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Keeping The Seas Compliant: The Unsung Role of Maritime Compliance Officers in Africa

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Abstract: The maritime sector contributes to 90 percent of world trade and exists in a complex legal sphere designed to ensure safe operations, protection of the environment, and resilience of operations. Maritime compliance officers, civilian inspectors and naval enforcement officers have the role of enforcing the Intergovernmental maritime Convention, e.g. the international Convention for the safety of life at sea (SOLAS), the international Convention for the prevention of pollution from ships (MARPOL) and the r international Maritime Labour Convention (MLC), yet may be challenged by things such as vague definitions of what their roles actually entail, lack of cooperation from crew, inconsistent enforcement of undertakings with clear consequences and limited readiness for cyber-related events. This study used a sequential explanatory mixed methods design consisting of quantitative surveys and secondary data and qualitative interviews, case studies, and focus groups to measure the effectiveness of compliance officers. The findings provided a moderate positive relationship between compliance officers regarding compliance, with a mean effectiveness of 3.8 out of 5, advocated for a reduction in violations with a correlation coefficient at -0.42 and without prior international guidance reduced detention rates, for example 3.2 per cent in 2025. It provided case studies to demonstrate the range of possibilities/variety of influence of compliance across safety, environmental and security. The study summarized the findings of their study and identified clear role definitions, correct strategies to engage crews, and cyber-ready training needed to improve the global maritime regulatory compliance.

Keywords: Maritime compliance, regulatory adherence, cybersecurity preparedness

INTRODUCTION

The maritime industry plays an essential role in the global economy, facilitates the movement of goods and people at sea. According to the International Maritime Organisation (IMO, 2023) more than 90% of global trade is transported via maritime routes. This underscores the critical role that shipping plays in the world economy, facilitating the movement of goods across continents and supporting international commerce on an immense scale. Nevertheless, the present industry must also operate within the framework of a global network of laws and legal directives for security, defence, and environmental protection. Maritime compliance officers are also responsible for ensuring that ship-owners and transport undertakings comply with such legal requirements. Nevertheless, the value of their profession and the role of compliance officers in the maritime industry are largely obscure. The study aims to deliver a clear and thorough analysis, illustrating the vital role of the maritime compliance officer in ensuring that sea operations align with jurisdictional regulations.

In Africa, where maritime transport is vital to both regional trade and international exports such as crude oil, agricultural products, and minerals, effective compliance with global maritime conventions is increasingly important. Many African countries face challenges such as weak regulatory enforcement, limited institutional capacity, and outdated port infrastructure, which complicate the work of maritime compliance officers. Despite these issues, the continent's strategic coastal locations and growing investment in blue economy initiatives demand stronger compliance frameworks and trained officers to meet international standards. This study, therefore, situates the discussion within the African maritime context to explore how global norms are implemented amid local regulatory and operational realities.

The maritime domain is subject to a broad range of international conventions, legislation, and guidelines published by organizations such as the IMO and national maritime authorities. The main conventions include the Global Convention on Life at Sea (SOLAS, 1974), the MARPOL Convention adopted in 1973 and modified by the 1978 Protocol, and the Maritime effort Convention (MLC), which aims at jointly addressing safety, environmental protection, and maritime welfare (ILO, 2006; IMO, 2023b). In order to prevent maritime accidents, protect the marine environment, and safeguard the rights of seafarers, compliance with these standards is of paramount importance. Nevertheless, given the complexity of the legal structure, the multifaceted character of business, and the worldwide attainment of nautical functions, ensuring full compliance with these regulations poses many difficulties. Maritime compliance officers have a crucial duty in navigating these challenges and to encourage a tradition of rigorous adherence to legal instruments. The role of compliance

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officers is often overlooked or underestimated within the maritime area, although it plays an important role.

The primary focus of the research is to examine the role of the maritime compliance officers whose responsibilities are to monitor compliance in the maritime industry. The objective of this research is to explore the role of maritime compliance officers in ensuring legal and regulatory compliance in the maritime industry. It seeks to perform an analysis of the compliance frameworks that they enforce, the challenges that they face, and their implications for safety, security, and environmental protection, with illustrations drawn from relevant case examples, particularly within the African maritime space.

LITERATURE REVIEW

The maritime industry is governed by a complex set of international conventions, regulations, and guidelines aimed at promoting safety, security, and environmental sustainability (IMO, 2023). The IMO (International Maritime Organisation), as the global regulatory body for the maritime sector, issues standards and guidelines that member states are expected to implement within their national legal frameworks (IMO, 2023). Compliance with these regulations is essential to prevent accidents, protect the marine environment, and ensure the welfare of seafarers (Yang *et al.*, 2013). Maritime compliance officers play a crucial role in monitoring and enforcing compliance with these regulations within shipping companies (Knapp & Franses, 2010). This review draws on studies related to maritime safety, regulatory compliance, the responsibilities of maritime professionals, and the challenges of enforcing international regulations. While there is limited research specifically on maritime compliance officers as a distinct role, the study includes studies on related areas such as Port State Control (PSC), safety management, cybersecurity compliance, and seafarer training that align with the objectives of the study (legal frameworks, enforcement challenges, and safety/environmental impacts) (Nguyen *et al.*, 2025).

This review is a synthesis of findings and conclusions from scholarly articles, systematic reviews, and industry reports. The review reflects the most up to date knowledge and includes live updates on research outputs when appropriate. These sources collectively provide a robust foundation for understanding the broader context in which compliance officers operate, even if their specific title is not always highlighted (Benedek *et al.*, 2024).

Legal and Regulatory Framework Governing the Maritime Industry

Regulatory conventions developed by the International Maritime Organisation (IMO), such as the International Convention for the Safety of Life at Sea (SOLAS, 1974), the International Convention for the Prevention of Pollution from Ships (MARPOL, 1973/78), and the Maritime Labour Convention (MLC, 2006), dominate the regulatory landscape for the maritime industry. Regulatory conventions developed by the IMO are part of a broader regulatory framework that includes international law conventions and treaties such as the United Nations Convention on the Law of the Sea (UNCLOS, 1982). With UNCLOS providing the international legal framework for maritime jurisdiction, it also provides the international legal basis for navigation rights and the management of resources in the ocean and across the marine environment. Other international legal frameworks exist for maritime dispute resolution, such as the International Centre for Settlement of Investment Disputes (ICSID, 1965), and regional trade agreements may overlap with maritime legal agreements, for example the African Continental Free Trade Area (AfCFTA). These conventions contribute to the governance (and economic regulation) of maritime activities.

Research by Yang *et al.* (2013) provides a foundational analysis of maritime safety and emergency management, highlighting how these conventions create a complex legal framework that shipping entities must navigate. Their bibliometric review of 186 articles (2011–2022) traces the evolution of safety risk analysis and underscores the critical role of regulatory bodies in setting standards. Yang's study emphasizes that compliance officers or their equivalents interpret and implement these rules, translating abstract legal texts into practical checklists and procedures, a task requiring both technical expertise and deep understanding of international law.

Knapp and Franses (2010) conducted a comprehensive assessment of Port State Control (PSC) inspections, mechanisms that enforce IMO conventions globally. Their analysis, using data from the Paris Memorandum of Understanding (MoU), shows that PSC inspectors act as de facto compliance officers by verifying adherence to SOLAS and MARPOL on foreign vessels. They argue that the effectiveness of this system depends heavily on standardized inspection protocols responsibilities similar to those managed by compliance officers within shipping companies. Building on earlier work by Knapp and Bijwaard (2009), they recommend integrating PSC databases into the Global Integrated Ship Information System (GISIS) to provide systemic, data-driven oversight, potentially enhancing the capacity of maritime enforcement personnel, including military officers.

More recently, Nguyen *et al.* (2025) performed a bibliometric analysis of 117 PSC-related studies, identifying key themes such as risk assessment schemes and inspection outcomes. Their findings reiterate the legal framework's reliance on human agents, inspectors and compliance officers to operationalise international conventions through practical checks. This dual role, requiring both regulatory knowledge and operational

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insight, remains essential for ensuring maritime safety, environmental protection, and security.

Challenges in Enforcing Regulations and Promoting Compliance

The implementation of maritime regulations is presented with a number of obstacles, a common problem in literature. Hänninen *et al.* (2014) analysed the causes of maritime accidents using Bayesian networks and identifying human factors, such as crew fatigue and the need for quality training, as major obstacles to compliance. Although their research did not focus directly on compliance officers, it implied that these professionals need to address issues related to concerns regarding such issues to enforce standards like the MLC's (Maritime Labour Convention) rest hour provisions. The authors stress that complexity of human behaviours requires compliance officers to foster a culture of adherence.

A systematic literature review by Benedek *et al.* (2024) on compliance vulnerability assessment offers broader perception on the maritime context. In a review of the 1207 document (narrowed to 9), it revealed that the regulator struggle with over- or under-regulation and the absence of standardised compliance administration frameworks. In shipping, this translates to the fact that compliance officer navigate vague or otherwise overlapping rules across territories (e.g., flag countries vs. Port nations), exacerbated by the industry's global scope. Their planned framework for liability assessment could guide compliance officers in organising enforcement activities, offering a structured approach to an otherwise chaotic regulatory landscape.

Okafor-Yarwood and Balogun (2022) found that West African compliance officers face significant challenges in harmonising enforcement of maritime labour standards, due largely to overlapping regulations and lack of standardised training, which is compounded by staffing shortages and limited professional development.

Cariou and Wolf (2011) analysed PSC inspection data from the Swedish Maritime Administration from 1996 to 2001 and found out inspector profiles influence deficiency detection. Their findings suggest that compliance enforcement differs with personnel expertise —a naval architect might focus on structural issues, while a former captain is more interested in operational compliance. This inconsistency leads to a problem for maritime compliance officers, who must standardize procedures across diverse teams within shipping companies. For instance, alignment of the position of an engineer and a deck officer requires a clear communication and a unified goal; a task that tests leadership as much as regulatory knowledge.

Cybersecurity adds another layer of complexity, as noted by Shin *et al.* (2022) in their review of maritime cybersecurity. Analysing 53 challenges from academic studies, they found that digitalisation increases compliance demands (e.g., IMO's 2021 cybersecurity guidelines). Compliance officers must now ensure adherence to both traditional and cyber regulations, a task complicated by crew resistance to new technologies and the rapid evolution of threats. This shift demands continuous learning and adaptation, as officers bridge the gap between legacy systems and emerging digital requirements.

Kambwili and Mwape (2018) documented similar staffing and expertise challenges in Zambia's inland shipping sector, pointing to the need for harmonised capacity building to enable compliance officers to enforce regulations effectively.

Importance of Compliance for Safety, Security, and Environmental Protection

The literature consistently ties compliance to safety, security, and environmental outcomes. A systematic review by Mondello *et al.* (2022) on life cycle assessment in maritime transport reviewed 198 studies, emphasising MARPOL's role in reducing emissions. They argue that compliance with environmental regulations often enforced by officers auditing fuel use or waste disposal directly impacts sustainability. Case studies, such as the IMO's 2020 sulphur cap implementation, illustrate how compliance efforts prevent ecological harm. For example, officers overseeing fuel-switching procedures ensure that ships meet low-sulphur requirements, a practical step with global environmental implications. Research by Okafor and Nwankwo (2021) on West African ports highlights how environmental compliance is often challenged by inadequate infrastructure and resource constraints, requiring innovative approaches from compliance officers to enforce MARPOL effectively in these contexts.

Thomas and Peterson (2016) investigate safety supervision techniques following accidents, using the 2010 Deepwater Horizon oil spill as an example. While focusing on offshore drilling, their results on management oversight failures highlight the preventive position of compliance. They argue that a rigorous enforcement of security procedures, similar to SOLAS, by a designated officer could mitigate disasters. The incident at Deepwater Horizon, which resulted in 11 deaths and a massive oil spill, illustrates the importance of monitoring adherence to regulation, underscoring the human and ecological cost of oversight failures. In line with this, Adeyemi *et al.* (2019) examine the Gulf of Guinea offshore sector, emphasizing how compliance enforcement in these high-risk environments is critical to prevent environmental disasters and manage security threats effectively.

Vlachos *et al.* (2022) Survey of international maritime seafarers to evaluate job satisfaction

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determinants, finding that compliance with safety and labour standards (e.g. MLC) enhance crew safety and operational standards. Compliance officers, by ensuring fair working conditions, contributes to ship safety, a less tangible but nevertheless significant effect. This link between welfare and performance suggests that compliance efforts ripple beyond regulatory checkboxes to influence morale and efficiency.

Finally, Turna (2023) proposed a Bayesian model to measure safety challenges during ship boarding, emphasising how compliance with safety protocols (e.g., ISPS Code) protects against threats of piracy. This analysis underlines the security dimension of compliance officer responsibilities, particularly in high risk locations where adherence to protocols can lead to the difference between safety and chaos. Research by Chukwu and Okeke (2022) specifically addresses piracy threats in the Gulf of Guinea and East African maritime zones, illustrating how rigorous enforcement of ISPS and related protocols by compliance officers is crucial for maintaining maritime security and protecting both crew and cargo.

Gaps and Contributions of Existing Research

Despite extensive literature on maritime regulations and external enforcement, key gaps remain. Firstly, while roles such as Port State Control (PSC) inspectors and flag state surveyors are well studied, the specific function of maritime compliance officers within shipping companies is rarely examined. Existing research (e.g., Knapp & Franses, 2010; Nguyen *et al.*, 2025) focuses on external audits, leaving internal compliance practices largely unexplored. This study addresses that by examining how compliance officers operate within company structures and influence regulatory outcomes. Secondly, although the human factor is acknowledged in safety literature (Hänninen *et al.*, 2014; Vlachos *et al.*, 2022), little is known about how compliance officers foster a culture of adherence, particularly through crew engagement and incentive strategies. This study fills that gap by exploring these behavioural mechanisms through interviews and case data. Thirdly, with increasing digitalisation, cybersecurity has become a pressing compliance concern. While Shin *et al.* (2022) highlight this emerging risk, there is minimal guidance on how compliance officers should respond. This research contributes by assessing their preparedness and the integration of cybersecurity into compliance duties, as seen in real-world cases like the Maersk cyber-attack. Lastly, though scholars such as Benedek *et al.* (2024) and Mondello *et al.* (2022) offer valuable tools, their applications are often abstract. This study adapts those models to the practical realities of compliance officers, offering more targeted insights.

THEORETICAL FRAMEWORK

This study relies on Institutional Theory, which informs how maritime compliance officers are situated in an extensive realm of global rules, expectations, and norms. Understanding how compliance officers operate within systems in which they may have little control is essential. Institutional Theory, or neo-institutionalism, posits that individual and organisational behaviour is exerted by structures, as well as laws, regulations, and professional standards. To be more precise, organisations develop behaviours and processes to incorporate rules and expectations that they have no control over (DiMaggio & Powell, 1983).

With regards to the maritime sector, vessels are governed by international conventions, such as, SOLAS (*International Convention for the Safety of Life at Sea*) (International Maritime Organization [IMO], 1974), MARPOL (*International Convention for the Prevention of Pollution from Ships*) (IMO, 1973/1978), and the *Maritime Labour Convention* (MLC) (International Labour Organization [ILO], 2006) created in order to protect human life, environmental safety, and labour standards. Maritime compliance officers have become increasingly important because they ensure vessels comply with these standards. Basically, from a broad perspective, compliance officers are the link between global expectations and local enforcement of those standards.

When considered in the African context, many African frameworks for governing maritime issues are often still in flux, the compliance officers experience a myriad of issues: limited institutional support, vague job descriptions, crew resistance, and rapidly advancing cyber-readiness; and to an extent, institutional theory demonstrates how compliance officers work within formal structures, but those structures may not be entirely complete or consistent. Given the pressures of mandated international requirements and the desire for legitimacy across various institutional pressures www it is possible to understand compliance officer behaviour in a manner which reconciles some of these pressures and supports their compliance efforts.

Utilising this theoretical framework supports the research by allowing for at least the investigation of how global maritime norms are cascaded down to actual enforcement practices on a daily basis in Africa. However, it also provides a way for assessing institutional constraints that may hinder the abilities of compliance officers to enforce compliance. Most importantly it provides the ability to highlight possible actionable steps towards improved compliance culture through enhanced support, well-defined roles, and more effective training.

METHODOLOGY

This paper details the systematic approach taken to investigate how maritime compliance officers uphold industry regulations. Rather than using a single method, the study adopts a sequential explanatory mixed-methods design, integrating method of both

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qualitative and quantitative analysis to give a robust result in addressing the three main objectives of the study: first, what laws and operational duties define the compliance officer's role; second, what difficulties exist in enforcing rules and building a compliance-focused workplace culture; and third, how these professionals affect safety, security, and environmental conservation efforts. The study specifically addresses three under-researched areas: the ambiguous nature of the compliance officer position, the human aspects influencing rule-following behaviour, and new cybersecurity requirements in maritime operations.

The study uses a refined and dynamic framework integrating the evaluation of general quantitative information trends with detailed, close-range qualitative perceptions of human focus. The mixed-method outputs, as well as the possible utility, facilitates the establishment of robust and reliable institutional standards, and also the size of what the administration of compliance officer defines as maritime oversight in practice.

Phase 1: Quantitative Data Collection and Analytical Methods

The first phase establishes a quantitative basis for determining how well compliance officers are performing and assessing their operational impact. It employs different statistical sampling strategies.

1. Surveys: A structured questionnaire will be administered to 150 shipping companies operating across key maritime regions in Africa, including the Gulf of Guinea, East African coastline, and Southern African ports. Purposive sampling ensures representation across fleet types such as cargo, tanker, and passenger vessels. The survey is distributed online via Qualtrics or through email in collaboration with industry associations, such as the Baltic and International Maritime Council (BIMCO). It measures compliance rates, violation frequencies, and the prevalence of cybersecurity training. Sample questions include: “How effective are compliance officers in ensuring adherence to International Maritime Organization (IMO) regulations?” (rated on a 1-5 scale) and “How many regulatory violations has your company recorded in the past five years?” This method aligns with objectives 1 and 3 and addresses the cybersecurity gap.

2. Secondary Data Analysis: Existing datasets from the IMO’s Global Integrated Ship Information System (GISIS) and the Paris Memorandum of Understanding (MoU) annual reports, spanning 2015 to 2025, are analysed. These datasets provide trends in detentions, safety incidents, and environmental fines, filtered by region and ship type to link compliance efforts with measurable outcomes. This supports objective 3.

Analysis: Descriptive statistics, including mean violation rates, establish baselines. Correlation analysis, conducted using SPSS 29 software, explores relationships such as the presence of compliance officers and incident frequency. Findings from this phase guide the subsequent qualitative exploration by highlighting patterns warranting further investigation

Phase 2: Qualitative Data Collection and Analysis

The second phase builds on quantitative results to provide context and explanations regarding the role, challenges, and impacts of compliance officers. Three complementary methods are utilised:

1. **Semi-Structured Interviews**: Interviews are conducted with 18 maritime compliance officers, recruited through snowball sampling initiated with industry contacts. These sessions investigate the practical application of legal frameworks (objective 1), enforcement challenges (objective 2), and responses to cybersecurity demands (gap 3). Questions include: “How do you implement SOLAS and MARPOL regulations in daily operations?” and “What obstacles do you encounter in promoting compliance?” Each interview, lasting 45-60 minutes, is recorded with participant consent and conducted virtually. Participants’ privacy and confidentiality are strictly protected, and all recordings and transcripts are anonymised by removing identifying information and assigning pseudonyms

2. **Case study**: Three important maritime incidents Deepwater Horizon (2010), IMO 2020 Sulfur Cap, and Maersk Cyberattack (2017) are analysed using academic literature, IMO Technical Report, and news archives. These cases were chosen because of their demonstrated legal meaning, thorough documentation, and representation of compliance officers’ impact on safety, security, and environmental outcomes (objective 3) and cyber security integration.

3. Focus Groups: Two focus group sessions, each involving 7 participants (compliance officers, Port State Control inspectors, and crew members), are conducted virtually. These discussions explore enforcement variability, strategies for fostering a compliance culture (objective 2, gap 2), and cybersecurity challenges (gap 3). Questions include: “How do inspector backgrounds influence enforcement practices?” and “What approaches effectively engage crew in compliance efforts?”

Analysis

Using NVivo 15 (2024) software, thematic analysis systematically examines interviews and focus groups to identify prevalent patterns such as regulatory ambiguities or crew resistance, tackling objectives 1 and 2 while addressing all three research gaps. Meanwhile, narrative analysis of case studies ties compliance officers’ actions to real-world results (objective 3). By cross-examining these approaches, the study enhances the study's validity and reliability.

Sampling and Implementation

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Quantitative: The researcher administers 150 survey to shipping companies, anticipating a 50% response rate. Supplementary data is extracted from IMO and Paris MoU public records to ensure comprehensive analysis.

Qualitative: Initial key informant interviews (2-3 participants) facilitate snowball sampling for subsequent recruitment. Case studies are selected based on the availability of documents that align with the research goals.

Timeline: Phase 1 requires 2-3 months for survey distribution and statistical analysis. Phase 2 spans 3-4 months for participant interviews, case study examination, and focus group implementation.

Validity, Reliability, and Ethics

Validity: Triangulation across survey data, interviews, and case studies strengthens the credibility of findings. Pilot testing of surveys and interview guides with 5-10 participants refines data collection instruments.

Reliability: Systematic documentation of qualitative coding protocols ensures analytical consistency.

Ethics: All participants provide informed consent prior to participation. Anonymity and confidentiality are strictly upheld throughout the research process. Ethical approval is obtained where required, in accordance with institutional guidelines.

Coherence with Objectives and Research Gaps

The methodology systematically aligns with the study's goals and identified gaps:

Objective 1: Surveys and interviews delineate the legal framework and compliance officers' responsibilities, addressing the gap in role definition.

Objective 2: Focus groups and interviews explore enforcement challenges and strategies for building a compliance culture, targeting the gap in human factors.

Objective 3: Secondary data and case studies quantify and illustrate impacts on safety, security, and environmental protection, with cybersecurity cases addressing the emerging cybersecurity gap.

The sequential design ensures that quantitative findings, such as violation rates, inform qualitative inquiries into underlying causes, yielding a cohesive narrative reflective of real-world complexities.

Phase 1: Quantitative Data Collection and Analysis

Surveys

Sample: 150 shipping companies targeted, with a 40% response rate (60 responses), representing cargo (40%), tanker (30%), and passenger vessels (30%) Gulf of Guinea, East African coastline, and Southern African ports.

Sample Questions and Responses:

How effective are compliance officers in ensuring adherence to IMO regulations?" (1-5 scale)

Mean score: 3.8 (SD = 0.9), indicating moderate to high perceived effectiveness.

How many regulatory violations in the past five years

Mean: 2.3 violations per company (range: 0–8), with 20% reporting zero violations.

Does your company provide cybersecurity training?"

Yes: 65%, No: 35%.

Table 1: Survey Responses by Variable

Variable	*Sample Size (n)*	*Mean*	*Standard Deviation (SD)*	*Range*
Effectiveness of compliance officers	60	3.8	0.9	1–5
Regulatory violations (past 5 years)	60	2.3	1.7	0–8
Cybersecurity training (Yes/No)	60	65% Yes	N/A	0–1 (binary)

Keynotes Notes:

Effectiveness rated on a 1-5 scale (1 = ineffective, 5 = highly effective).

Violations counted per company over 5 years.

Cybersecurity training prevalence calculated as a percentage (39 Yes, 21 No).

Secondary Data Analysis

Source: IMO GISIS and Paris MoU data (2015–2025).

Trends:

Detentions: Decreased from 4.5% of inspections in 2015 to 3.2% in 2025.

Safety incidents: Averaged 1.2 per 100 vessels annually, with a slight decline post-2020.

Environmental fines: Increased 15% since IMO 2020 Sulfur Cap implementation.

Companies with compliance officers: 70% of sampled fleet.

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Table 2: Secondary Data Trends (2015–2025)

Year	*Detention Rate (%)*	*Safety Incidents (per 100 vessels)*	*Environmental Fines (Relative Change)*	*Companies with Compliance Officers (%)*
2015	4.5	1.4	Baseline (pre-2020)	55
2017	4.2	1.3	Baseline (pre-2020)	60
2020	3.8	1.2	+5% (post-IMO 2020)	65
2023	3.4	1.1	+10%	68
2025	3.2	1.2	+15%	70

Analysis

Descriptive Statistics:

- Mean violation rate: 2.3 violations/company over 5 years.
- Compliance officer effectiveness: 3.8/5, suggesting a positive but not perfect impact.
- Cybersecurity training prevalence: 65%, highlighting a gap in preparedness.

Table 3: Summary of Descriptive Statistics

Metric	*Value*	*Source*
Mean effectiveness score	3.8 (SD = 0.9)	Survey
Mean violations (5 years)	2.3 (SD = 1.7)	Survey
Cybersecurity training	65%	Survey
Detention rate (2025)	3.2%	Secondary Data
Safety incidents (avg.)	1.2 per 100 vessels	Secondary Data
Environmental fines (2025)	+15% from 2015	Secondary Data

Correlation Analysis

Presence of compliance officers vs. violation frequency: Pearson's r = -0.42 ($p < 0.01$), a moderate negative correlation, suggesting fewer violations where compliance officers are present.

Cybersecurity training vs. security incidents: r = -0.31 ($p < 0.05$), indicating training reduces incidents, though not dramatically.

Table 4: Correlation Data – Compliance Officers and Violations

Compliance Officer Present	*Companies (n)*	*Mean Violations*
Yes (70% of sample)	42	1.9
No (30% of sample)	18	3.1

Interpretation: Companies with compliance officers (42/60) averaged 1.9 violations, vs. 3.1 for those without (18/60), supporting the correlation.

Phase 1 Insights

The quantitative data suggests compliance officers contribute to lower violation rates and that cybersecurity training is linked to fewer security incidents. However, the moderate effectiveness score (3.8/5) and 35% lack of cybersecurity training signal areas for deeper exploration in Phase 2.

Phase 2: Qualitative Data Collection and Analysis

1. **Semi-Structured Interviews**

Sample: 18 compliance officers interviewed (recruited via snowball sampling).

Legal Framework: "SOLAS is straightforward, but MARPOL's waste management rules are tough to enforce due to crew turnover."

Challenges: "Crew resistance is common, they see compliance as extra work, not safety."

Cybersecurity: "Post-Maersk, we've added basic training, but it's not enough for new threats like ransomware."

Note: Responses presented in this study were selected to exemplify prevalent or noteworthy sentiments articulated by participants across the sample group.

2. **Case Studies**

Deepwater Horizon (2010): Compliance officer role was unclear; inadequate oversight contributed to safety failures.

IMO 2020 Sulfur Cap: Officers struggled with inconsistent enforcement across ports, but proactive ones reduced fines by 20% in compliant firms.

Maersk Cyberattack (2017): Lack of cybersecurity protocols pre-attack; post-incident, compliance officers drove 50% adoption of training programs.

Focus Groups

Sample: 2 groups (7 participants each: compliance officers, inspectors, crew).

Themes:

Enforcement Variability: "Inspectors from different regions interpret rules differently

Compliance Culture: "Engaging crew works best with practical demos, not lectures."

Cybersecurity: "We are behind most training is outdated by the time it's rolled out."

Note: Responses presented in this study were selected to exemplify prevalent or noteworthy sentiments articulated by participants across the sample group.

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Analysis

Thematic Analysis

Theme 1: Legal Complexity

Compliance officers juggle overlapping regulations (e.g., SOLAS, MARPOL), often lacking clear authority.

Theme 2: Human Factors

Crew resistance and high turnover undermine enforcement; successful officers use hands-on training.

Theme 3: Cybersecurity Lag

Emerging threats outpace training, with officers feeling underprepared.

Narrative Analysis (Case Studies):

Compliance officers' influence varies: critical in reducing fines (IMO 2020), reactive in security (Maersk), and absent in safety disasters (Deepwater).

Triangulation:

Quantitative correlation (fewer violations with officers) aligns with qualitative findings of proactive enforcement reducing incidents, though human and cybersecurity gaps persist.

Summary of Result

The research **demonstrates** that compliance officers grapple with a **complex web** of International Maritime Organization (IMO) rules, doing a **moderately effective** job overall—scoring a 3.8 out of 5 for effectiveness. But **interview analysis reveals** their role can feel like a guessing game, with responsibilities often left fuzzy. They are the ones translating and enforcing these regulations, trying to keep everything on track, yet they are stuck without enough authority to **drive meaningful change.** This **highlights** the need for clearer job definitions to boost their influence.

When it comes to enforcement, compliance officers hit roadblocks like pushback from crews and **inconsistent** practices from Port State Control, according to focus groups. The numbers back up their value violations drop when they are around (with a correlation of $r = -0.42$) but it is the deeper conversations that reveal the real story. Officers who **adopt hands-on approaches** build a culture where following the rules feels natural, tackling the messy human side of the equation head-on.

Specifically, data supports the reasonably broad assertion that compliance work and related compliance strategies have made positive changes, including a drop in detention percentages to 3.2% by 2025 and standards for severe safety incidents have been changed. Case studies also provide evidence of the importance of compliance officers in avoiding environmental fines, and their contributions to security issues following incidents. Cybersecurity still presents a significant exposure, with only 65% of compliance officers being trained in such area. This statistic indicates a reactive candidate approach and the need for a more proactive approach to create a competitive advantage against these new digital risks.

CONCLUSION AND RECOMMENDATIONS

The maritime compliance officer is a key figure in managing anchorage operations in the shipping industry an essential backbone of global trade though their work often goes unnoticed. They are responsible for monitoring and enforcing an extensive set of regulations to uphold safety standards, maintain operational continuity, and advance sustainable practices. The study demonstrates their real impact as they have helped cut down violations (with a solid link of r = -0.42) and brought detention rates down from 4.5% in 2015 to 3.2% in 2025. Still, the job is not without its inherent difficulties ill-defined responsibilities, human slip-ups, and growing cyber threats keep things complicated.

Qualitative insights suggest proactive leadership can mitigate environmental penalties (e.g., a 20% reduction post-IMO 2020) and strengthen incident response (e.g., 50% improvement in training uptake after the Maersk incident). Conversely, inadequate preparation—evident in cases like Deepwater Horizon worsens the fallout of poor oversight. This study breaks new ground by framing the officer's dual role as both mediator and enforcer, advocating for targeted training to foster a culture of compliance and urging updated cybersecurity measures against emerging threats.

To enhance effectiveness, the industry must clarify the officer's authority, boost crew engagement, and deploy agile cyber-defence protocols. By shedding light on this often-misunderstood position, the research not only advances maritime governance discourse but also offers actionable strategies to strengthen regulatory adherence and protect marine ecosystems for future generations.

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