied to very satisfied, as seen in Table 1.

Table 1. Customer satisfaction index (CSI) value criterias

No.	*CSI Value*	*CSI Criterias*
1	> 0.81	Very satisfied
2	0.66 – 0.81	Satisfied
3	0.51 – 0.65	Quite Satisfied
4	0.35 – 0.50	Less Satisfied
5	< 0.35	Dissatisfied

IPA and CSI methods are commonly used in research to determine the level of service. Several studies that have used this method are described as follows. In the results of the research analysis of the application of the IPA method on the Trans Koetaradja bus, it is found that users are satisfied with the arrangement of passenger density on the bus, however, the arrival time needs to be improved [10]. The use of the IPA method to determine the service level of speedboats on the Ternate-Rum route resulted in the conclusion there were variables with high expectations but poor performance, as well as variables that were considered unimportant but had good performance [11]. In addition, there was a study in the North Halmahera region using the IPA and CSI methods to discuss the performance assessment of transportation infrastructure. From the analysis, it is found that the performance of land, sea, and air transportation infrastructure has a satisfaction index in the range of 51%-65% which is included in the category of quite satisfied [12]. Another study discusses passenger perceptions of the quality of sea transportation services at PM Lotus, PM Bunda Maria, and PM Theodora which serve the Ternate-Sanana route; the study shows that the service is in the fairly satisfied category with a satisfaction index range of 51%-65% [13]. Based on the studies above, it can be concluded that the IPA and CSI methods can be used to obtain the level of performance of a mode of transportation or transportation infrastructure, hence, the adoption of said method in this study.

RESULTS AND DISCUSSION

A. Data on Passenger Motorboats (PM) Operational and Mode Users during the Pandemic

One of the protocols implemented to control the Covid-19 pandemic is the restriction of travel for people between places and regions, this restriction is also enforced in the island of Bali based on the instructions of the Governor. This restriction has very extreme implications in the decrease of PM operations and passengers as shown in Table 2 and Table 3.

The impact of the Covid outbreak is severe globally, but it is worse in tourism-driven places, such as Bali with the tiny island of Nusa Penida. In Indonesia, not only Bali, other eastern Indonesian islands are also complaining about the grave economic consequences of the "no sailing orders" that has been imposed.

The COVID-19 crisis has had a broad impact on the development of Bali's maritime sector such as in transportation and mobility, shipping, passanger motorboat, cruise ship tourism, and fisheries. This crisis has caused a massive negative demand shock due to the necessary precautionary measures and instructions to practice social distancing and avoid travel. Consequently, the supply chain was disrupted, in the form of a sharp decline in international and domestic tourism, and overall reduced mobility, which can be seen in Table 3. There is a very sharp decline of 84.62% in the number of PMs operating per day, the number of PM trips on the route Bali-Nusa Penida decreased by 86.54%, and the number of passengers decreased from 3,542 people per day at normal times to 140 people per day during the pandemic or decreased by 96.05%. This number shows that most people do not travel and had chosen to do activities at home following government recommendations. The spread of the virus has posed serious challenges to the industry because every activity has to be involved with public health and safety issues.

The characteristics of mode users are represented by the variables of gender, age, education level, income, and travel destination. Most of the mode users are male (63.89%), the age of mode users is between 25-35 years as much as 47.22%. The highest education of mode users, in general, is undergraduate (58.33%) with ASN/TNI/Polri (i.e., civil servants/military/police, respectively) occupations as much as 47.22%. The income level of mode users generally ranges from 3 million – 4 million as much as 36.11%. The purpose of mode users for the affairs of Hindu worship to Nusa Penida is as much as 77.78%.

With the vaccine's launch gaining momentum, everyone hopes that the public health situation will continue to improve and are aware that coronavirus is an ongoing situation that is developing day by day with its effects can be both deep and long term. How

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the cruise industry will look like after COVID-19 is unclear; however, [14] as the necessary data and tools to analyze the impact of the pandemic on specific shipping activities by analyzing ship traffic data and providing reliable figures to assist in determining recovery policies and specific actions. These figures are expected to help all parties involved (EU, maritime administration, and shipping industry) in determining a recovery strategy to overcome the economic crisis facing Europe.

Table 2. Passenger Motorboat (PM) Service Provider at the Port of Sanur to the Port of Sampalan

No.	*Service Provider*	*Passengers (Normal)*	*Passengers (PSBB)*	*Status*
1	Sanur Express	65	X	Not operating
2	Gogun Express	60	X	Not operating
3	Kebo Iwa Express	68	X	Not operating
4	Golden Queen	65	X	Not operating
5	Mola-Mola Express	68	X	Not operating
6	Tamarind Express	75	X	Not operating
7	Maruti Express	70	25	Operating
8	Sanjaya Fastboat	70	X	Not operating
9	S'Gening Fastboat	70	X	Not operating
10	El Rey Junior Fast	65	X	Not operating
11	Cruise	60	X	Not operating
12	Starfish Fast Cruise	60	X	Not operating
13	Wijaya Buyuk	60	X	Not operating
14	Dream Beach Express	70	X	Not operating
15	The Angkal	75	X	Not operating
16	Dwi Manunggal	75	X	Not operating
17	Prasi Sentan Funtastic	75	X	Not operating
18	Nusa Penida Fast	75	X	Not operating
19	Cruise	70	20	Operating
20	Yamuna Express	70	X	Not operating
21	Angel Billabong Fast	70	X	Not operating
22	Cruise	70	X	Not operating
23	Sri Rejeki Express	60	X	Not operating
24	Nusa Jaya Cruise	60	10	Operating
25	Ganesha Express	70	25	Operating
26	Ray Fishfast Cruise	75	X	Not operating
	Semabu Hills Fast Cruise			
	Idola Fast Cruise			
	Crown Fast Cruise			

Source: Secondary Data from Sanur Port

Table 3. Average Operation for Passenger Motorboats (PM)

No.	*Description*	*Normal Period*	*Pandemik Period*	*Decrease (%)*
1	PM operated per day	26	4	84.62
2	(unit)	104	14	86.54
3	PM trips per day (times)	3542	140	96.05
	Passengers per day (person)			

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Some of the consequences of the termination of the shipping industry and protocol recommendations (PPKM) so that shipping can continue. However, Coronavirus is an ongoing situation that is developing day by day and the impact can be deep and port in the long term facing an unprecedented number of moored ships. What shipping will look like post COVID-19 is unclear. Due to the dramatic impact on the entire industry, some motorboats in Bali are trying to continue despite the fact that COVID-19 is not yet under control and passengers are sparse. The disruption to the shipping industry has had a profound impact on those who rely on tourism for their livelihoods as well as on vendors in various supply chains. However, Cruise lines globally have committed to extensive new measures in response to COVID-19, including testing every guest and crew prior to boarding including strict protocols covering crew quarantine, social distancing, sanitation, health monitoring, and response procedures [15]. CLIA and its members advocate the gradual and controlled resumption of domestic shipping within Australia, starting with local cruises for local passengers while international borders remain closed.

B. Result of Importance Performance Analysis

Based on the questionnaire assessment (perception) of mode users on the performance and expectations (importance) of the Bali-Nusa Penida PM route, the results obtained are as in Table 3. The results from Table 3 are then mapped with quadrant analysis to determine the relationship between the level of performance and the level of importance based on the assessment /perception of PM mode users. By using a Cartesian diagram, it can be seen in more detail about the attributes that fall into the repair category and the attributes that fall into the categories that need to be maintained as shown in Figure 2.

Table 3. Questionnaire results to assess the level of performance and expectations of users of PM mode

No.	*Variable and Indicators*	*Performance Level Value (X)*	*Expected Level Value (Y)*	*Levels Discrepancy (X) – (Y)*
1	Hygiene	3.13	3.47	-0.33
2	Information services and rate	2.67	3.43	-0.77
3	Seats' comfort	1.67	3.40	-1.73
4	Service provider's attitude	1.57	3.47	-1.90
5	Officers' strictness	1.77	3.40	-1.83
6	Air circulation area	1.90	3.60	-1.57
7	Item deposit counter	2.20	3.47	-1.23
8	Availability of navigation tools	2.27	3.43	-1.30
9	Life jacket	2.43	3.57	-1.37
10	Fire extinguisher	2.70	3.80	-0.70
11	Mooring line	2.10	3.40	-1.33
12	Distress signal	2.27	3.43	-1.17
13	First aid kit	2.23	3.43	-1.13
14	Personal protective equipment	3.10	3.37	-0.33
15	(PPPE)	2.53	3.43	-0.90
	Hand sanitizer			
Average		**2.30**	**3.47**	**-1.17**

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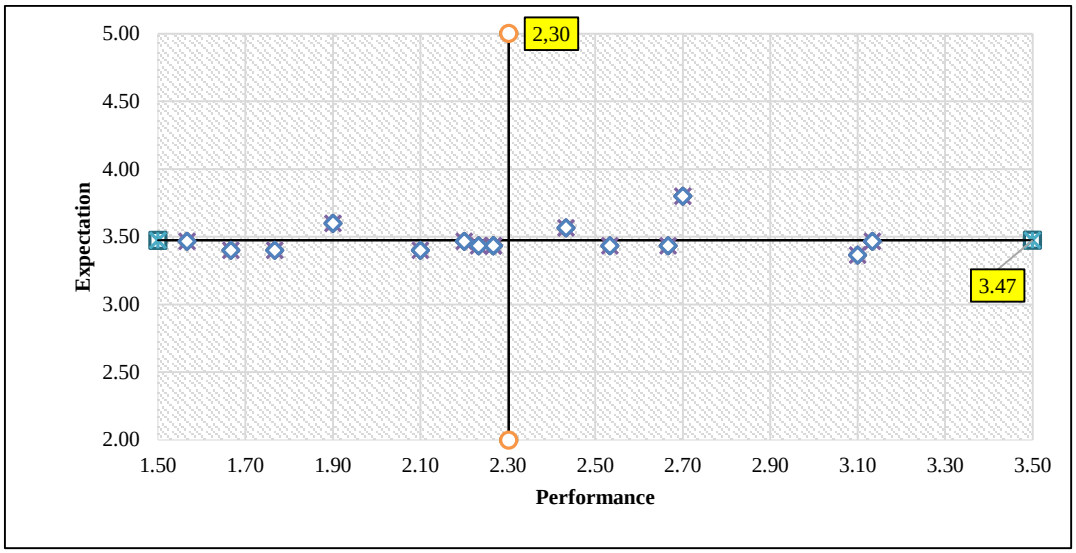

Figure 2. Relationship between performance level and expectation level

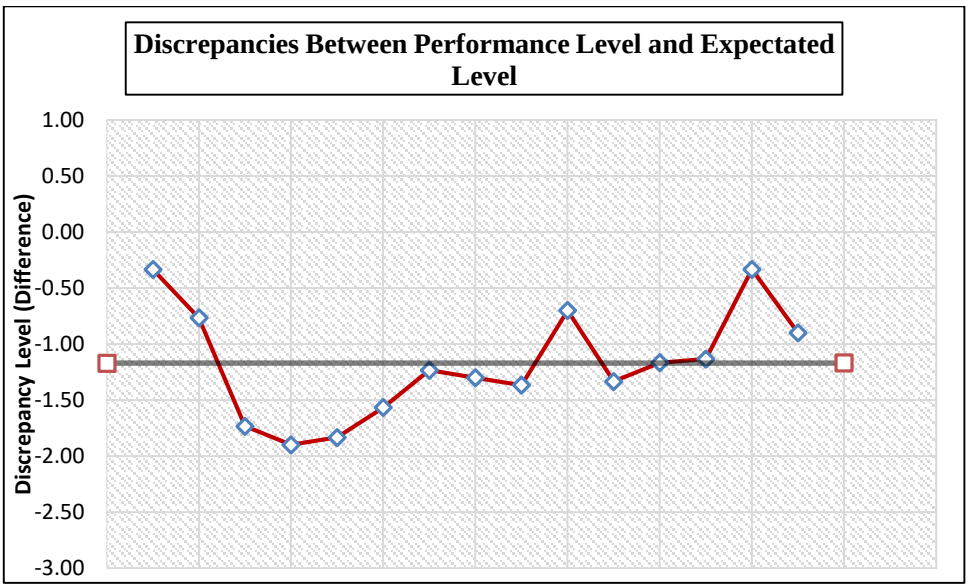

Figure 3. Levels' discrepancy value between performance level and expectation level

Based on Figure 2, it can be seen that there is an average rating of PM mode users which was rated as a low level of performance below the average of 2,18 (see Table 4). Values of low to high importance. This shows that these variables and indicators need to be considered in order to improve their level of performance. The order of priority for handling (improving) is based on the results of the assessment/perception of the use of the PM mode regarding the level of performance and the level of expectation, the value's difference between assessment and perception level is shown in Figure 3.

The discrepancy level between performance and interest is the difference between the value of performance level and expectation level of the users of PM transportation mode. From Figure 3, it can be seen that there is a discrepancy level that is below the average value of -1,53. This means that service attributes with a discrepancy value worse than -1,53 must receive attention to be fixed and improve their performance. The greater the value of the gap level, the higher the priority for handling or improving its performance.

C. Customer Satisfaction Index

Customer Satisfaction Index is the satisfaction index used for each service indicator as can be seen on Table 4.

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Table 4. Level of satisfaction after assessing performance and expected levels

No.	*Variables and Indicators*	*ΣYi*	*n*	*MIS*	*MPS*	*WF*	*WS*
1	Hygiene	52.10	30	3.47	3.13	6.654	20.849
2	Information services and rate	52.11	30	3.43	2.67	6.590	17.573
3	Seats' comfort	48.67	30	3.40	1.67	6.526	10.877
4	Service provider's attitude	45.27	30	3.47	1.57	6.654	10.424
5	Officers' strictness	41.81	30	3.40	1.77	6.526	11.529
6	Air circulation area	38.41	30	3.60	1.90	6.910	13.129
7	Items deposit counter	34.81	30	3.47	2.20	6.654	14.639
8	Availability of navigation tools	31.34	30	3.43	2.27	6.590	14.937
9	Life jacket	27.91	30	3.57	2.43	6.846	16.658
10	Fire extinguisher	24.34	30	3.80	2.70	7.294	19.693
11	Mooring line	20.54	30	3.40	2.10	6.526	13.704
12	Distress signal	17.14	30	2.27	2.27	6.590	14.937
13	First aid kit	13.71	30	2.23	2.23	6.590	14.717
14	Personal protective equipment	10.27	30	3.10	3.10	6.462	20.032
15	(PPE)	6.91	30	2.53	2.53	6.590	16.694
	Hand sanitizer						
		2.18		52.1			230.39
						CSI	**57.59%**

CONCLUSIONS AND SUGGESTIONS

A. *Conclusion*

This analysis attempts to conclude the impact of COVID-19 by discussing the challenges and disruptions faced by the shipping industry on the Bali – Nusa Penida route. Two findings that have had a significant impact on the shipping industry since early 2020 are summarized below.

First, The COVID-19 has an adverse effect on the community, jobs are lost every day due to non-operating vessels, and operators (e.g., ship owners, ship masters, onshore operators, carriers, etc.) have faced operational losses such as restrictions and regulations. This inevitably affects transportation fares, rental rates, income, and utilization of facilities and human resources. There was a decrease in the number of Passenger Motorboats (PM) operating per day by 84.62%, a decrease in PM trips on the Bali-Nusa Penida route by 86.54%, and a decrease in the number of passengers by 96.05%. From the results of the IPA analysis, the performance level of the PM mode is low below the average of 2.30, while the value of the importance level is low to high.

Second, the purpose of mode users to Nusa Penida is for the worship of Hindus as much as 77.78%. Seafarers or passengers who go through the port - recorded and subject to mandatory inspection - must accept the inconvenience due to health and safety considerations and some additional facts are the suspension and cancellation of ongoing passenger operations. However, despite the situation, it is found that the industry has an overall satisfaction index of 57.59% for users of PM mode, which is still in the range of quite satisfied criteria (51% -65%) in the satisfaction index.

B. *Suggestion*

Guidance is needed to inform or share best practices with the community, especially after reflecting on the sharp increase of people who are tested positive for COVID-19 in Indonesia. Despite the infectious nature of COVID-19, Passenger Motorized Boats (PM) can still be operated and used by mitigating the risks if everyone involved – agents, staff, and passengers – takes the necessary steps and precautions. With little time to prepare, agencies across the country are deploying service changes, new policies, and many other changes to help slow the spread of this highly contagious disease, saving countless lives along the way. PM shipping agents or companies continue to grapple with providing services during uncertain times. This new normal incorporates new and changing guidelines from medical and public health. Practicing these best practices can also inform future pandemic emergency preparation strategies [16].

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