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A Study on the Role of Customs Clearing Agents in Managing Cold Chain Risks for Seafood Exports

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Abstract: *The global demand for seafood exports necessitates stringent adherence to cold chain protocols to preserve product quality and ensure compliance with international safety standards. This article explores the critical role played by customs clearing agents in managing cold chain risks during the exportation of seafood. Customs clearing agents serve as pivotal facilitators between exporters, regulatory bodies, and logistics providers, ensuring the timely clearance of goods and adherence to cold chain requirements throughout the export process. Through qualitative interviews with industry stakeholders and a review of export case studies, the research highlights the challenges faced by customs agents—including documentation delays, infrastructure limitations, and regulatory complexities—and the strategies they employ to mitigate these risks. The findings suggest that enhanced coordination, digital documentation systems, and continuous training can significantly improve cold chain integrity. This study aims to assess the role of customs clearing agents in managing cold chain risks associated with seafood exports. It focuses on identifying the key logistical challenges faced during customs clearance, such as temperature control, delays, and documentation issues. Additionally, the research evaluates how integrating customs processes with broader supply chain systems can enhance regulatory compliance and reduce the risks involved in international seafood trade..*

Keywords: Seafood, Export, Agents, Cold Chain

I. INTRODUCTION

The global seafood industry plays a vital role in international trade, contributing significantly to the economies of many coastal and island nations. However, the export of seafood products presents unique challenges due to their highly perishable nature, which demands strict temperature control and adherence to cold chain protocols from origin to destination. Any disruption in the cold chain can compromise product quality, lead to significant economic losses, and result in non-compliance with international food safety standards. Customs clearing agents act as key intermediaries in the export process, responsible for ensuring that goods comply with customs regulations and are cleared in a timely manner. Their role becomes particularly crucial in the context of seafood exports, where delays in documentation or clearance can severely impact cold chain integrity. Despite their importance, the specific contributions and challenges faced by customs clearing agents in managing cold chain risks remain underexplored in academic and industry literature.

This article aims to assess the role of customs agents in managing cold chain risks for seafood exports, Identify key challenges in cold chain logistics during customs clearance, evaluate how integrated systems improve compliance and reduce export risks. By examining their responsibilities, identifying common risk factors, and assessing mitigation strategies, the research seeks to highlight best practices and recommend improvements in operational efficiency and regulatory compliance. Understanding these dynamics is essential for enhancing the reliability of seafood export supply chains and ensuring sustainable trade practices in the global market.

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II. REVIEW OF LITERATURE

The export of perishable commodities such as seafood demands an unbroken cold chain to preserve both quality and safety. James et al. (2006) highlight the complexity of managing cold chain logistics, particularly in international trade, where products must meet stringent regulatory and quality standards across borders. The need for constant temperature control from harvest to the final destination is particularly critical for seafood, a highly perishable commodity. Chatterjee (2017) emphasizes that any deviation in temperature maintenance during transportation, storage, or customs clearance can lead to product spoilage, financial loss, and reputational damage.

Risks associated with cold chain logistics are multifaceted. Aung and Chang (2014) identify key risk sources such as equipment failure, improper packaging, customs delays, and poor coordination among stakeholders. They argue that customs clearance is a critical juncture where disruptions can severely impact the cold chain integrity, especially for sensitive goods like seafood. In this context, customs clearing agents play a pivotal role. According to Kumar and Rajan (2020), these agents act as intermediaries ensuring that all compliance, documentation, and regulatory requirements are met to facilitate the smooth movement of goods across borders. Their efficiency directly influences how long cargo remains at ports, with timely action helping to reduce cold chain risks.

Timely and accurate documentation also forms a key aspect of regulatory compliance. Singh (2019) points out that customs agents must have a thorough understanding of both domestic and international trade laws, including seafood-specific sanitary and phytosanitary (SPS) standards. Their ability to coordinate effectively can prevent temperature excursions during regulatory checks. Additionally, technological advancements have begun to reshape cold chain logistics. Zhao et al. (2021) show that the integration of real-time temperature monitoring and automated documentation systems enables customs agents to respond swiftly to cold chain disruptions, thereby enhancing cargo safety and clearance efficiency.

Collaboration and capacity-building are equally important. Fernando and Wijesinghe (2018) argue that improved coordination between exporters and customs agents, along with targeted training programs, strengthens agents' ability to manage cold chain logistics. By understanding the sensitivity of seafood products and anticipating challenges, trained customs agents are better equipped to ensure compliance, minimize risk, and maintain cold chain integrity throughout the export process.

III. CLASSIFICATION OF SEAFOODS EXPORTS BY COLD CHAIN RISK

Seafood Category	Examples	Cold Chain Risk Level	Storage Temperature	Key Risks
Highly Perishable - Fresh Seafood	Prawns (raw), Salmon (fresh), Tuna (sashimi), Scallops	**High**	**0°C to 2°C**	Bacterial growth, short shelf life, must be kept just above freezing.
Frozen Seafood	Frozen prawns, frozen fish fillets, squid	**Moderate**	**-18°C or lower**	Thawing/re-freezing cycles damage quality; risk of cold chain breaks.
Cooked, Chilled Seafood	Cooked prawns, crab meat, smoked salmon	**Moderate**	**0°C to 4°C**	Sensitive to temp rise; recontamination possible if packaging fails.
Live Seafood	Live lobsters, crabs, oysters	**High**	**4°C to 10°C (in water)**	Requires aeration, exact salinity/oxygen; death = spoilage.
Processed Shelf-Stable Seafood	Dried prawns, canned tuna/sardines	**Low**	**Ambient (15°C to 25°C)**	No cold chain needed unless opened; stable under most conditions.

Special Focus: Prawns (Shrimp)

A. Exported as Fresh (Raw) Prawns

Risk Level: High

Cold Chain Needs:

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Ice slurry or chilled to near 0°C
Must avoid time-temperature abuse to prevent bacterial growth
Spoilage begins within hours if mishandled
B. Exported as Frozen Prawns
Risk Level: Moderate
Cold Chain Needs:
Keep at -18°C or lower
Thawing during transport leads to drip loss, texture degradation, microbial risk
Use insulated containers + temperature loggers
C. Exported as Cooked/Chilled Prawns
Risk Level: Moderate
Cold Chain Needs:
Must remain below 4°C
Risk of Listeria, recontamination if packaging is compromised
D. Dried or Shelf-Stable Prawns
Risk Level: Low
Cold Chain Needs: None
Notes: Proper dehydration and packaging are essential to prevent moisture absorption
These are the seafood export procedure done by KAY JAY Agencies, and activities carry down with their customs clearance agents in their organization.

IV. VARIOUS SECTORS IN THE LOGISTICS COMPANY RELATED TO SEAFOOD EXPORTS

Cold Chain Management
Maintains **temperature control** from source to final destination.
Includes:
Refrigerated trucks (reefers)
Cold storage warehouses
Blast freezing and ice packaging

Packaging & Labelling
Uses **food-grade, insulated, leak-proof packaging**.
Applies:
Labels with product details, country of origin, batch, expiry
HS codes, barcodes, and compliance marks

Customs Documentation & Regulatory Compliance
Prepares and submits:
Invoice, Packing List, Bill of Lading
Health certificates (from food safety authorities)
Phytosanitary/Export permits
Catch certificates (especially for wild seafood)
Certificates of Origin (if claiming trade benefits)
Freight Forwarding
Manages:
Mode selection (air freight for high-value or fresh seafood, sea freight for frozen)
Booking with carriers
Route optimization
Transit time estimation

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Customs Clearance
Coordinates with port and customs officials for:
Export declaration
Inspection (if required)
Clearance processing
Last Mile Distribution / Delivery
Ensures timely delivery to the importer, retailer, or warehouse in the destination country.
Includes real-time **tracking systems** and contingency plans.
Quality Assurance / Traceability
Implements **HACCP**, traceability logs, and quality inspections throughout the chain.
Manages **temperature monitoring records** for compliance.
Customer Service & Coordination
Updates clients on:
Shipment tracking
Regulatory changes
Delivery timelines and issue handling

V. RISK AND CHALLENGING FACED BY CUSTOMS BROKER IN SEAFOOD EXPORT LOGISTICS

Customs brokers play a crucial role as intermediaries between exporters and government authorities. In seafood exports—especially perishable goods requiring cold chain management—their responsibilities are intensified due to time sensitivity and regulatory complexity.

1. High documentation accuracy requirements
Challenge: managing complex export documentation including:
Bill of lading
Health and sanitary certificates
Catch certificates (for wild seafood)
Export declaration forms
Country-specific permits (e.g., fda, eu)
Risk: errors or omissions can cause:
Shipment delays
Penalties or fines
Product spoilage due to cold chain break

2. time sensitivity of perishable cargo
Challenge: customs delays (even a few hours) can compromise seafood freshness.
Risk:
High-value losses if cargo is rejected
Responsibility falls partly on customs broker for not expediting clearance
Pressure: need to coordinate clearance in strict timelines with port and logistics operators

3. Changing international trade regulations
Challenge: each country has unique and evolving food safety, quarantine, and customs laws.
Risk: lack of awareness or failure to stay updated can result in:
Non-compliance
Shipment rejection at destination
Client distrust

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4. Cold chain infrastructure limitations at ports

Challenge: inadequate or overbooked cold storage or reefer plug points
Risk: brokers may not be able to secure cold storage space in time
Consequence: delayed inspection = cargo exposure to ambient temperature

5. Coordination with multiple stakeholders

Challenge: must coordinate with:
Exporters
Logistics companies
Quarantine/health inspectors
Port authorities
Shipping lines
Risk: poor coordination = delay in customs clearance, break in cold chain

6.Financial & liability risks

Challenge: customs brokers may face:
Demurrage, detention fees if delays are caused by documentation error
Liability disputes from exporters if cargo is spoiled
Risk: broker's reputation and income at stake; may lose clients

7. Systemic/technological failures

Challenge: customs portals (icegate, etc.) Or shipping line systems may go offline
Risk: clearance gets delayed; brokers blamed for factors beyond control

8.Inspection-related delays

Challenge: physical inspection of seafood can delay customs clearance
Risk: if inspection facilities aren't close to cold storage, products may be exposed.

VI. CONCLUSION

The export of seafood, particularly high-value and highly perishable items such as prawns, demands a highly coordinated and time-sensitive logistics process where the integrity of the cold chain must be maintained at all stages. Within this complex supply chain, customs clearing agents play a pivotal role—not only as compliance facilitators but also as risk managers who help prevent delays that could compromise product quality. This study highlights that cold chain disruption, documentation errors, regulatory non-compliance, and coordination breakdowns are common challenges faced by customs brokers. Customs agents are often the last line of defense in ensuring smooth clearance, especially in scenarios where port infrastructure, inspection delays, or government system outages threaten time-bound delivery. Ultimately, the success of seafood export logistics depends on a synergistic partnership between exporters, logistics providers, and customs clearing agents. By leveraging real-time tracking, digital documentation systems, and continuous training on international compliance standards, stakeholders can reduce risks, ensure food safety, and uphold the quality of seafood in the global market.

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