

Transaction Patterns and Institutional Interactions in Fish Landings at Nizam Zachman Ocean Fishing Port

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ABSTRACT

Fish landing activities at ocean fishing ports involve multiple actors and administrative procedures that require coordination among vessel owners or captains, port authorities, fisheries inspectors, enumerators, and intermediaries. This study examines the transaction patterns in fish landing activities at Nizam Zachman Ocean Fishing Port, Jakarta, with particular attention to the landing procedure, the relationship between landing frequency and fish landing volume, and interactions among transaction actors. A mixed-method approach was employed using qualitative descriptive analysis and simple linear regression. Primary data were obtained through observations, interviews, and questionnaires involving actors involved in fish landing activities, while secondary data included port operational records and fish landing statistics. The results show that the landing process consists of four main stages: vessel arrival, fish unloading, fish weighing, and PHP settlement. The regression analysis indicates a positive relationship between landing frequency and fish landing volume for both large and small pelagic purse seine vessels during 2019–2021, with R^2 values ranging from 0.7916 to 0.9831 for large pelagic vessels and from 0.8314 to 0.8678 for small pelagic vessels. The qualitative findings indicate recurring interactions among transaction actors, with port agents functioning as intermediaries in administrative and documentary processes. The findings also identify different degrees of negotiation space among actors, particularly in interactions between vessel owners or captains and agents. These patterns illustrate how administrative procedures, uncertainty, repeated transactions, and intermediary relationships shape interactions throughout the fish landing process.

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INTRODUCTION

Fishing ports serve as important nodes in capture fisheries because they accommodate vessel arrival, berthing, fish unloading, data recording, and various administrative and fisheries services (Benoit et al., 2022). These activities involve repeated interactions among vessel operators, port authorities, fisheries officers, and other actors, making coordination and administrative procedures integral to fish landing activities (Telaumbanua &

Telaumbanua, 2025). These activities can also create operational pressures when port facilities and services must accommodate high levels of vessel and fish-landing activity (Prastika et al., 2024). At the national level, the Ministry of Marine Affairs and Fisheries reported that fish landings at Indonesian fishing ports reached 1.3 million tons by November 2024, indicating the substantial role of fishing ports in supporting fisheries production and data recording (Nugroho et al., 2024).

One major fishing port in this system is Nizam Zachman Ocean Fishing Port in Jakarta, a Type A ocean fishing port and Indonesia's largest fishing port. [Wurjanto et al. \(2023\)](#) reported that the port had experienced overcapacity, reflected in the arrangement of vessels moored in rows parallel to the berths because available berth capacity was insufficient. The port's production data also reflect the scale of landing activity. Official KKP records show that fishery production landed at PPS Nizam Zachman reached 266,578 tons in 2024, compared with 151,129 tons in 2023, representing a substantial increase in recorded landing volume. This high volume of activity requires coordination across vessel arrival, unloading, weighing, data verification, and post-production levy administration, creating an environment in which repeated transactions and interactions among fisheries actors can be examined.

Fish landing administrative procedures at ports involve multiple stages, including issuing the STBLKK and settling the post-production levy. These procedures require vessel owners or captains to prepare administrative documents and coordinate with several actors involved in the landing process. Fish landing activities at fishing ports are formed through a series of transactions among relevant actors, which can be examined using the New Institutional Economics approach ([Nainggolan et al., 2023](#)). This perspective views transactions as exchanges involving rights, resources, and institutional arrangements ([Ménard, 2022](#); [Bellanger et al., 2021](#)). This approach matters to the present study because fish landing activities at PPS Nizam Zachman involve repeated interactions among vessel captains, port agents, harbormasters, fisheries inspectors, and enumerators. These interactions involve administrative requirements, information exchange, verification, coordination, and regulatory procedures. Transaction Cost Economics provides a framework for examining these interactions through characteristics such as uncertainty, transaction frequency, and asset specificity.

Every exchange involving goods, services, or information requires resources to organize and complete. Transaction costs refer to the costs associated with carrying out an exchange beyond the direct costs of producing the goods or services involved ([Cuypers et al., 2021](#)). Transaction Cost Economics explains that conditions such as uncertainty, frequency, and asset specificity affect how organizations organize in transactions. Imperfect information and limited access to information can also increase the resources required to complete transactions ([An & Rau, 2021](#); [Garz et al., 2021](#)). In the fish landing process, these conditions show up in document preparation, information verification, repeated vessel activities, supervision, and coordination among actors.

Fish landing activities are a transactional process within the port system's institutional framework. Interactions among actors form a transaction system that operates through formal procedures and recurring relationships. Institutions provide rules and information that shape how economic activities organize transactions ([Davis & Sinha, 2021](#)). In the fish landing process at PPS Nizam Zachman, uncertainty may arise from administrative requirements, information verification, and coordination among actors involved in vessel arrival, unloading, weighing, and settlement of post-production levies. Actors also have different responsibilities and access to information at these stages. Formal procedures alongside intermediary relationships provide a basis for examining how actors coordinate their activities and negotiate administrative arrangements within the port.

Fish landing transactions at PPS Nizam Zachman involve fisheries actors such as the harbormaster, a government agent with authority to regulate services and supervision at the port; vessel captains and owners as users of port services; and fisheries inspectors, enumerators, and port agents. The complexity of procedures, information requirements, and repeated interactions provide different forms of coordination among these actors. This study

therefore examines the transaction patterns that emerge during fish landing activities at PPS Nizam Zachman Jakarta, including the stages of the landing process, the relationship between landing frequency and fish landing volume, and interactions among the actors involved.

Previous studies have examined institutional relationships and fish landing activities in Indonesian fishing ports from different perspectives. [Osmaleli et al. \(2022\)](#) One study analyzed stakeholder roles and interests at Paotere Fishing Port in Makassar and identified government and non-government actors involved in fisheries management. [Wurjanto et al. \(2023\)](#) Examined the modernization of Nizam Zachman Ocean Fishing Port, focusing on economic and safety considerations under conditions of port overcapacity. These studies provide useful evidence on stakeholder relationships and port conditions, but they describe the interactions among vessel operators, port agents, and formal port authorities during the administrative process of fish landing less clearly. This study addresses this aspect by examining the transaction patterns and negotiation space that emerge among actors during fish landing activities at PPS Nizam Zachman.

In addition to Transaction Cost Economics, this study also draws on Rational Choice Theory, popularized by [Coleman \(1990\)](#), to examine how individual actors make decisions within institutional settings. This theory views individuals as actors who make choices based on their goals, available resources, and perceived costs and benefits. In the fish landing process, this perspective is used to interpret the involvement of port agents and the choices made by vessel captains or owners when dealing with administrative procedures and coordination requirements. The use of third-party assistance is therefore examined as part of the observed transaction pattern rather than assumed in advance to represent an efficient or inefficient choice.

RESEARCH METHODS

This study used a mixed-method design that combined qualitative and quantitative approaches. The qualitative approach described the fish landing process, administrative procedures, and interactions among actors involved in landing activities. The quantitative approach examined the relationship between vessel landing frequency and fish landing volume. The two approaches provided complementary evidence on transaction patterns during fish landing activities at Nizam Zachman Ocean Fishing Port. The study was conducted at Nizam Zachman Ocean Fishing Port (PPS), Jakarta, from November to December 2024. The location is shown in **Figure 1** below. The research location was selected because the port has intensive fish landing activities involving vessel operators, port authorities, fisheries officers, enumerators, and port agents.

Population and Sample

The population included actors directly involved in fish landing at Nizam Zachman Ocean Fishing Port. Respondents were selected using purposive sampling based on their direct involvement and knowledge of the fish landing process. A total of 15 respondents participated in the study, consisting of vessel captains or owners, port agents, harbormasters, fisheries inspectors, enumerators, and other actors involved in the administrative process.

Data Collection

Primary data were collected through field observations and structured interviews. Observations were conducted to identify the sequence of fish landing activities and the interactions among actors at each stage. Interviews were conducted with actors directly involved in the process to obtain information on administrative procedures, coordination, information exchange, document processing, and other transaction-related activities.

Secondary data consisted of fish landing records at Nizam Zachman Ocean Fishing Port for 2019–2021, operational

records, and relevant institutional and administrative documents. The fish landing records were used to examine the relationship between vessel landing

frequency and fish landing volume for large pelagic purse seine and small pelagic purse seine vessels.

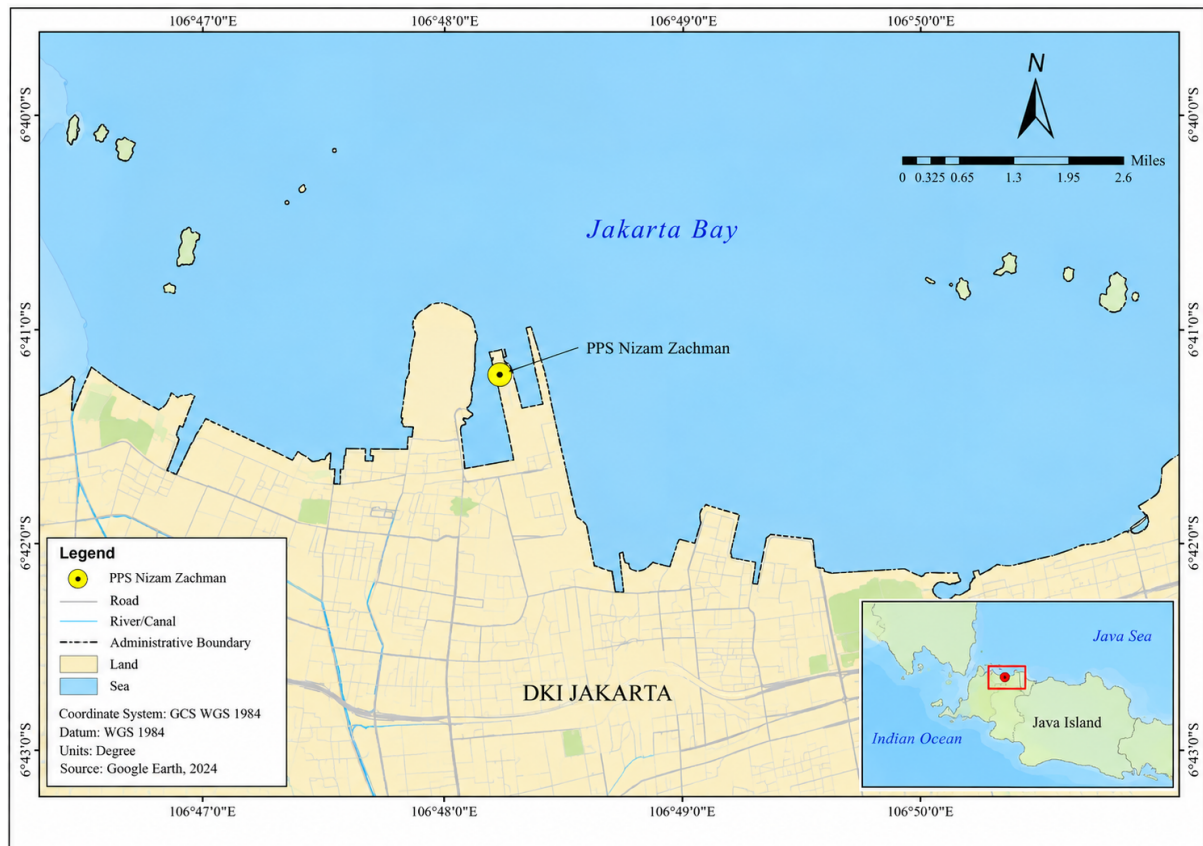


Figure 1. Research Location (Source: Data Processing, 2024)

Data Analysis

Qualitative data were analyzed descriptively by organizing information from observations and interviews by fish-landing stages, the actors involved, and the interactions occurring at each stage. The analysis focused on four main stages, namely vessel arrival, fish unloading, fish weighing, and post-production Fisheries Production Levy (PHP) settlement. Transaction-related activities were examined through information exchange, document preparation, coordination, negotiation, monitoring or supervision, and administrative compliance.

The study qualitatively classified the degree of negotiation space among actors based on the extent of discussion, adjustment, and coordination observed during interactions in the fish landing process. This classification was used to

describe differences in interaction patterns among vessel owners or captains, port agents, the harbormaster, and other actors involved in the administrative process.

Quantitative data were analyzed using simple linear regression with SPSS to examine the relationship between vessel landing frequency as the independent variable (X) and fish landing volume as the dependent variable (Y). The regression model was formulated as follows:

$$Y = a + bX + e \dots \dots \dots (1)$$

where Y represents fish landing volume, X represents vessel landing frequency, a represents the constant, b represents the regression coefficient, and e represents the error term. Regression analysis was conducted separately for large

pelagic purse seine and small pelagic purse seine vessels for each year from 2019 to 2021.

RESULTS AND DISCUSSION

Transaction Characteristics in the Fish Landing Process at Nizam Zachman Ocean Fishing Port

Fish landing activities at Nizam Zachman Ocean Fishing Port involve a sequence of administrative and operational procedures before and after fish unloading. Based on field observations and interviews, the process consists of four main stages, namely vessel arrival, fish unloading, fish weighing, and Fisheries Production Levy (PHP) settlement. Each stage involves

different actors and forms of coordination, particularly among vessel captains or owners, the harbormaster, fisheries inspectors, enumerators, and port agents.

The general sequence of the fish landing process is presented in Figure 2. The process begins with notification of vessel arrival and continues through document verification, berthing, unloading approval, fish unloading and weighing, data validation, and PHP settlement. These stages show that fish landing is not limited to physically unloading catches but also involves administrative interactions and verification activities among the actors involved.

Table 1. Fish Landing Stages and Main Activities at Nizam Zachman Ocean Fishing Port

Stage	Main activities	Main actors involved	Transaction-related activities
Vessel arrival	Arrival notification, document verification, berthing arrangement, STBLKK issuance	Vessel captain/owner, harbormaster, port agent	Information exchange and document verification
Fish unloading	Unloading approval, unloading, coordination of facilities	Vessel captain/owner, fisheries inspector, port agent, unloading workers	Coordination and supervision
Fish weighing	Catch recording, weighing, comparison of records	Vessel captain/owner, enumerator, harbormaster, fisheries inspector	Data verification and supervision
PHP settlement	Catch data validation and PHP payment	Vessel captain/owner, port authority, relevant administrative officers	Data validation and administrative compliance

(Source: Field observations and interviews, 2024)

The four stages in **Table 1** form a continuous sequence of activities in the fish-landing process at Nizam Zachman Ocean Fishing Port. The process begins with vessel arrival and administrative verification, followed by unloading and weighing of the catch, and ends with data validation and settlement of the Fisheries Production Levy (PHP). **Figure 2** illustrates the sequence of these activities and the main actors involved at each stage. The figure shows that the process involves the harbormaster, fisheries inspector, enumerator, and vessel captain or owner, with digital applications and administrative documents supporting the flow of activities from vessel arrival to PHP settlement.

As shown in **Figure 2**, the fish landing process starts with vessel arrival, where the arrival is reported and required documents are processed before the vessel proceeds to unloading. The process then continues to unloading and weighing, which involves the unloading recommendation, e-SLO, fish catch recording, and comparison with the vessel's self-reported catch data. The final stage settles the Post-Production Fisheries Levy (PHP) and issues the relevant administrative document. Based on this sequence, the transaction characteristics at each stage are described below.

a. Vessel arrival

At the vessel arrival stage, the vessel captain or owner reports the planned arrival through the e-PIT

application. The harbormaster receives the arrival notification and coordinates the berthing arrangement. The required vessel documents are then checked before the STBLKK is issued as part of the vessel arrival administration.

This stage is repeated whenever a fishing vessel returns from fishing operations. Field observations indicate that the main interaction at this stage involves submitting and verifying administrative information. The completeness and clarity of the required documents determine whether the vessel can proceed to the subsequent landing activities. Port agents may assist vessel operators in preparing or handling administrative documents when assistance is required.

b. Fish unloading

After the vessel arrival requirements have been completed, the process continues with the unloading of the catch. As shown in Figure 2, the fisheries inspector issues the unloading recommendation before the catch is unloaded. The unloading process includes weighing and recording activities involving the vessel captain or owner, enumerator, and other actors involved in fish handling.

Field observations indicate that this stage requires coordination between the vessel operator and the actors responsible for inspection, recording, and unloading. The process also depends on completing the administrative requirements from the previous stage. Port agents may be involved in facilitating communication and administrative coordination on behalf of vessel captains or owners.

c. Fish Weighing

Fish weighing is conducted to obtain data on fish catch production. The vessel captain or owner prepares a self-reported catch record, which the enumerator then compares with the catch data recorded during unloading and weighing. This comparison provides a basis for verifying the data before the

process moves to the next administrative stage.

Differences between the vessel's self-reported data and the enumerator's records may require further verification. The harbormaster and fisheries inspector supervise the weighing and recording process. The validated catch data are then used to calculate the Fisheries Production Levy.

d. Settlement of Fisheries Production Levy (PHP)

The final stage shown in Figure 2 is the settlement of the Post-Production Fisheries Levy (PHP). After the fish catch data have been validated, the vessel captain or owner completes the required payment. The relevant administrative document is then issued as part of the completion of the landing process.

Field observations show that interaction at this stage mainly involves data validation, administrative requirements, and communication between vessel operators and port authorities. When clarification or additional verification is required, completing the settlement process depends on further coordination among the actors involved.

These findings align with previous research showing that fishing port activities involve interactions among multiple actors and institutional roles. [Suherman et al. \(2022\)](#) In their study of the Nizam Zachman Ocean Fishing Port, they found that the port serves as a center for fish landing and distribution and that administrative facilitation helped maintain fishing operations during the COVID-19 period.

The present findings also complement [Pratiwi et al. \(2021\)](#), who found that tuna traceability at Nizam Zachman was supported by several actors along the supply chain but that documentation and fish handling still required improvement. Their study reported that 83% of assessed activities met traceability standards and identified documentation and unloading procedures as areas requiring further attention.

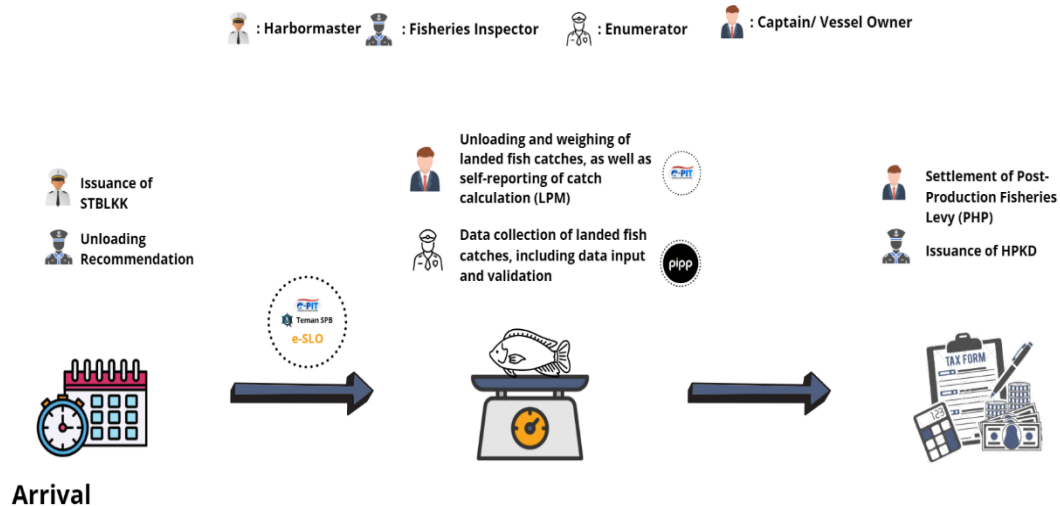


Figure 2. Fish Landing Process at Nizam Zachman Ocean Fishing Port
 (Source: PPS Nizam Zachman)

Fish Landing Dynamics at Nizam Zachman Ocean Fishing Port

Fish landing dynamics in this study refer to the relationship between vessel landing frequency and the volume of fish landed at Nizam Zachman Ocean Fishing Port. Landing frequency represents the number of vessel landing activities recorded at the port, while fish landing volume represents the total catch recorded during the corresponding period. The analysis was

conducted separately for large pelagic purse seine and small pelagic purse seine vessels using data from 2019 to 2021.

Figure 3 presents the scatter plots and simple linear regression results for 2021. The observations show a positive relationship between vessel landing frequency and fish landing volume for both vessel groups. **Table 2** presents the regression results for the three-year period, providing a more complete year-to-year comparison.

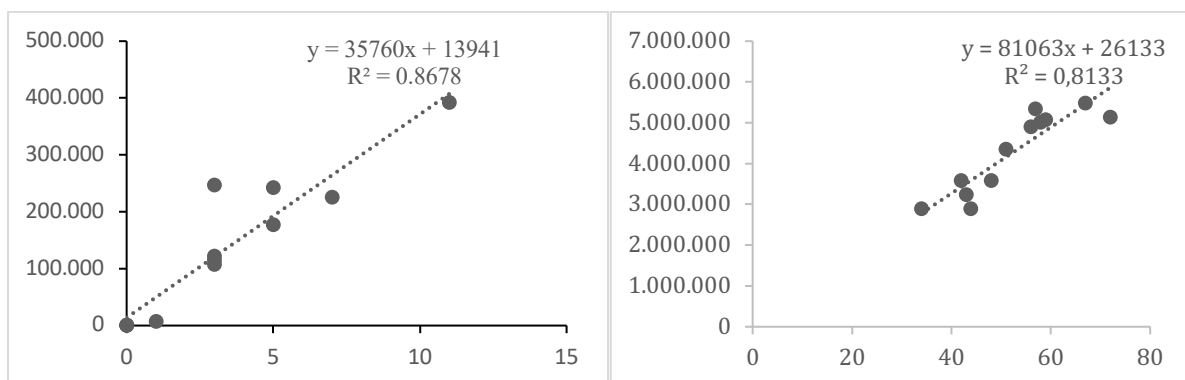


Figure 3. Scatter Plot of Simple Linear Regression between Vessel Landing Frequency (X) and Fish Landing Volume (Y) for Large Pelagic and Small Pelagic Purse Seine Vessels in 2021 (Source: Data Processing, 2024)

Figure 3 shows a positive relationship between vessel landing frequency and fish landing volume for both large pelagic and small pelagic purse seine vessels in 2021. The regression line shows the direction of the relationship, while the coefficient of determination indicates how much variation

in fish landing volume is explained by variation in landing frequency. To examine whether this pattern was consistent across the three study years, the regression equations and R^2 values for 2019–2021 are presented in **Table 2**.

Table 2. Simple Linear Regression Results between Vessel Landing Frequency and Fish Landing Volume, 2019–2021

Vessel type	Year	Regression equation	R ²
Large pelagic purse seine	2019	$Y = 87,053X - 435,440$	0.9831
Large pelagic purse seine	2020	$Y = 77,134X + 371,869$	0.7916
Large pelagic purse seine	2021	$Y = 81,063X + 26,133$	0.8133
Small pelagic purse seine	2019	$Y = 44,840X + 20,656$	0.8636
Small pelagic purse seine	2020	$Y = 50,292X + 39,996$	0.8314
Small pelagic purse seine	2021	$Y = 35,760X + 13,941$	0.8678

(Source: PPS Nizam Zachman fish landing records, 2019–2021, processed using simple linear regression)

Table 2 shows that all regression coefficients are positive, indicating that higher landing frequency was associated with higher fish landing volume in both vessel groups during 2019–2021. For large pelagic purse seine vessels, R² values ranged from 0.7916 to 0.9831, while for small pelagic purse seine vessels, they ranged from 0.8314 to 0.8678. Differences in R² across years indicate that the strength of the association varied across observations.

The regression equations also show a positive coefficient for landing frequency in all vessel groups and years. This indicates that higher landing frequency was associated with higher recorded fish landing volume within the analyzed data. However, this relationship should be interpreted as a statistical association, not evidence that increased landing frequency directly causes increased fish landing volume. The analysis examined the relationship between the two variables and did not account for other factors that may affect catch volume.

The finding is comparable to observations from other fishing ports, where vessel activity and fish production vary across periods. [Maky et al. \(2023\)](#) A study of fish unloading activities at Pondokdadap Coastal Fisheries Port in Malang reported substantial variation in the number of vessels landing fish during September 2021 to August 2022. The highest number of vessels was recorded in June 2022 with 603 vessels, while the lowest was 22 vessels in January 2022. Their study also found differences in landing activity between periods, although the analysis focused on seasonal variation and the landing system rather than the statistical relationship

between landing frequency and fish volume.

A different pattern was reported by [Kurniawan et al. \(2024\)](#) at Gaung Fish Landing Base in Padang. Their study found that total fish production decreased by 911.42 tons, or 33.95%, between 2021 and 2022. Using multiple regression analysis, they obtained an R² of 0.757 and found that several production factors were associated with catch volume, with length of fishing trip identified as the most influential factor in their model. These findings indicate that fish landing volume can be associated with several operational factors, whereas the present study specifically examines the relationship between landing frequency and recorded landing volume.

The results therefore show that landing frequency is closely associated with the volume of fish recorded at Nizam Zachman Ocean Fishing Port during 2019–2021. Differences in R² between vessel groups and years also indicate that the strength of this relationship varied across observations.

Transaction Patterns in the Fish Landing Process at Nizam Zachman Ocean Fishing Port

Transaction patterns in the fish landing process describe recurring interactions among actors involved in administrative and operational activities at the port. Based on field observations and interviews, these interactions involve vessel owners or captains, port agents, the harbormaster, fisheries inspectors, and enumerators. The nature of the interaction varies with each actor's responsibilities and

the administrative requirements that must be fulfilled.

The interactions identified in this study occur throughout the fish landing process. Vessel owners or captains communicate directly with port authorities to fulfill procedural requirements, while

agents provide administrative assistance and coordinate documents on behalf of vessel operators. These actors' different roles create varying degrees of negotiation space in the fish landing process, as shown in **Table 3**.

Table 3. Characteristics of Interaction and Negotiation Space among Actors in the Fish Landing Process

Actors involved	Negotiation Space	Basis of Classification	Form of Interaction
Vessel owner or captain and port agent	Relatively wide	Discussion may occur regarding service fees, document preparation, and the scope of administrative assistance	Discussion of service fees, preparation of administrative documents, and assistance with document processing
Vessel owner or captain and harbormaster	Procedurally limited	Interaction is mainly governed by established port procedures and the authority of the harbormaster	Notification of vessel arrival, document verification, and coordination of berthing arrangements
Port agent and harbormaster	Administrative and technical	Interaction concerns document requirements, verification procedures, vessel inspection, and administrative compliance	Administrative coordination, document verification, vessel inspection, and issuance of STBLKK

(Source: Field observations and interviews, 2024)

The interaction patterns in **Table 3** show that the degree of negotiation space varies with each actor's role and authority. The relationship between vessel owners or captains and port agents allows for more room for discussion because it involves administrative assistance, document preparation, and service arrangements. In contrast, interaction between vessel owners or captains and the harbormaster is procedurally limited because the activities are governed by established port procedures. Interaction between agents and the harbormaster is primarily administrative and technical, particularly for document verification, vessel inspection, and issuing the STBLKK.

This finding is comparable to [Hamjan's \(2024\)](#) a study at Lappa Fish Landing Base in Sinjai. The study describes the fishing port as a center of production, processing, marketing, and various socio-economic activities, with services extending from fish landing to distribution and involving different groups operating within and around the port. The similarity lies in the presence of multiple actors whose

activities are connected through port services and fisheries-related transactions. However, [Hamjan \(2024\)](#) emphasizes the broader socio-economic activities surrounding the fishing port, whereas the present study focuses more specifically on interactions during the administrative stages of fish landing.

A different pattern was reported by [Sudarman et al. \(2022\)](#) at the Kassi Kajang Fish Landing Base in Bulukumba. Their study examined employee service ethics in issuing fishing permits and found that fishermen responded negatively to administrative payment, inconsistent permit processing, and employee integrity. This differs from the present findings, which identify the interaction between vessel operators and the harbormaster as procedurally limited and centered on established administrative requirements. This difference may reflect the studies' different focuses. Sudarman et al. examined service quality and ethical conduct in permit administration, while this study examines how several actors interact throughout the fish landing process.

The role of port agents in the present study also distinguishes it from these previous studies. At Nizam Zachman Ocean Fishing Port, agents prepare and process administrative documents and coordinate with port authorities. Their position creates a separate channel of interaction between vessel operators and port administration. The present findings therefore provide a more specific description of how intermediary actors participate in fish-landing administration.

From a transaction-related perspective, the interactions identified in this study involve information exchange, document preparation, coordination, verification, and administrative compliance. These activities recur because vessel operators must complete similar procedures each time a vessel arrives and lands its catch. Agent involvement can be understood as part of this recurring administrative arrangement. However, the findings do not provide a direct monetary measurement of transaction costs or a quantitative measure of time savings. Therefore, the authors interpret agents' role as an observed intermediary function within the transaction process rather than as evidence that agents increase or reduce transaction efficiency.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

NA. Contributes to the conceptualization of the study, research design, data collection and analysis, and the drafting of the original manuscript in its entirety. **TN.** Contributes as the first supervisor, guiding the development of the theoretical framework, refining the methodology, and supervising the research process. **MM.** contributes as the second supervisor, providing guidance in the refinement of the methodology and data analysis, and supervision throughout the research process. **EM.** contributes to the critical review of the manuscript, including the refinement of the discussion and conclusion sections and the improvement of

the manuscript for an international readership

CONCLUSION

The fish landing process at Nizam Zachman Ocean Fishing Port consists of four main stages, namely vessel arrival, fish unloading, fish weighing, and Fisheries Production Levy settlement, with each stage involving different forms of administrative and operational interaction among vessel owners or captains, port agents, the harbormaster, fisheries inspectors, and enumerators. The regression results for 2019–2021 show a positive association between landing frequency and fish landing volume for both large and small pelagic purse seine vessels, with R^2 values ranging from 0.7916 to 0.9831 for large pelagic vessels and from 0.8314 to 0.8678 for small pelagic vessels. The transaction patterns further indicate that interactions between vessel owners or captains and agents allow more room for discussion, particularly on administrative assistance and service arrangements, while interactions with the harbormaster are more closely governed by established procedures. These findings describe agents' role as intermediaries in the administrative process of fish landing.

Future research should examine fish landing transactions using more detailed quantitative measures, particularly transaction-related monetary costs, processing time, and the frequency of interactions among actors, to provide a more precise assessment of the economic and administrative dimensions of the process. Further studies could also include more respondents and compare transaction patterns across several fishing ports to identify similarities and differences in the role of intermediaries, administrative procedures, and interactions between vessel operators and port authorities.

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