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Assessing the burden of an excessive SMS size on the effective implementation of the ISM Code

Li An Xian

ASSESSING THE BURDEN OF AN EXCESSIVE SMS SIZE ON THE EFFECTIVE IMPLEMENTATION OF THE ISM CODE

LI AN XIAN

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of Master of Science in Maritime Affairs

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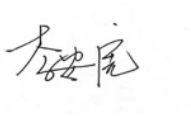
Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.



(Signature): ....

(Date): .....20/JUL/2024.....

Supervised by: ...Prof. Chen Haiquan / Prof. Rapheal Baumler.....

Supervisor's affiliation: ……..... Dalian Maritime University / WMU.....

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Abstract

TITLE OF DISSERTATION: ASSESSING THE BURDEN OF AN EXCESSIVE SMS SIZE ON THE EFFECTIVE IMPLEMENTATION OF THE ISM CODE

Degree: Master of Science

With the enforcement of the ISM Code, the Safety Management System (SMS) became a mandatory requirement for all shipping companies. Since then, scholars have mainly focused on studying its benefits and the factors that may impact its implementation. These discussions have focused on how to improve a ship's SMS for compliance and how to educate and train seafarers to comply with the SMS. Very few scholars have ever discussed the real demands of the crew regarding the SMS. Its necessity has been tacitly accepted, precisely because it is mandated by the Convention. Over the years, the ship's SMS documentation has increased, becoming larger and more cumbersome. The SMS itself has become a burden and a potential risk factor. Streamlining the SMS needs to be studied to address challenges arising from its excessive size. This dissertation aims to investigate the causes from manager's perspectives and seek methods to streamline the SMS without compromising safety standards.

A combined research method was utilized, including quantitative and qualitative method. Twelve companies' SMSs were collected and analyzed. eight managers who had more than ten years of sea experience were interviewed by using Semi-structured interviews, to gain comprehensive insights into the development process and management's views on the excessive size of the SMS.

Key findings of the research indicate that a focus on compliance with voluminous SMS may shadow over the practical application of safety measures. Furthermore, the research emphasizes the importance of cultural

factors and mechanism of audit and review. Lastly, the dissertation concludes with a series of recommendations for stakeholders in streamlining and reducing size of SMS.

Keywords: Streamlining, Documentation Burden， SMS.

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List of Abbreviations

AHTS.	Anchor Handling Towing Supply tug
DPA	Designated Person Ashore
FOC	Flags of Convenience
ILO	International Labour Organization
IMO	International Maritime Organization
ISM	International Safety Management
MNC	Major Non-Conformity
NC	Non-Conformity
OHS	Occupational Health and Safety
PSV	Platform Supply Vessel
QMS	Quality Management System
REC	Research Ethics Committee Protocol
RO/RO	Roll On /Roll Off
SMS	Safety Management System
SOLAS	International Convention of the safety of life at sea
TMN	Traditional Maritime Nations
UNCTAD	United Nations Conference on Trade and Development
WMU	World Maritime University

Chapter 1 Introduction

1.1 Research Background

The maritime transport sector is pivotal to the global economy. The "Review of Maritime Transport 2022" reported by the United Nations Conference on Trade and Development (UNCTAD) indicates that ships handle over 80% of the global trade volume (UNCTAD, 2022). Consequently, the safety and efficiency of maritime operations are crucial to the industry's sustainable economic development. In this context, the Safety Management System as required by ISM Code stands out as a fundamental framework, which is designed to integrate safety procedures, policies, and practices. It offers a structured and systematic approach to risk management and accident prevention, plays a key role in cultivating a safety culture of shipping companies.

Effective implementation of SMS is an ongoing process that demands commitment and dedication from top management to the onboard crew. Regular reviews and audits are needed to keep the system updated to meet ship operating requirements and latest regulations. However, the industry is facing a challenge that SMS size is getting bigger and thicker. It becomes too cumbersome to navigate. The extensive paperwork can result in overwhelming and hard to manage, attention is paid on compliance with ISM Code rather than the practical application of safety measures. To solve this issue, some larger companies have undertaken the trial on simplifying content and using visual aids such as flowcharts and diagrams for quick reference.

This dissertation aims to address the challenges caused by excessive size in SMS from the employer's perspective. strategies will be explored to streamline SMS, to make SMS more accessible and concise for seafarers.

1.2 Research questions and Objectives

1.2.1 Research Objectives

The objectives of the research are to provide evidence support for the regulator in amending the regulation in streamline SMS. To achieve it, actual size of SMS was measured and possible areas of SMS was identified for simplifying, impact of documentation burden was assessed.

The research also aims to understand the effects of cultural and organizational barriers in effective implementation of SMS and how to engage seafarer participation and management support (Bhattacharya, 2009).

1.2.2, Research Questions:

Two research question were proposed to accomplish above research objectives:

- How to implement SMS on board with too big in size?
- How to reduce size of SMS?

These research questions and objectives aim to provide a comprehensive understanding of the issues surrounding documentation in the context of safety management systems within the maritime industry, as well as to offer practical solutions to streamline processes and improve overall safety management practices.

1.3 Research Significance

The study will contribute to the maritime industry by providing insights into how the size of SMS and documentation burden can be reduced without compromising safety, leading to less administrative burden for seafarers, allowing them to focus more on operational safety and efficiency.

It will be significant for regulatory bodies as it will offer evidence-based recommendations for revising the ISM Code to reduce bureaucratic challenges.

The research will hold practical significance for shipping companies seeking to enhance their SMS implementation and for seafarers who directly experience the impact of these procedures. Seafarers' concern regarding to documentation burden can be heard. Potentially it could improve working condition and job satisfaction on board.

1.4 Research Methodology

Qualitative and quantitative research methods are utilized in this research.

- Qualitative research: semi-structured interviews are conducted with company managers, to gain an in-depth understanding of the SMS documentation process.
- Quantitative research: statistical analysis of SMS documentation is conducted, to measure the extent of the burden and its impact on safety management outcomes.

This research methodology is designed to provide a thorough and balanced examination of the documentation burden within maritime SMS implementation, offering both depth and breadth in its analysis.

Chapter 2 Literature Review

In this chapter, section 2.1 will be history and overview of ISM code itself, to understand the development of ISM and classify the duties designated for Company. section 2.2 will review the role of company in effectiveness of SMS implementation from three aspects: 2.2.1 ability and willingness of company. 2.2.2, company's obligation.2.2.3, commitment from company. Role of communication and trust will be reviewed independently in section 2.3. section 2.4 will carry out comparative analysis of documentation burdens across different sectors. Meanwhile, the research

gaps will be concluded at the end of each section. lastly, research framework will be stated in section 2.5.

2.1 History and Overview of ISM code.

2.1.1 History of ISM code

The ISM Code stands as a testament to the maritime industry's commitment of safety and environmental protection. its origins could be traced back to the early 20th century. The sinkage of the Titanic in 1912 was marked as a turning point, which highlighted the urgent need for improving safety managements at sea. As the respond to this disaster, the International Convention for the Safety of Life at Sea (SOLAS) was adopted in 1914. It established the first international standards for the safety of ships, their crew, and passengers.

After World War II, public focus was drawn into maritime sector due to oil spills from tankers, such as " Torrey Canyon" in 1967 and the "Amoco Cadiz "in 1978. Another notable disaster was the capsizing of the Roll-On/Roll-Off vessel, called Herald of Free Enterprise in March 1987. It resulted in the tragic loss of 193 lives out of a total of 539 people on board. The subsequent investigation presented that human errors and inadequate supervision from shore-based management are the main factors. The enquiry report concluded that “from top to bottom the body corporate was infected with the disease of sloppiness”.

Since then the public realize the necessity of changing in maritime safety administration. As a response to these disasters. In October 1989, new guidelines were adopted by the IMO, introducing the "Management for the safe operation of ships and for pollution prevention”. The guidelines provided a framework for the development, implementation, and assessment of safety and pollution prevention

practices. These guidelines were formalized as the ISM Code in November 1993 and were became a new Chapter IX of the SOLAS Convention in May 1994. The code became mandatory for shipping company operating specific types of vessels from July 1, 1998, and subsequently for all other ships by July 1, 2002.

Since then, the ISM Code has been implemented through a variety of IMO instruments and national legislations. It has made shipping safer and cleaner over the past twenty years.

2.1.2 Overview of ISM code

The ISM Code, as outlined by the IMO, represents a significant regulatory framework aimed at ensuring the safety and environmental protection of maritime operations (IMO, 2002). Shipping companies are directly responsible for developing and maintaining a SMS that encompasses all aspects of safety and environmental management on board ships.

The ISM Code mandates that companies establish a safety culture in which personnel safety and pollution prevention are of paramount importance (Bhattacharya, 2009). This involves creating a comprehensive set of safety policies, guidelines, and procedures to be followed by all personnel on board. The code also requires companies to designate one or more persons ashore with direct access to the highest level of management, known as the Designated Person Ashore (DPA), who is responsible for monitoring the safety and pollution prevention aspects of the operation (IMO, 2002).

A company's responsibility was clarified under ISM Code, such as conducting safety audits, verifying the SMS regularly, and applying corrective actions to any deficiencies (Anderson, 2002). The effectiveness of SMS mainly depends on the

company, who develop series of documents and ensure these documents serving their intended purpose.

The literature emphasizes the importance of seafarers' participation in safety management. Seafarers are encouraged to identify loopholes of the SMS for continuously improvement (Frick & Wren, 2000). However, there is a recognized tension between a focus on compliance and practical application of safety measures (Gallagher et al., 2003).

Previous research has indicated that the bureaucratic nature of SMS implementations (Bhattacharya, 2009). This has led to calls for a streamlined approach to reduce the administrative burden while maintaining the integrity of safety management practices (LaMontagne et al., 2004).

There are no any technical or operational features stated in ISM code. It only requires shipping companies to carry out self -regulating with three objectives of the code.

1). provide for safe practices in ship operation and a safe working environment;

2). establish safeguards against all identified risks; and

3). continuously improve safety management skills of personnel ashore and aboard ships, including preparing for emergencies related both to safety and environmental protection.

To achieve the objectives, a broad functional requirement is set out in the code. the companies were expected to develop their own SMS adapting to their own operating mode and trading area. the following is broad functional requirement stated in ISM code for managers to add in their SMSs:

- A safety and environmental-protection policy;

- Instructions and procedures to ensure safe operation of ships and protection of the environment in compliance with relevant international and flag State legislation;
- Defined levels of authority and lines of communication between, and amongst, shore and shipboard personnel;
- Procedures for reporting accidents and non-conformities with the provisions of this Code;
- Procedures to prepare for and respond to emergency situations; and
- Procedures for internal audits and management reviews.

After analyzing more than 10 company's SMSs, one significant problem is identified. There are only three objectives and six functional requirements. however, more than thousands of pages are counted in their SMSs, some even more than five thousand pages. As stated by the seafarers, they have never read through the whole SMS, what they did is common practice on board to select the checklists or forms required to be complete or filled up only. Such problem creates the challenge for companies to find a balance between the necessary documentation for regulatory compliance and operational effectiveness, and the need to keep the documentation burden manageable for seafarers. Streamlining the SMS requires a critical review of existing procedures, the implementation of electronic documentation systems where appropriate, and a commitment to continuous improvement based on feedback from seafarers and management.

2.2 The role of company in effectiveness of SMS implementation.

The effectiveness of SMS implementation within a company depends on the active participation and commitment from various stakeholders; the company plays a central role. The literature points out that a paradigm shift has taken place in the approach to safety management. Regulatory framework transited from a command-and-control to regulated self-regulation (Gunningham and Johnstone, 1999). This

shift redefined the roles and responsibilities of companies in ensuring the safety and health of their workers.

Studies have consistently shown that the commitment of top management is a key factor in the success implementation of SMS (Nytro et al., 1998; LaMontagne et al., 2004). Such commitment is achieved through establishing a management system, including the allocation of resources, the process of establishment on safety management, and fostering a safety culture. Employers shall comply with regulatory requirements, meanwhile identify and assess hazards of workplace. (Frick and Wren, 2000).

Employee's participation is also key factor in the effective implementation of SMS. It's helpful to assess and manage risks if employee thinks like business owner (Dawson et al., 1988). The literature also points out the importance of trust and communication between manager ashore and seafarer (Bohle and Quinlan, 2000). However, globalization poses challenges to this collaborative approach. it can lead to job security issue and hamper open communication within the organization (Rogowski and Wilthagen, 1984).

Various tools and processes have been developed to adapt the implementation of SMSs. key components are risk assessment, incident reporting, and audit and review mechanisms. They are essential for identifying and addressing loophole of management system (Anderson, 2002; IMO, 2006). The literature points out that the effectiveness of these elements is closely tied to the company's commitment.

In conclusion, the company's role is multifaceted in the effectiveness of SMS implementation, including the commitment of top management, the promotion of employee participation, and the establishment of robust safety processes. The literature underscores the importance of a holistic approach to safety management, one that addresses not only regulatory compliance but also the social and economic

factors that influence workplace safety and health. As stated above, there are three key players impacting the effectiveness of implementation, they are administrators, employees and employers. The main driven force is the employers. Their ability, willingness, obligation and commitment play key factor in implementation of ISM code effectively on board.

2.2.1 Ability and willingness of company

Employers play a critical role in safeguarding the health and safety of their workers. The European Union Framework Directive has been a key catalyst in this regard, promoting a shift towards self-regulation with a focus on employer responsibility (Vogel, 1994). However, the effectiveness of this directive is contingent upon the ability and willingness of employers to implement necessary measures. Empirical studies, particularly those focusing on small and medium enterprises (SMEs), have consistently identified a gap in employers' knowledge and expertise in OHS management (Mayhew, 1997; Walters, 2001). This gap is not only a result of the size of the enterprise but also reflective of a broader issue of managerial competence and training.

Gunningham's (1998a) study further explores the challenges faced by different types of employers and highlights the group labeled as "the incompetent." These employers, regardless of the size of their companies, struggle with understanding OHS legislation and prioritize economics over the safety and health of their workers. Moreover, the literature reveals that a subset of employers, composed of smaller and medium-sized enterprises, lacks the willingness to invest in safety management. These employers treat safety measures as financial burdens rather than cornerstones in the long-term success of their businesses (Gunningham, 1998a). This myopic approach only calculates the immediate costs, ignoring the benefits of safety investments (HSE, 1997).

The concept of "employers' bounded rationality" (Gunningham, 1999) is central to understanding this reluctance. It means that employers are limited by their focus on immediate outcomes, which restricts their ability to appreciate the broader, long-term benefits of safety investments. This perspective is further complicated by the shared nature of industrial injury consequences, which dilutes the direct financial incentive for individual employers to invest in safety measures (Grayson and Goddard, 1975).

Despite the introduction of the ISM Code, the maritime industry also faces these challenges. A notable portion of employers fail to see the value of investing in safety management (Lloyds List, 2003). This highlights the need to encourage and enable employers to recognize and act on the long-term benefits of OHS management.

In conclusion, the literature emphasizes the need for a shift in employers' perspectives on safety management. This shift requires addressing the ability and willingness of employers to engage with safety issues.

2.2.2 Company’s obligation

The literature emphasizes the obligations of employers to provide a safe working environment for their employees. Regulatory frameworks, such as the EEC Directive 89/391, have established clear guidelines for employers to adopt a proactive approach to safety. However, a notable gap exists between these regulatory ideals and actual employer practices. Research indicates that better outcomes are achieved by employers who prioritize creating a safe working environment. Gallagher's (2000) study demonstrated that focusing on safe working conditions, rather than solely on modifying employee behavior,

results in superior safety performance. This finding is corroborated by SafeMAP audits.

Nevertheless, the literature also underscores the limitations of a 'safe-person' approach. This approach concentrates on modifying employee behavior rather than addressing workplace risks. Bohle and Quinlan (2000) argue that this approach leads to a dead-end, where employers mainly focus on employee training and supervision while neglecting the contributions to workplace safety. Denton (1982) and Hofmann and Stertzer (1996) claim that such a myopic approach overlooks the primary obligation of employers to provide a safe working environment. They think that it would divert attention from hazards of workplace to individual shortcomings, thereby reinforcing employer's control over workers.

Hale (1970) and Nichols (1997) criticize this approach which the focus is shifted from hazards of workplace to weaknesses of individual workers. Studies indicate that this can result in a tendency of blaming individual workers for incidents, therefore overlooking underlying root causes (Culvenor, 1996). The DuPont model heavily emphasizes employees' good safety habits. It has been criticized because of the narrow focus on worker behavior and the neglect of the employer's responsibility to provide a safe workplace (DuPont, 2007). Wokutch and VanSandt (2000) argue that this approach could impact worker's safety due to its failure to address the underlying social and economic factors.

In the maritime industry, the ISM Code outlines specific responsibilities for employers in ensuring the seafarers' safety. However, the Code emphasis seafarers' adherence to company’s procedures, training, and medical fitness, without explicitly addressing the employers' obligation to conduct risk assessments. Maritime press articles have also exposed a tendency that

managers prioritize to correct seafarers' behavior over risk-based management, often blame individual seafarers for incidents (Lloyd, 2004; 2007).

In conclusion, the literature insists on that employers' primary obligation is to provide a safe working environment

2.2.3 Commitment from company: the importance of audit

Audit systems serve as an important tool for employers to assess the effectiveness of their SMSs. The International Labour Organization (ILO) guidelines specifically encourage employers to utilize audits to evaluate the adequacy of their management arrangements in light of the risks present within their organizations (ILO, 2001b). However, studies such as Hopkins' (2000) case study on the Esso Oil plant explosion highlight the potential shortcomings of audit systems. The company failed to identify critical weaknesses in its SMS despite regular audits, which led to the catastrophic event. This case suggests that audits may focus more on the existence and functioning of management mechanisms rather than their effectiveness in addressing actual risks.

Power (1997) and Parker (2003) further criticize the overreliance on audits, particularly external audits. They conclude that such audits often assess only compliance rather than evaluating the validity of the systems themselves. This could result in audits serving as a tool of managerial control rather than as a means of improving safety standards.

The same concerns are applicable to the maritime industry. Hot debate is ongoing, regarding to whether audits could effectively enhance implementation of SMS or only simply meet procedural requirements. Critics argue that audits shall be a comprehensive assessment of the SMSs

implementation and their impact on worker's safety, rather than verify compliance on regulation.

Frick et al. (2000) provide a new view on the outcomes of regulated self-regulation on safety management. They state that the level of employer's commitment is a key determinant of success. Such organizations are more likely to achieve success, if their top management care more to hazard detection and prevention, and include workers in decision-making processes. conversely, if organizations treat such approaches as a tool to obtain operational licenses, there is less likelihood to care workers' safety. The literature suggests that while audit is a valuable tool for assessing the effectiveness of SMS, its utility mainly depends on the commitment of employers. In conclusion, audits shall be included into the commitment of safety management, rather than being a formality.

In the context of the maritime industry, to make sure that audits are effectively used to enhance the seafarers' safety, the implementation of ISM Code and the role of managers played in this process shall be further examined.

2.3 Role of communication and trust.

Trust and communication between managers and workers are critical for the successful implementation of safety management systems. Fox's research offers foundational insights into how trust can be institutionalized through managing roles and rules. Relationships characterized by high trust, with long-term commitments and aligned goals, could increase the likelihood of dedication and personal commitment to the organization. Blau's social exchange theory also explains how trust can lead to higher levels of social exchange.

O'Reilly (1978) highlighted that effective communication relies on the trust between workers and managers. It is essential for the free flow of information and critical for decision-making and participation. Seibold and Shea's (2001) research reinforces that effective communication is built upon employee participation. Conger and Kanungo (1988) discuss how effective communication can empower workers and enhance their self-efficacy. This empowerment is a key component of successful safety management, as noted by Gallagher et al. (2003), who identified open and free communication as a prerequisite for effective worker participation.

However, the maritime industry faces unique challenges regarding trust and communication. Reports, including the Marine Accident Investigation Branch's (MAIB) 2001 annual report and various maritime press articles, indicate a disconnection between seafarers and management ashore, which could potentially hinder the implementation of the ISM Code and safety management practices. The lack of trust could discourage seafarers from reporting incidents.

In conclusion, trust and communication are universally recognized as essential for safety management. The specific context of the maritime industry presents additional hurdles. Building trust and open communication channels are not only the manager's responsibilities but also essential components of a safety management strategy.

Summary

In this chapter, a thorough literature review was conducted on the implementation of self-regulation in safety management. The role of the company was examined in detail, including aspects such as the company's ability and willingness, obligations, commitment, and the importance of communication and trust.

Chapter 3 Methodology

This research methodology is designed to provide a thorough and balanced examination of SMS implementation and documentation burden.

3.1 Research method

This section is divided into two parts. document analysis was explained in the first part, the subsections presents semi-structured interviews used for managers and seafarers. A total of 8 days was spent to collect data though document analysis and semi-structured interview. each research method is Average 4 days. The summary is stated in Table (1).

Table 1: Duration of each method

Research Method	Total days spent
Document analysis	4
Semi-structured interview with managers	4
Total	8

3.1.1 Document analysis.

In this chapter, SMSs from Twelve shipping companies were collected and reviewed. To minimize sampling bias, a variety of company types were selected, including dry bulk carriers, liquid bulk carriers, container ships, and engineering vessels. This diverse selection aimed to cover the major aspects of seaborne transportation, allowing for a comprehensive exploration of

commonalities and root causes pertinent to the research questions. To meet the broad functional requirements of ISM Code, each company could develop its own SMS, taking into consideration of its operating mode and trading area. To standardize tasks and minimize risks, the SMS included the company's general safety policies, which established foundational principles to guide all activities, along with detailed operating procedures. To address contingencies, the SMS featured comprehensive shipboard emergency procedures, outlining clear actions for various emergency scenarios. A robust incident and near-miss reporting mechanism was also integrated into the system, facilitating the systematic capture and analysis of operational incidents to drive continuous improvement. The SMS further provided specific cargo operating instructions for the safe handling and management of various types of cargo. Lastly, the SMS was supported by a suite of checklists and forms designed to verify compliance and record essential operational data.

Document analysis, as noted by several scholars, is a valuable method in social science research. Prior (2003) emphasized that documents can introduce researchers to a social context, offering a structured perspective on organizational dynamics and either reinforcing or challenging data obtained through other methods.

However, while these documents helped me understand the companies' procedures, they offered limited insight into the practical execution of SMS elements within the organizations. For instance, they did not elucidate the rationale behind managers' responses to ship reports.

Atkinson and Coffey (1997) also discussed the limitations of document analysis, noting that documents reflect organizational identity and are often created with broader objectives in mind, which means they might not present an unbiased reality.

Throughout the document review process, numerous questions were noted and recorded for further clarification during interviews with the managers.
As stated in Table 2, various of company are selected for document analysis.

Table 2: company are selected for document analysis

Identity of Company	Type of Company	Digital Format	Size of Company
Company A	RO-RO	Microsoft Word	Small
Company B	Container/bulk	PDF	Intermediate
Company C	Container	PDF/Micro. Word	Big
Company D	Container/bulk/Tankers	Microsoft Word	Big
Company E	Engineering shipping	Microsoft Word	Intermediate
Company F	RO-RO	Microsoft Word	Intermediate
Company G	General/Bulk	PDF	Intermediate
Company H	Oil tanker	PDF	Intermediate
Company I	Container	PDF	Big
Company J	Oil tanker	PDF	Big
Company K	Container	PDF	Small
Company L	Container /Bulk	PDF	Small

Note: Size of Company is sorted that, small :1 to 10 Ships, intermediate :11 to 40 ships, big company over 41 ships

3.1.2 semi-structured interviews with managers

The semi-structured interview approach was the technique utilized to ensure conversational flexibility while adhering to a predefined set of topics. Although I followed the general framework of the interview schedule (as detailed in Appendix E), I allowed the dialogue to evolve naturally, which

facilitated a more nuanced understanding of the issues raised by the participants. This method also enabled a thorough exploration of topics and provided participants with the opportunity to express their perspectives in their own words.

Rubin and Rubin (1995) presented that this method allows interviewees to elaborate the thoughts freely. It might not be possible in a strict structured interview.

The objective of these interviews is to focus on management's viewpoints and gain a deeper understanding on development and implementation of their company's SMS, such as the process of creating the SMS, its length in pages, the time required to read it, and other factors influencing its implementation. The interviews aim to explore their roles in dealing with the excessive documentation of SMS and the challenges they encountered during the implementation.

Questions were designed to initiate discussions on these topics during the interviews, such as 'What is the purpose of SMS? and 'What are the roles of the company and middle managers in implementing SMS?' Additionally, the interviews sought to uncover any social constraints or dynamics, such as the relationships between managers and seafarers, that might impact the effective implementation of SMS elements.

On average, each interview lasted between 60 to 90 minutes. I planned to use a voice recorder, which would allow me to focus on formulating subsequent questions. However, when participants did not consent to recording due to fearless from higher management, I relied on taking handwritten notes instead. The accompanying table summarizes the number of interviews conducted during the initial phase of my fieldwork.

As stated in Table 3, Participant for interviewing

Table 3: Participant for interviewing

Identity for participant	total numbers	Rank of participant
P1	1	Director
P2	1	Manager
P3	1	Director
P4	1	Manager
P5	1	DPA
P6	1	Superintendent
P7	1	DPA
P8	1	Manager

3.2 Data analysis method.

3.2.1 Method for semi-structured interviews.

During the data collection phase, I conducted a total of 8 interviews. Although tape-recording was planned for the purpose of recording, the interviewees rejected this method from the outset due to concerns about job security. Consequently, I had to rely on handwritten notes, averaging one hour per interview. In addition to the interviews, the Safety Management Systems (SMSs) of 12 companies were collected in digital format.

The handwritten notes were later transcribed onto a computer. Transcribing material from non-native English speakers, primarily from regions like the Far East, proved to be somewhat challenging. It took approximately three days to complete the transcription of all interviews into English.

A large volume of data was generated from the interview transcripts. To facilitate better understanding and analysis, coding this data was the first step.

I initially planned to use the computer-based program 'Atlas.ti' for qualitative data analysis; however, coding only 8 interviews manually proved to be more feasible. Each code was assigned based on the content of the interview questions, relating directly to the research questions and serving them. The assignment of codes took two days. Examples of ten codes from my dissertation include:

- Managers' fear of being complained against by seafarers if some areas aren't included in the SMS.
- The company's attitude in dealing with the excessive size of the SMS.
- The company's attitude in developing the SMS.
- The history of the development of the SMS.
- The origin of seafarers and managers.
- Additional training as a supplement to the excessive size of the SMS.
- Real-world perspectives on the utility of the SMS.
- External audit.
- Focus areas of the audit.
- SMS review.

After completing the coding assignment, the next step was to group related codes together into categories, representing a higher level of abstraction and organization. Similar codes were brought together to form broader themes or concepts. These categories were analyzed in Sections 4 and 5.
Finally, these related categories were woven together into themes to tell a more comprehensive story about the data, reflecting the research questions or the central issues identified in the study

3.2.2 Methods for Document analysis.

Document analysis within the context of a Safety Management System (SMS) is a critical process for evaluating the system's effectiveness and usability. If the SMS is perceived as excessively large, it can hinder its practical implementation on ships. To address this issue, a statistical approach is applied to systematically analyze the actual size of the SMS, including the number of pages in hardcopy, memory space, estimated reading time, and total word count. The goal is to identify areas for optimization.

The analysis began with a direct quantification of the SMS's size, using the 'Word Count' feature in Microsoft Word software to determine the total number of pages and words. This data provided a foundational reference for subsequent examination. Memory usage was then evaluated by checking the file properties. The total reading time was estimated by using the average adult reading speed, which is around 200-300 words per minute (WPM). In this dissertation, 300 WPM was used for calculations. Then the result is converted to hours for easy reference. Based on the assumption that daily reading time is one hour, and the total days of reading is presented in the table (9).

In summary, the document analysis provides direct evidence regarding to voluminous documentation and excessive size of SMS.

3.3 Ethical consideration

This research used semi-structured interviews and document analysis for data collection. The requirements of the Research Ethics Committee (REC) at World Maritime University (WMU) were strictly followed. Documents were submitted to the REC for approval on 20 April 2024, including Participant Involvement, Consent Procedures, Potential Risks, and Identity Protection Plans. The REC granted approval on 24 April 2024, and the ethical approval

form, research proposal, and REC permissions are detailed in the thesis appendices. At each fieldwork stage, participants, including managers and seafarers, were briefed with detailed project explanations.

Before each interview, approximately five minutes were spent explaining the research to participants, discussing the study's aims and methods, and addressing any queries. Participants were assured of anonymity and informed of their right to omit answers or discontinue the interview at any time. Permission to record interviews was also sought at this stage. Similar permissions were obtained from ship department heads of shipping companies before reviewing their SMS, ensuring respect for information and privacy.

Hammersley and Atkinson (1995) emphasize that social science research should not compromise ethical standards. It is a cornerstone of this research's ethical framework that all respondents are fully informed and provide their voluntary consent. Post-interview, maintaining participant anonymity is a critical ethical aspect. Interviewee names were disguised with random numbers, and only ranks, shore-based management unit identities (e.g., Company-A or B), and manager identities (e.g., Manager-P1, P2, P3, P4) were retained for analysis.

In Chapters 4, generic language like "one manager from one of the research companies said" and "one of the managers in Company-B said" was used when quoting interviews. Protecting the anonymity of participants by keeping organizational and ship identities confidential was essential, as emphasized by scholars like Christians (2005), who underscores the significance of safeguarding personal information with anonymity. To ensure this, additional care was taken throughout the thesis to obscure the identities of individuals and organizations. This approach occasionally led to deliberately broad

descriptions regarding company backgrounds, ship details, and the nationalities of seafarers

Chapter 4 Findings

Divided into two sections, this chapter presents the findings from SMS quantification and semi-structured interviews.

4.1 Statistical measures of SMS documentation burden

This section is organized into two subsections to present the findings from the document analysis:

- The first subsection provides statistical data on the size of SMS documents, encompassing word counts, storage space requirements, and page numbers.
- The second subsection is dedicated to the Reading Time Estimation. The purpose is to calculate the time necessary for seafarers and company members to read the SMS documents based on average reading speeds.

4.1.1 Statistics on the size of SMS documents.

Word counts, storage space, and page numbers were determined for 12 companies.

Quantification process

Whenever possible the quantification was done directly (software allowing direct reading). However, in some cases, the quantification required converting files. When the SMS was provided in PDF format, the number of

pages was easy to read but not the wordcount. To obtain the wordcount, the PDF documents were converted into word document, allowing to assess the number of words.

Below is a summary for each company:

- **Company A**

  Type of company:

  The company operates on three Roll-On/Roll-Off (RO/RO).

  Organization of the SMS:

  The SMS comprises numerous documents compiled together organized in two parts: (1) general documents applying to all ships within the company, and (2) ship-specific procedures for certain ship.

  Type of SMS support:

  The SMS was provided as an electronic document in PDF Format. The memory space required for the SMS in the shipping company is 22.2 MB. The memory space per ship is 20.0 MB. The support language is Chinese language.

  SMS Quantification:

  General documents applying to all ships

  Number of word (after conversion):590,708words

  Number of pages (direct counting): 975 pages

  Ship 1 Specific procedures and instructions

  Number of word (after conversion):41,401words

  Number of pages (direct counting): 93 pages

  Ship 2 Specific procedures and instructions

  Number of word (after conversion):41,216words

  Number of pages (direct counting): 94 pages

  Ship 3 Specific procedures and instructions

  Number of word (after conversion):40,861words

Number of pages (direct counting): 99 pages

Table 4: Statistics of Company A

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Approx.)
General	18.9	975	590,708
Specific -Ship 1	1.1	93	41,401
Specific -Ship 2	1.1	94	41,216
Specific -Ship 3	1.1	99	40,861
SMS magnitude for the seafarers and the company			
Total for seafarers (ship 1)	20	1068	632,109
Total for seafarers (ship 2)	20	1069	631,924
Total for seafarers (ship 3)	20	1074	631,569
Total for the company	22.2	1261	714,186

Note 1: Total for seafarers includes general + ship-specific instructions and procedures.

Note 2: Total for the company includes general + all ship- specific instructions and procedures.

Company B:

Type of company:

It is an intermediate shipping company with a variety of ship types, including dry bulk carriers and container ships.

Organization of the SMS:

No evidence of ship-specific procedures and instructions was provided. Such procedures and instructions may exist on certain ships and / or flags, if any ship-specific procedures or documents exist, they will add on top of the general SMS. Therefore, the general SMS constitute the minimum requirement

for seafarers.

Type of SMS support

The SMS was provided as an electronic document. The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 40.6 MB. The documentation is available in two language English and Chinese.

SMS Quantification

General documents applying to all ships

Number of word (after conversion):1,805,729 words

Number of pages (direct counting): 2876 pages

Table 5: Statistics of Company B

General/Specific	Memory Space (MB)	Pages	Total words in SMS
General	40.6	2,876	1,805,729
Total for seafarers (minimum)	40.6	2,876	1,805,729
Total for the company (minimum)	40.6	2,876	1,805,729

Company C:

Type of company:

Very large container shipping companies. The company is included in the top five of the sector.

Organization of the SMS:

No evidence of ship-specific procedures and instructions was provided. Such procedures and instructions may exist on certain ships and / or flags, if any ship-specific procedures or documents exist, they will add on top of the general SMS. Therefore, the general SMS constitute the minimum requirement for seafarers. The SMS was provided in English.

Type of SMS support

The SMS was provided as an electronic document. The SMS has been provided as a PDF and word Format. The memory space required for the SMS in the shipping company is 101.8 MB.

SMS Quantification

General documents applying to all ships

Number of word (after conversion):1,892,300 words

Number of pages (direct counting): 2980 pages

Table 6: Statistics of Company C

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	101.8	2,980	1,892,300
Total for seafarers (minimum)	101.8	2,980	1,892,300
Total for the company (minimum)	101.8	2,980	1,892,300

Company D :

Type of company:

Large shipping management company operating various ship types.

Organization of the SMS:

The SMS is divided into two parts: (1) general procedures and instructions applying to all ships irrespective from their types, and (2) specific procedures and instructions by ship type. However, no evidence of ship-specific procedures was provided. The SMS is in Chinese language.

Type of SMS support:

The SMS has been provided as a WORD Format. The memory space required for the SMS in the shipping company is 40.7 MB.

SMS Quantification:

General documents applying to all ships

Number of word:1,657,880 words

Number of pages: 2674 pages

Ship type-Specific procedures (type A -Excluding tankers):

Number of word: 57,660 words

Number of pages: 93 pages

Ship type-Specific procedures (type B -tankers):

Number of word (after conversion): 42,160 words

Number of pages (direct counting): 68 pages

Table 7: Statistics of Company D

General / Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	38.3	2,674	1,657,880
Specific - Ship type A (Excluding tankers)	1.5	93	57,660
Specific - Ship type B (tankers)	0.9	68	42,160
SMS magnitude for the seafarers and the company			
Total for seafarers (Ship type A)	39.8	2,767	1,715,540
Total for seafarers (Ship type B)	39.2	2,742	1,700,040
Total for the company	40.7	2,835	1,757,700

Company E:

Type of company:

It is an intermediate shipping company that operates a variety of engineering vessels, including Platform Supply Vessels (PSVs) and Anchor Handling Towing Supply Ships (AHTSs).

Organization of the SMS:

No evidence of ship-specific procedures and instructions was provided.

Type of SMS support:

The memory space required for the SMS in the shipping company is 75.2 MB. The SMS language is English.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion):2,075,580words

Number of pages (direct counting): 3347 pages

Table 8: Statistics of Company E

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	75.2	3,347	2,075,580
Total for seafarers (minimum)	75.2	3,347	2,075,580
Total for the company (minimum)	75.2	3,347	2,075,580

Company F:

Type of company:

It is an intermediate size Roll-On/Roll-Off (RO/RO) shipping company with 20 ships in total.

Organization of the SMS:

The SMS is divided into two parts: general documents applying to all ships within the company, and ship-specific procedures for certain ship. There are a total of 98 forms and checklists.

Type of SMS support:

The memory space required for the SMS in the shipping company is 70.6 MB. The SMS language is Chinese.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion):473,850 words

Number of pages (direct counting): 729 pages

Ship-Specific procedures (average):

Number of word (after conversion):64,000 words per ship (average)

Number of pages (direct counting): 200 pages per ship (average)

Table 9: Statistics of Company F

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	10.3	729	473,850
Each Ship(average)	3 (60.3 total)	200 (4,270 total)	64,050
Total for seafarers	13.3	929	53,7900
Total for all ships (20 ships)	60.3	4,270	1,281,000
Total for the company	70.6	4,999	1,754,850

Company G:

Type of company:

It is an intermediate size shipping management company. TYPE OF SHIPS?

Organization of the SMS:

Its general procedures and instruction in SMS apply to all ships irrespective from their types. No evidence of ship-specific procedures was provided.

Type of SMS support:

The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 16.7 MB. The SMS language is Chinese.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion):368,279words

Number of pages (direct counting): 540 pages

Table 10: Statistics of Company G

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	16.7	540	368,279
Total for seafarers (minimum)	16.7	540	368,279
Total for the company (minimum)	16.7	540	368,279

Company H:

Type of company:

It is an intermediate size oil tanker shipping company.

Organization of the SMS:

Its general procedures and instruction in SMS apply to all ships. No evidence of ship-specific procedures was provided.

Type of SMS support:

The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 12.7 MB. The SMS language is English.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion): 178,504 words

Number of pages (direct counting): 298 pages

Table 11: Statistics of Company H

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	12.7	298	178,504
Total for seafarers (minimum)	12.7	298	178,504
Total for the company	12.7	298	178,504

(minimum)			

Company I:

Type of company:

It is a big container shipping company.

Organization of the SMS

Its general procedures and instruction in SMS apply to all ships irrespective from their sizes. No evidence of ship-specific procedures was provided.

Type of SMS support:

The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 25.2 MB. The SMS language is English.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion): 191,096 words

Number of pages (direct counting): 499 pages

Table 12: Statistics of Company I

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	25.2	499	191,096
Total for seafarers (minimum)	25.2	499	191,096
Total for the company (minimum)	25.2	499	191,096

Company J :

It is a big oil tanker shipping company.

Organization of the SMS:

Its general procedures and instructions in SMS apply to all ships irrespective from their sizes. No evidence of ship-specific procedures was provided.

Type of SMS support:

The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 36.8 MB. The SMS language is Chinese.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion): 596,349 words

Number of pages (direct counting): 879 pages

Table 13: Statistics of Company J

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	36.8	879	596,349
Total for seafarers (minimum)	36.8	879	596,349
Total for the company (minimum)	36.8	879	596,349

Company K:

Type of company:

It is a small container shipping company.

Organization of the SMS:

Its general procedures and instruction in SMS apply to all ships irrespective from their types. No evidence of ship-specific procedures was provided.

Type of SMS support:

The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 37.3 MB. The SMS language is Chinese.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion): 616,430 words

Number of pages (direct counting): 1020 pages

Table 14: Statistics of Company k

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	37.3	1020	616,430
Total for seafarers (minimum)	37.3	1020	616,430
Total for the company (minimum)	37.3	1020	616,430

Company L:

Type of company:

It is a small container / bulk shipping company.

Organization of the SMS:

Its general procedures and instruction in SMS apply to all ships irrespective from their types. No evidence of ship-specific procedures was provided.

Type of SMS support:

The SMS has been provided as a PDF Format. The memory space required for the SMS in the shipping company is 9.5 MB. The SMS language is Chinese.

SMS Quantification:

General documents applying to all ships

Number of word (after conversion): 257,887 words

Number of pages (direct counting): 778 pages

Table 15: Statistics of Company L

General/Specific	Memory Space (MB)	Pages	Total words in SMS(Appro.)
General	9.5	778	257,887
Total for seafarers (minimum)	9.5	778	257,887
Total for the company (minimum)	9.5	778	257,887

4.1.2 Reading Time Estimation.

The average reading speed for a normal adult varies based on several factors, including the individual's reading habits, language proficiency, and the type of material being read. However, several studies have provided insights into typical reading speeds.

According to a meta-analysis of 190 studies, the average silent reading speed for adults in English for non-fiction is approximately 238 words per minute (WPM), and for fiction, it is slightly higher at 260 WPM (Brysbaert, 2019). It is important to note that these figures pertain to silent reading of English text by native English-speaking adults. When considering reading aloud, the average reading speed is generally slower. The same meta-analysis found that the average oral reading rate is 183 WPM.

Adult reading speeds is various and depends on many factors. For example, reading speed tests across 2,768 individuals were conducted by the SwiftRead's. The result shows 50% of readers have a reading speed between 235 WPM and 460 WPM, with a median of 334 WPM (SwiftRead).

Furthermore, research indicates that there is no direct correlation between reading comprehension and reading speed across individuals (SwiftRead). This

suggests that readers with a wide range of speeds can achieve similar levels of comprehension.

In summary, while the average reading speed for adults can be approximated, it is essential to consider the nuances of individual reading capabilities and the goals of the reading task at hand. Improving reading speed should ideally be balanced with maintaining or enhancing comprehension.

In this research, a median reading speed of 334 WPM will be used for estimating the Reading Time of each company's SMS documents.

This average can be considered as high because, the SMS is not always written in the native language, is essentially composed of a technical terminology, and there is a wide diversity among crew members.

Therefore, the reading time for the SMS presented in the table represents a minimum. For numerous seafarers and company staff, the time spent in reading the SMS would be much higher.

Considering that crew members need to be on duty or carry out other related work during work hours and must ensure adequate rest after work, it is assumed that each crew member has one hour of concentrated reading time each day. This assumption is used to calculate how many days it takes to read all of the SMS documents. The details are presented in following Table 16.

Table 16: Reading Time Estimation

Identity of Company	Total words in SMS(Approx.)	Total time in minute (334 WPM)	Total time in hour	Total time in day (average one hour daily)
Company A	714,186	2138	35.6	35.6
Company B	1,805,729	5406	90.1	90.1
Company C	1,892,300	5666	94.4	94.4
Company D	1,757,700	5263	87.7	87.7
Company E	2,075,580	6214	103.6	103.6
Company F	1,754,850	5254	87.6	87.6
Company G	368,279	1103	18.4	18.4
Company H	178,504	534	8.9	8.9
Company I	191,096	572	9.5	9.5
Company J	596,349	1785	29.8	29.8
Company K	616,430	1846	30.8	30.8
Company L	257,887	772	12.9	12.9

In short, seafarers would spend between 9 and 104 days to read the SMS, meaning having an idea of its content. This reading does not mean full understanding or remembering. Considering the high workload of seafarers, this reading time reading would affect the rest periods if executed during the period onboard. To avoid any conflict between the operation and the absorption of the instruction and procedures, the company would ideally support the seafarers to incorporate the SMS during training sessions ashore. Notably, the aviation sector trains pilots in simulators and classrooms about essential procedures and instructions. Consequently, the aviation staff can directly focus on their operational duties and direct application of procedures when flying.

4.2 Findings from Semi-Structured Interviews

4.2.1 Interviewee's sociodemographic characteristics

Semi-structured interviews were conducted with eight participants. The composition of the interviewees is presented in Table 3 and includes superintendents, Designated Persons Ashore (DPAs), directors, and managers. All participants are from shipping companies and have more than 10 years of sea experience. Their ages ranged from 52 to 58 years old. The reason for this selection is that after working for several years at sea, they have witnessed the evolution of the Safety Management System (SMS) from non-existence to establishment. This enables them to perceive more intuitively the changes that the SMS has brought to ship operations, as well as the evolution of the SMS itself. Furthermore, they have transitioned from being seafarers to management positions ashore and remain engaged in work related to the SMS. Therefore, their perspectives possess a certain level of representativeness.

Table 17: Interviewee's sociodemographic characteristics

Identity for participant	total numbers	Sea services time (year)	age	rank on board	Rank of participant
P1	1	15	52	Master	Director
P2	1	14	56	Master	Manager
P3	1	16	55	Master	Director
P4	1	13	58	Master	Manager
P5	1	18	54	Master	DPA
P6	1	15	55	Master	Superintendent
P7	1	14	56	Master	DPA
P8	1	16	53	Master	Manager

4.2.2 SMS Development and Implementation.

The objective of this section is to provide an in-depth analysis of how a shipping company has approached the development and implementation of its Safety Management System (SMS). After categorizing the codes mentioned in Chapter Three, a theme emerged for each category. The following themes will guide the exploration of these categories:

- Development of SMS (involving 6 interviewees)
- Company's attitude (involving 8 interviewees)

These themes are designed to provide a comprehensive understanding of SMS development and implementation within the company. They will be supported by qualitative and quantitative data gathered through document analysis, interviews, and other relevant research methods. The findings from this section will contribute to the overall argument of the thesis and offer actionable insights for the maritime industry's safety management practices.

Theme 1: Development of SMS

This theme will trace the historical development of the SMS, highlighting key milestones and adaptations that have occurred over time in response to regulatory changes. The initial development phase of the SMS and its evolution in line with the company's growth and industry standards.6 interviewees have mentioned the significant changes before and after adaptation of SMS.

> *"In the early 1990s, I joined one container ship as a deck cadet, at that time, there was no Document call SMS on board, what we have was called Quality management system (QMS), It mainly focused on ship's operation, such as*

loading, discharging, ballasting and de ballasting. there was less paperwork and stresses caused by inspection and audit than today. The significantly changes with Adaptation of SMS is that the documents getting bigger and bigger in size with never-ending paperwork .as a ship master, I was exhausted in dealing with such paperwork, I think that is not the purpose of ISM code. That's why I quit my seafarer's career and joined to shipping company as a marine superintendent to look for the cue for above confuse." (P6)

"I was seafarer before, I experienced the development of SMS from non-existence to establishment. with Adaptation of SMS, series of standards were set up for ship's safe operation and pollution prevention. It provided rules and standards for crew to follow to operate ships safer and more efficient. Not like before, we mainly relied on our experience. "(P2)

Theme 2: Company's attitude. All 8 interviewees mentioned the importance of company's role in developing SMS, especially with such top-down management. Company's attitude is crucial for implementation of ISM code.

"From company's perspective, we would like to deliver a high-quality SMS to cover all the functional requirements of ISM code. And that is what we are doing to include more detail procedures and operation standards. On the other hand, it will increase the size of SMS. Coins has two sides. Nothing can be perfect." (P4)

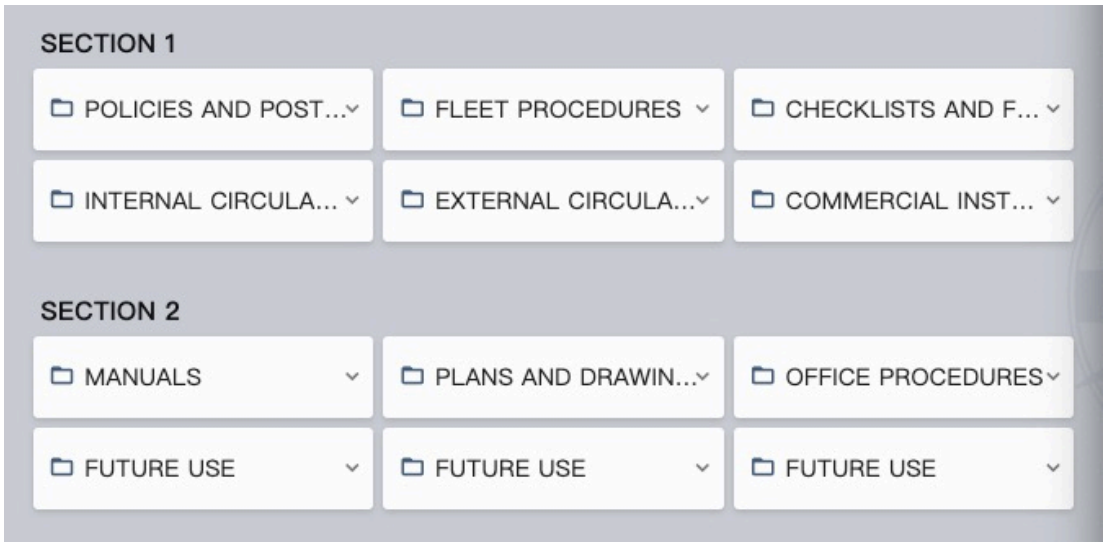
"We all know that the SMS are too much and too cumbersome, but in order to successfully pass the audit and certification, it has to only include everything. We also expect the crew to read through it. But from the

observation and feedback, they more often take it as a reference book similar to a dictionary. Look for what they need." (P7)

"I have served in different shipping company, the company currently served has a well-structured SMS .it is clearly stated the roles and responsibilities for each department ashore to guarantee effective implementation of ISM code, such as Head of Technical has been assigned as the person overall responsible for the operations of the vessel as per the ISM Code. He holds the overall responsibility for the Health, Safety, Security, Environment and Quality of the Organization and the vessels under the management. The Head of Technical and the Department Heads shall ensure that enough resources are made available for the timely, practical, and complete implementation and maintenance of the SMS and to ensure continued compliance with the ISM Code. With such clear role and well-structured SMS。It's easy to follow for personnel both onboard ship and ashore." (P3)

As mentioned by the interviewee P3. I logged into the website to check the SMS, there is no more hard copy or digital format kept in their computer on board. Even the checklist and forms are not allowed to download and store in the hard drive to make sure latest version been used every time.

Fig（1）is the screenshot which I took from this company X's website for reference only .states the structure of SMS as mention above .this company's SMS has more than three thousands pages, but it's well-structured and easy to locate the resources.



Fig（1）: Structure of on sample company X’s SMS

Sources: company X’s website

4.2.3 Stakeholder Relations and Communication

Managers are often facing the challenging responsibility of developing an SMS that comprehensively addresses the needs of the maritime operation while also satisfying the diverse concerns of seafarers. One of the primary concerns for managers is the potential for complaints from seafarers if certain areas are not adequately covered within the SMS. Seafarers, who are the end-users of the SMS, may have specific concerns about the practicality, effectiveness, and relevance of the procedures and policies outlined in the system. The key challenges are size of SMS (5 Interviewees) ,Gap between developer and end-user (6 Interviewees)

Challenge 1: Size of SMS; data from the document analysis shows that it’s common practice to have more than thousands of pages in one company SMS, and the tendency is continuously increasing with new requirements entering into force.

“I’m not very sure how many pages in the company’s SMS. I guess it must be a lot. Thousands of pages plus. Because since I was cadet in this company, I noticed the hardcopy of SMS was more than 20 cm in thickness. after I became manager in this company, I noticed that we were keeping add more detail procedures into it. Very rare situation, we remove some of them. I fully understand that it should be more streamlining and specific, it’s not the more the better. however, nobody wants to be the early bird to streamlining it. the main motivation is that fear of failure in certification of Document of Compliance (DOC) and Safety Management Certificate (SMC).” (P2)

Challenge2: Gap between developer and end-user; this challenge presents real-world perspectives on the SMS's utility

“As the developer of the SMS of the shipping company, the aim of the company is to provide concise and standardized SMS. but the difficulty in the actual operation process is that it can be too simple to cover everything, because once the defects are found out, everyone will first look at the SMS, the crew will say that there are no relevant provisions in SMS. This also leads to our system documents have been doing addition, rarely do subtraction, which is why our documents will become thicker and thicker.” (P1)

“We have received complaints that too much documentation is not conducive to implementation, and we want to streamline the relevant paperwork, but there are two sides to the story. When nothing happens, everyone will say that there is too much documentation, but when something happens, everyone's first reaction is to check the company's documentation for relevant statements. If not, then the crew will blame the company, saying that the company's SMS did not specify the requirements.” (P5)

4.2.4 Audit and Review Processes

External audits and SMS reviews are integral components of ensuring the effectiveness and continuous improvement of safety practices in the maritime industry. External audits are systematic evaluations conducted by independent third parties to assess a company's compliance with regulatory requirements and the effectiveness of its SMS. These audits are crucial for identifying areas of non-compliance, potential risks, and opportunities for improvement.

SMS reviews are internal assessments that companies conduct to evaluate the performance of their SMS and identify areas for improvement. These reviews are typically more comprehensive and frequent than external audits. These systems were designed with very strong intention in self-regulating. however, as problem raised from interviewee, they are kinds of formalism now.

There are two challenges were noted from the data analysis: random checking (8 interviewees), SMS reviews is only paperwork (5 interviews).

Challenge 1: random checking. The original intention of this mechanism is enhancing the implementation of ISM code, but it has its limitations in the process. For example, the external audit experts have limited time and cannot fully understand the SMS, so what they can do is to random check some areas they think are important for detailed inspection, and the rest is basically to follow check list. In addition, there is regional limitations. A shipping company have many ships, but due to the reasons of the trading area, it is impossible to randomly inspect any of them. The selection of ships here is not random, and the shipping company has arranged them in advance. The ship is then notified in advance to prepare for the response. Such audit rarely success in identifying defects.

> *"when I was Master on board, ship will be notified by company if any external audit has been arranged and prepare accordingly in advance." (P5)*

"before external audit getting due, we will contact the third-party conducting audit to confirm the audit schedule, then certain ship in the fleet will be informed in advance. During auditing, as the marine superintendent, I will board the ship to accompany the auditor for better communication. Normally auditor has their procedure to follow, such as using formal checklist." (P6)

"before becoming Director, I was marine superintendent too. I accompanied the auditor every time when the auditing is happening on the ship under my supervision. They are well skilled and knowledgeable. However, the time is limited for them, so most of time they will focus on the area which with high risk recently. For example, recently there is few collision cases which ship collided with bridge when navigating in the river .so the auditor focusing on the procedure of navigating in the river with bridge and related contingency plan." (P1)

Challenge 2: SMS reviews is only paperwork; SMS reviews are critical self-assessment processes undertaken by maritime organizations to evaluate and enhance the effectiveness of their SMS. These reviews are proactive measures aimed at identifying strengths, weaknesses, areas for improvement, and ensuring compliance with international safety standards such as the ISM Code.

It's a structured approach to safety management, ensuring that the SMS remains relevant and effective. By conducting regular SMS reviews, organizations can proactively manage safety risks, adapt to changing operational environments, and foster a culture where safety is a top priority.

Through these reviews, organizations can identify and rectify issues before they escalate, thereby contributing to a safer and more secure maritime industry.

"Our company will carry out the review of SMS regularly according to ISM code, and in order to prevent everyone from filling in relevant contents in a centralized manner before deadline.it is expressly stated in the SMS that every Captain should organize the review of SMS during his contract period. However, from the reviews collected, everyone still stays on the surface of formalism. Or "form over content". There is no real identification of deficiencies or loopholes in the SMS." (P3)

"when I was junior officer on board, I noticed that SMS review was organized。within two & three days before deadline. Tasks were assigned to each rank, such as two comments from second officer regarding to Navigation. after being a Captain of tanker with 3-4 months contracts. There is 3-4 Captains relieving happening, but most of the time reviews is done by the last Captain on board during the fourth quarter." (P2)

4.2.5 Cultural and Demographic Factors

The origin of individuals, including nationality, ethnicity, and cultural background, can significantly shape the approach to safety management and interactions within the maritime industry. Cultural background plays a pivotal role in shaping an individual's values, attitudes, and behaviors. In the context of SMS, cultural differences can affect how safety is perceived, prioritized, and implemented. For example, some cultures may place a higher emphasis on collective safety measures, while others might stress individual responsibility. Two themes were extracted from data analysis: Origin of crews and managers (5 interviewees), unstable crew market (8 interviewees).

Theme one: Origin of crews and managers. cultural nuances caused by origins can affect the acceptance and adoption of safety procedures, the effectiveness of safety training, and the overall safety climate on board ships.

> *"Our crews and managers ashore come from different regions and countries, both European and Asian. From what I have observed and from the feedback of my colleagues, crews from Europe place a greater emphasis on safety and compliance. Many Asian seafarers are more casual, lack of safety awareness and awareness of norms. At the same time, managers from Asia pay more attention to formulating detailed rules to restrain crew members, while European managers pay more attention to human rights and care about the physical and mental health of crew members." (P8)*

Theme two: unstable crew market. with high crew turnover, it takes more time for newly recruited seafarers to get familiar with the SMS, or it is impossible for them to get familiar with excessive size of SMS within a period of time. Meantime, they are not very interesting in the development of the SMS. It has become a potential risk that affects the implementation of SMS.

> *"The current crew market is unstable, or the crew supply is diverse, many shipping companies do not have their own crew. Our company in addition to the Captain and Chief Engineer are the company's elderly, relatively fixed. Most of the remaining positions were recruited from the freelance market. Every time before they board the ship, lots of time and resources are spent on training of the SMS." (P6)*

Chapter 5: Discussion

To address these research questions, this chapter will conduct a comprehensive analysis of the findings and their implications for the maritime

industry. Actionable insights and recommendations for companies, regulatory bodies, and seafarers will be provided on how to effectively implement and streamline the Safety Management System (SMS). The discussion will emphasize the importance of balancing safety management needs with the practical realities of managing extensive documentation.

5.1 Implementation of excessive size of SMS

5.1.1 Documentation Burden

From data analysis in previous chapter, regardless size of company, all sampling companies have voluminous procedures in their SMS, ranging from 298 pages to 4999 pages. Estimated reading time is from 8.9 days to 103.6 days. More than hundreds of form and checklist to be completed and reported in the daily routine. Frankly speaking, it's too large for crew to read through and implement it. such documentation burden can impact SMS 's effectiveness and practical application. Several challenges associated with the excessive size of SMS documentation has been discovered. One primary concern is the sheer volume of it, ranging from hundreds to several thousand pages. Extra Time and effort are demanded to understand and implementing extensive documentation. Seafarers may spend excessive time to locate procedures related to their daily work. Cognitive load caused by extensive SMS can induce stress and fatigue, potentially affecting their decision making and performance in emergency situation. It can finally decrease overall operational efficiency and compromise safety.

5.1.2 Bureaucratic and Formalism

another issue is a tension between regulatory compliance and the practical application of safety measures found in this research. it reflected the conflict of demand and supply. Compliance of regulation is necessary for certification, while an emphasis on paperwork can shadow over the practical application, leading to bureaucratic and formalism.

From the managers' perspective

Their priority is to ensure the safe operation of the ship and guarantee the crew's Occupational Health and Safety. However, data from semi-structured interviews indicates that compliance for certification takes the highest priority. Consequently, the addition of paperwork into the Safety Management System (SMS) will never end, as long as it is required by the International Safety Management (ISM) Code.

Secondly, there is a lack of trust between managers and seafarers. Particularly, managers do not trust the crew members they have recruited. As stated in the literature review, their management skill is often perceived as an exercise of power. They attempt to shape and standardize the behaviors of seafarers by employing increasingly detailed procedures.

Thirdly, the interviewees mentioned that complaints were received about the excessive SMS being difficult to follow. However, if any defects are found, personnel ashore or aboard first check the SMS. The SMS has become a tool for them to assign blame or avoid blame.

From the seafarers’ perspective

Many crew members spend more time on the ship than they do at home. thus, the ship becomes their true home. They all hope that the ships which they work on are safe. Interviewees mentioned that they used to rely on their own experience to work. Now, with the development of the SMS, there are procedures to follow. however, some SMSs are too general and not specific to the ships they work on, forcing them to rely on their own experience to solve problems. What is provided by the company is not always what the crew needs. This conflict is also evident with the size of the SMS; the crew needs something more specific and concise, but the company aims to cover as much as possible to close all potential loopholes, which may impact certification.

Some interviewees also mentioned that there are numerous forms and checks to be completed before working. They have to fill them out after working. There is no proper mechanism to ensure whether the forms or checklists are completed before or after work. This practice turns SMS into a formality, which is not the intended design of the system.

5.2 High crew turnover and an unstable crew market

Traditionally, owners from Traditional Maritime Nations (TMN) used to register their ships in their homeland and employ local crews. the crew, owner, and managers all shared the same culture, language, and background. High standards and stringent procedures were maintained on board and were well followed.

However, with the development of globalization and free-market capitalism, owners began to register their ships in countries known as Flags of Convenience (FOC), which have few restrictions on crew nationality. New seafarer supply nations, such as those in Eastern Europe and Asia, entered the

market. Cheaper crews were hired to reduce operational costs. High crew turnover and an unstable crew market are consequences of these shifts in ship registration and globalization.

The origin of individuals, including nationality, ethnicity, and cultural background, can significantly shape the approach to safety management. Cultural background plays a pivotal role in shaping an individual's values, attitudes, and behaviors. In the context of the Safety Management System, cultural differences can affect how safety is perceived, prioritized, and implemented.

The origin of crews and managers can affect the acceptance and adoption of safety procedures and the effectiveness of safety training. Interviewees mentioned that crews from Europe place a greater emphasis on safety and compliance. Many Asian seafarers, they noted, are more casual, lacking in safety awareness and awareness of norms. At the same time, managers from Asia pay more attention to formulating detailed rules to restrain crew members, while European managers focus more on human rights and care about the physical and mental health of crew members.

5.3 Self-regulating mechanism: Audit and Review

Audits and SMS reviews are integral components of ensuring the effectiveness and continuous improvement of safety practices in the maritime industry. The designed intention is to encourage employees and managers participate in amendment or improvement of SMS.

5.3.1 Audit

External Audits are systematic evaluations conducted by independent third parties to assess a company's compliance with regulatory requirements and the effectiveness of

its SMS. These audits are crucial for identifying areas of non-compliance, potential risks, and opportunities for improvement.

Nevertheless, interviewees mentioned that loopholes were identified. Due to limitation of the audit time, it's not possible for the auditor to check through large and cumbersome SMS. Tick box checking is normal practice and mainly focus on documentation compliance, very rare cases check practical application. The selection of ships is not random. The audited ship was selected and informed in advance. Such audit rarely success in identifying defects.

5.3.2 SMS Review

SMS reviews are critical self-assessment processes undertaken by maritime organizations to evaluate and enhance the effectiveness of their SMS. These reviews are proactive measures aimed at identifying strengths, weaknesses, areas for improvement, and ensuring compliance with international safety standards such as the ISM Code.

It's a structured approach to safety management, ensuring that the SMS remains relevant and effective. By conducting regular SMS reviews, organizations can proactively manage safety risks, adapt to changing operational environments, and foster a culture where safety is a top priority.

Interviewee stated that the review became formalist.no proper mechanism was designed to monitor the review process. practical application of SMS review on board disobeys its designed intention.

5.4 Addressing the Research Questions

5.4.1 Implementation Strategies:

This section will address the research question, regarding to the effective implementation of SMS. The discussion will focus on the strategies that companies could potentially employ to ensure the effective implementation of SMS across all levels of the organization.

Top-Down Approach and Leadership Support:

A top-down approach is crucial in the implementation of SMS. Top management's support is need in this strategy, then it cascades down to all levels of the organization. Leaders' commitment sets the tone to the entire company. such commitments shall clearly state that safety is a core value and not just a regulatory requirement.

Middle Managers as Facilitators:

Middle managers play a Facilitator’s role in the implementation process. they act as intermediaries between top management and seafarers. It’s their responsibility to transit SMS policies into practical procedures and ensure seafarers understand and adhere. Their support, motivation and communication skill are vital in driving the SMS forward.

Comprehensive Training Programs:

To ensure seafarers familiarize with the SMS, it's essential to establish comprehensive training programs. These programs shall cover all aspects of the SMS and be suitable for different learning styles and levels of expertise. Regular training sessions, drills, and simulations can significantly enhance seafarers' understanding and competence in applying SMS procedures in real-world scenarios.

Safety Culture Development:

the safety culture will be redefined to emphasize the practical application of SMS. It means that the environment will be fostered to prioritize safety over bureaucratic compliance.

Technological Support:

Use of technology is a effective tool in implementation of SMS. It could provide Immediate access to safety procedures, checklists, and reporting tools by using certain software or application. It is also useful in training, incident reporting, and real-time monitoring of safety practices.

In conclusion, the effective implementation of SMS can be achieved by a combination of strategic approaches, including commitment, middle management's facilitation, training, safety culture, and technological support.

5.4.2 Streamlining SMS:

This section is going to address the research question regarding to how to reduce the size of SMS. As noted, that the tendency for SMS getting thicker and longer. It should be short and simple and easily followed. The methods and approaches will be explored in this section to reduce the size of documentation while maintaining its core effectiveness.

Critical Review of Documentation:

Reviewing of exist SMS shall be conducted to locate areas for improvement. they could be overly complex and repetitive. Key point to note is that checklist

is getting longer and hard to be followed properly.it should act as a reminder to guide seafarers what to do with step-by-step procedures. Some company put the tanker's procedures in the SMS for dry bulk carrier. Some company's pre-departure checks for three steering gear systems where only two exist. By doing the reviewing, the SMS could be more concise without losing essential content.

Electronic Documentation Systems:

Electronic Documentation Systems can make SMS readily accessible to both managers ashore and seafarers aboard. It can help seafarers to locate the procedures and checklist quickly. With its function of searchability and information sharing. It could lead to a well-organized and navigable SMS.

Visual Aids and Clarity:

Some larger companies have conducted the reviews and reduced the volume of text by replace it with Visual aids, such as flowcharts and diagrams. It could improve the clarity of SMS documentation. Through these tools, complex procedures can be presented in a visual format for better understanding. Critical safety information can be located more effectively.

Engagement of Seafarers:

Seafarers' engagement is crucial in the streamlining SMS. Before adding any new procedures and checklists, seafarer's views shall be considered. Their experience and views are valuable. Their feedback makes the SMS more practical and applicable.

Continuous Improvement Process:

To adapting the needs of maritime industry, regularly reviewing and updating based on feedback, new regulations, and best practices is necessary to ensure the SMS remaining valid. a continuous improvement process will be Instituted to maintain the relevance and effectiveness of the SMS. Such ongoing process of refinement helps to further streamline the SMS.

In summary, streamlining SMS means enhancing its efficiency without diluting its safety standards. By Applying critical review, digital transformation, visual clarity, seafarer engagement, and continuous improvement, a more agile and effective SMS can be expected. This approach reduces the load of administrator and seafarer.

Chapter 6: Conclusion and Recommendations

6.1 Conclusion

This dissertation intends to assess the Burden of an Excessive SMS Size on the Effective Implementation of the ISM Code from the company's perspective. Through document analysis and semi-structured interview, several key challenges are found, such as the excessive size of SMS, documentation burden, the tension between compliance and practical application.

To address these challenges, each stakeholder plays different role and has its own responsibility. A multifaceted approach is recommended. It emphasizes that companies need to streamline documentation and create a safety culture. Additionally, seafarers are encouraged to engage themselves in the development of SMS. Lastly, regulatory support from policymakers is key to solve these challenges from the root.

The significance of this research is obvious. The study advocates a mind shift to achieve the goal of a more efficient and effective SMS. Such shift is essential for enhancing safety culture and operational efficiency without overburdening seafarers. It is also crucial for the maritime industry to foster a safer, more sustainable, and efficient working environment, which aligns with international safety standards and promotes the well-being of all stakeholders.

By addressing the documentation burden and the excessive size of SMS, attention could be refocused on the practical application of safety measures. Significant improvements can be expected in operational efficiency, safety, and job satisfaction on board. This proactive approach will contribute to the sustainable economic development of the global maritime sector.

6.2 Recommendations

Significant implications are posed to various stakeholders by the study's findings, including the industry itself, regulatory bodies, and seafarers. Each stakeholder has its own role in streamlining and reducing size of SMS. Following is the recommendations for reference.

6.2.1 For the Maritime Industry

As the developer of SMS, the shipping industry suffers from the consequences of voluminous documentation. To address this conundrum, changing in mindset and approach is primary, moving away from the notion that "more is better." The needs of seafarers must be reconsidered. The goal is to develop the specific procedures aligning with actual operations.

However, the reality is that a sheer volume documentation will be needed for regulatory compliance. Unless conventions can be amended to address is. Consequently, it's the prioritized option for industry to shift to a more streamlined and efficient SMS without jeopardizing safety. This could involve:

- Redesigning Documentation: more concise and user-friendly documentation shall be created. Attention shall be refocused on critical safety information without unnecessary complexity.
- Risk-Based Approach: safety measures shall be prioritized based on risk assessments rather than solely regulatory compliance.
- Innovation: to manage safety more efficiently, new technologies and methodologies shall be explored, such as digital platforms for documentation and training.

6.2.2 For Regulatory Bodies

Regulatory bodies are the rule maker in defining the framework of SMS. They set the standards to guide how SMS could be structured and implemented in the maritime industry. In summary, regulatory bodies are essential in shaping the SMS. They directly influence the safety culture of the industry, the behavior of companies. To assist shipping company streamlining and reducing size of SMS, the following actions shall be taken by these bodies.

- Reviewing and Simplifying Regulations: existing regulation shall be reviewed and simplified to identify the area needed to streamline. attention shall be refocused on the safety requirements by reducing bureaucratic hurdles.
- Promoting Flexibility: flexibility is necessary and crucial for company in developing their own SMS. It allows company to develop specific SMS which is suitable for their operational requirement to accommodate the diverse contexts of the maritime industry.

6.2.3 For seafarer and company

Seafarers plays an important role in the implementation and improvement of SMS. As the end-user of SMS, their practical insights provide diversity views of angle, which can avoid the conflict of need and demand. They are engaging themselves in the frontline to foster a safety culture, manage risks and ensure compliance. Seafarers are not only the executors of safety protocols but also the catalysts for change and innovation within the maritime safety. Their voices and demands shall be noted and satisfied when streamlining SMS. following aspects is the reference for Shipping companies in developing their SMS:

- User-Friendliness: for better comprehension and adherence to safety protocols, SMS documentation shall be more accessible and understandable to seafarers.
- Participation of Seafarers: Seafarers shall be encouraged to engage themselves in the development of the SMS. their needs and perspectives shall be considered to develop more practical and effective safety measures.
- Working Environment: a work environment that prioritizes safety without overburdening seafarers shall be created by addressing the administrative burden associated with the SMS.

In summary, this research presents the necessity of streamlining SMS. Each stakeholder shall take its own responsibility. The maritime industry shall balance the need between compliance with regulations and the practical application. A clearer and more adaptable guidelines shall be delivered to support this balance by Regulatory bodies. Lastly seafarers shall engage themselves in the development and improvement of the SMS.

References

Akyuz, E., & Celik, M. (2014). A hybrid decision-making approach to measure effectiveness of safety management system implementations on-board ships. Safety Science.

Anderson, P. (2002). Managing Safety at Sea. A project submitted to Middlesex University, UK for the partial fulfilment of the requirements for the Doctor of Professional Studies.

Atkinson, P. and Coffey, A. (1997). "Analyzing documentary realities". In: Silverman, D. (ed.) Qualitative Research: Theory, Method, Practice. London: Sage Publications.

Ayres, I., & Braithwaite, J. (1992). Responsive Regulation: Transcending the Deregulation Debate. Oxford: Oxford University Press.

Bhattacharya, S. (2009). The Impact of the ISM Code on the Management of Occupational Health and Safety in the Maritime Industry. Ph.D. thesis, Cardiff University.

Bhattacharya, S. (2012). The effectiveness of the ISM Code: A qualitative enquiry. Marine Policy.

Bohle, P. and Quinlan, M. (2000). Managing Occupational Health and Safety: A Multidisciplinary Approach. South Yarra: Macmillan Publishers.

Bohle, P., Quinlan, M. and Mayhew, C. (2001). "The health and safety effects of job insecurity: an evaluation of the evidence". Economic and Labour Relations Review.

Brysbaert, M. (2019). How many words do we read per minute? A review and meta-analysis of reading rate. *Journal of Memory and Language*.

Carless, U. (2007). Safety Management Systems in the Shipping Industry. Journal of Navigation.

Christians, C.G. (2005). "Ethics and politics in qualitative research". In Denzin, N.K. & Lincoln, Y.S. (eds.) The SAGE handbook of qualitative research. California: Sage Publications.

Conger, J.A. and Kanungo, R.N. (1988). "The empowerment process: integrating theory and practice". Academy of Management Review, 13(3): 471-482.

Culvenor, J. (1996). Safe Places versus Safe People Stamp out Risky Business. Seminar at Ballart on 15.10.1996. http://www.culvenor.com/Download%20Files/Safe%20Places%20versus%20Safe%20 People.pdf. [Accessed 03.01.2008].

Dawson, S., Willman, P., Clinton, A. and Bamford, M. (1988). Safety at Work: the Limits of Self-Regulation. Cambridge: Cambridge University Press.

Denton, D.K. (1982). Safety Management: Improving Performance. New York: McGraw-Hill.

DuPont (2007). Beyond a safety culture: protecting people, processes and operations. http://www2.dupont.com/Safety_Products/en_US/news_events/article20070416.html [Accessed 22.12.2007].

Ebbers, T., Takes, R. P., Smeele, L. E., Kool, R. B., van den Broek, G. B., & Dirven, R. (2024). The implementation of a multidisciplinary, electronic health record

embedded care pathway to improve structured data recording and decrease electronic health record burden. International Journal of Medical Informatics.

Frick, K. and Wren, J. (2000). “Reviewing occupational health and safety management– multiple roots, diverse perspectives and ambiguous outcomes”.

Gallagher, C. (2000). Occupational Health and Safety management systems: system types and effectiveness. Melbourne: Deakin University.

Gallagher, C., Underhill, E. and Rimmer, M. (2003). “Occupational safety and health management systems in Australia: barriers to success”. Policy and Practice in Health and Safety.

Grayson, J. and Goddard, C. (1975). “Industrial Safety and the Trade Union Movement”. Studies for Trade Unionists, 1(4).

Gunningham, N. (1998a). “Towards innovative occupational health and safety Regulation”. The Journal of Industrial Relations.

Gunningham, N. (1998b). “Environmental management systems and community participation: rethinking chemical industry regulation”. UCLA Journal of Environmental Law & Policy.

Gunningham, N. and Johnstone, R. (1999). Regulating Workplace Safety: System and Sanctions. Oxford: Oxford University Press.

Hale, A.R. and Hale, M. (1970). “Accidents in perspective”. Occupational Psychology,
44: 115–122.

Hammersley, M. and Atkinson, P. (1995). Ethnography: Principles in Practice. London: Routledge.

Hansen, H.L. (1996). “Surveillance of deaths onboard Danish merchant ships, 1986-93: implications for prevention”. Occupational and Environmental Medicine.

Hofmann, D.A. and Stertzer, A. (1996). “A cross-level investigation of factors influencing unsafe behaviours and accidents”. Personnel Psychology, 49: 307-339.

Holub, M., & Giegerich, C. A. (2023). Decreasing the Nursing Documentation Burden During the Covid-19 Surge.

Hopkins, A. (2000). Lessons from Longford: The Esso Gas Plant Explosion. Sydney: CCH Australia Limited.

HSE (1997). Successful Health and Safety Management. London: HSE books.

ILO (2001a). The Impact on Seafarer’s Living and Working Conditions of Changes in the Structure of the Shipping Industry. Geneva: ILO.

ILO (2001b). Guidelines on Occupational Safety and Health Management System. Geneva: ILO.

ILO (2005). HIV/AIDS and Work in a Globalizing World. Geneva: ILO.

ILO (2006). Maritime Labour Convention, at the ILO 2006. http://www.ilo.org/ilolex/cgi-lex/convde.pl?C186. [Accessed 21.08.2008].

IMCO (1982). Tanker Casualty Investigations: Report of the Tanker Accident Working Group by the ICS, OCIMF and INTERTANKO. Presented at Maritime

Safety Committee 46th Session Agenda No. 18. (MSC 46/18/7 26 February 1982 – ICS).

IMO (1982). ICS/ISF Code of Good Management Practice in safe Ship Operation. Presented at Maritime Safety Committee 47th Session Agenda No. 5. (MSC 47/INF.2 ,19 August 1982 – ICS & ISF).

IMO (1987). Ro-Ro Passenger Safety. Presented at Assembly 15th Session Item No. 12.(A 15/12/4 28 October 1987 – UK).

IMO (1988a). Guidelines for the Production of Operating Manuals. Presented at Maritime Safety Committee 55th Session Agenda No. 23. (MSC 55/23/1/Add.1 16 February 1988 – UK).

IMO (1988b). Shipboard Management for Maritime Safety and Pollution Prevention. Presented at Maritime Safety Committee 55th Session Agenda No. 2. (MSC 55/2/2 14 March 1988 – Secretariat).287

IMO (1988c) IMO Guidelines on Management for Safe Ship Operation and Pollution Prevention. Presented at Maritime Safety Committee 56th Session Agenda No. 4. (MSC 56/4/2 30 August 1988 – Nordic countries).

IMO (1988d). IMO Guidelines on Management for Safe Ship Operation and Pollution Prevention. Presented at Maritime Safety Committee 56th Session Agenda No. 4. (MSC 56/4/3 5 September 1988 – OCIMF).

IMO (1988e). Consideration and adoption of amendments to the International Convention for the Safety of Life at Sea, 1974. Presented at Maritime Safety Committee56th Session Agenda No. 2. (MSC 56/2/7 5 September 1988 – USSR).

IMO (1988f). IMO Guidelines on Management for Safe Ship Operation and Pollution Prevention. Presented at Maritime Safety Committee 56th Session Agenda No. 4. (MSC 56/4/4 8 September 1988 – ICS and ISF).

IMO (1988g). IMO Guidelines on Management for Safe Ship Operation and Pollution Prevention. Presented at Maritime Safety Committee 56th Session Agenda No. 4. (MSC 56/4/WP.4 26 October 1988 – Working Group).

IMO (1989a). IMO Guidelines on Management for Safe Ship Operation and Pollution Prevention, including possible development of guidelines on operational manual. Presented at Maritime Safety Committee 57th Session Agenda No. 13. (MSC 57/13 16 January 1989 – GDR).

IMO (1989b). IMO Guidelines on Management for Safe Ship Operation and Pollution Prevention (including possible development of guidelines on operational manual). Presented at Maritime Safety Committee 57th Session Agenda No.: 13. (MSC 57/13/3 2 March 1989 – Canada).

IMO (2002a). International Safety Management Code and Revised Guidelines on Implementation of the ISM code by Administrations. London: IMO.

IMO (2006). Assessment of the Impact and Effectiveness of Implementation of the ISM Code. Maritime Safety Committee, 81st session, dated: 10-19 May 2006.

IMO (2008). International Maritime Organization. http://www.imo.org/ [Accessed 01.03.2008].

IMO (2009). International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL)

Jensen, O.C., Sorensen, J.F.L., Canals, M.L., Hu, Y.P., Nikolic, N. and Thomas, M. (2004). „Incidence of self-reported occupational injuries in seafaring – an international study“. Occupational Medicine.

Kochan, T.A. (1998). „What is distinctive about industrial relations research? “ In: Whitfield, K. and Strauss, G. (eds.) Researching the World of Work: Strategies and Methods in Studying Industrial Relations. Ithaca: Cornell University Press.

LaMontagne, A.D., Barbeau, E., Youngstrom, R.A., Lewiton, M., Stoddard, A.M. McLellan, D., Wallace, L.M. and Sorensen, G. (2004). “Assessing and intervening on OSH programmes: effectiveness evaluation of the Wellworks-2 intervention in 15 manufacturing worksites”. Occupational and Environmental Medicine.

Lillie, N. (2004). “Global collective bargaining on flag of convenience shipping”. British Journal of Industrial Relations.

Lillie, N. (2005). Union Networks and Global Unionism in Maritime Shipping. http://id.erudit.org/iderudit/011540ar. [Accessed 19.08.2008].

Lillie, N. (2006). A Global Union for Global Workers: Collective Bargaining and Regulatory Politics in Maritime Shipping. New York: Routledge.

Lin, J. and Mills, A. (2001). “Measuring the occupational health and safety performance of construction companies in Australia”. Facilities.

Lloyds List (1994a). “Foreign seafarers' threat to expensive crews”. Lloyds List published: 11.07.1994.
Lloyds List (1994b). “Grey Labour”. Lloyds List published: 02.12.1994.

Lloyds List (1996). “Just why the policeman must be fair”. Lloyds List published:

10.04.1996.

Lloyds List (1998a). “Legal Focus: Taking an optimistic view of ISM”. Lloyds List published: 20.05.1998.

Lloyds List (1998b). “Special Report on ISM Compliance: Code makes a confident Beginning”. Lloyds List published: 25.09.1998.

Lloyds List (2000). “A license to operate”. Lloyds List published: 04.10.2000.

Lloyds List (2002a). “Wave of paperwork causes sinking feeling”. Lloyd’s List. Published: 24.05.2002.

Lloyds List (2002b). “Fear deters ISM whistle-blowers: Blame culture stops seafarers from reporting wrongs”. Lloyd’s List. Published: 27.06.2002.

Lloyds List (2002c). “Let’s take the plunge into genuine risk assessment”. Lloyd’s List. Published: 28.08.2002.

Lloyds List (2002d). “Can ISM code be made into a beautiful game”? Lloyd’s List. Published: 29.04.2002.

Lloyds List (2003a). “We’ve had safety – now what about some health?” Lloyd’s List. Published: 09.06.2003.

Lloyds List (2003b). “Let seafarers’ light way forward on ISM Code: The effectiveness of the ISM Code requires an urgent review”. Lloyd’s List. Published: 16.05.2003.

Lloyds List (2003c). “Equasis ready to turn the spotlight on managers”. Lloyd’s List. Published: 25.09.2003.

Lloyds List (2004a). “Back to basics”. Lloyd’s List. Published: 26.07.2004.

Lloyds List (2004b). “The ISM Code needs revitalizing”. Lloyd’s List. Published: 02.12.2004.

Lloyds List (2004c). “Time for shipping to hold its head high”. Lloyd’s List. Published:20.05.2004.

Lloyds List (2005a). “Countries queue up for slice of register pie”. Lloyd’s List. Published: 07.09.2005.

Lloyds List (2005b). “Why vetting improves the ISM Code”. Lloyd’s List. Published 28.04.2005.

Lloyds List (2005c). “Too many jobs on the radar”. Lloyd’s List. Published 15.08.2005.

Lloyds List (2005d). “Criminalization of seafarers proves unpopular with industry.” Lloyd’s List. Published: 25.02.2005.

Lloyds List (2006a). “ISM makes way for self-assessment”. Lloyd’s List. Published: 21.06.2006.

Lloyds List (2006b). “Not waving, but drowning”. Lloyd’s List. Published: 09.01.2006.

Lloyds List (2006c). “Criminology afloat”. Lloyd’s List. Published: 15.03.2006.

Lloyds List (2007a). “Murdoch calls for ISM overhaul to put a lid on „human error”:

Experts say that perfect paperwork is no barrier against accidents“. Lloyd’s List. Published: 13.09.2007.

Lloyds List (2007b). “Equasis sets down state of world fleet”. Lloyd’s List. Published:08.01.2007.

Lloyds List (2007c). “Shell tops tanker charter table as traders rise”. In: Lloyd’s List. Published:09.01.2007.

Lloyds List (2007d). “Near misses are a lesson to be shared”. Lloyd’s List. Published: 24.10.2007.

Lloyds List (2007e). “Cracking the code presents IMO with a tough challenge”. Lloyd’s List. Published: 25.07.2007.

Lloyds List (2008a). “Throwing a lifeline to ship safety”. Lloyd’s List. Published: 19.02.2008.

MAIB (1993). Report of the Chief Inspector of Marine Accidents into the Engine Failure and Subsequent Grounding of MT Braer at Garths Ness, Shetland on 5th January 1993. Southampton: MAIB.

MAIB (2001). Marine Accident Investigation Branch Annual Report 2001. http://www.maib.gov.uk/cms_resources/annual%20report%202001.pdf. [Accessed 27.12.2007].

MAIB (2004). Bridge Watch Keeping Safety Study. Southampton: MAIB.

MAIB (2005). Report on the Investigation of the Collision between Scot Explorer and Dorthe Dalsoe Route ‘T’ in the Kattegat, Scandinavia on 2nd November 2004.

(Report No 10/2005). Southampton: MAIB.

Mayhew, C. (1997). Barriers to Implementation of Known Occupational Health and Safety solutions in Small Business. Canberra: Australian Government Publishing.

Nichols, T. (1997). The Sociology of Industrial Injury. London: Mansell Publishing Limited.

Nytrö, K., Saksvik, P.Ö. and Torvatn, H. (1998). "Organizational prerequisites for the implementation of systematic health, environment and safety work in enterprise". Safety Science.

O"Reilly, C. (1978). "The intentional distortion of information in organizational communication: a laboratory and field approach". Human Relations, 31: 173-193.

Parker, C. (2003). "Regulator-required corporate compliance program audits". Law and Policy, 25(3): 221-244.

Power, M. (1997). The Audit Society: Rituals of Verification. Oxford: Oxford University Press.

Prior, L. (2003). Using Documents in Social Research. London: Sage Publications.
Rogowski, R. and Wilthagen, T. (1984). Reflexive Labour Law – Studies in Industrial Relations and Employment Regulation. Deventer: Kluwer Law and Taxation Publishers.

Rubin, H.J. and Rubin, I.S. (1995). Qualitative Interviewing: the Art of Hearing Data. California: Sage Publications, Inc.

Seibold, D.R. and Shea, B.C. (2001). "Participation and decision making". In: Jablin,

F.M. and Putnam, L.L. (eds.) The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods. Thousand Oaks: Sage Publications.

Shapiro, S. (2013). The Paperwork Reduction Act: Benefits, costs and directions for reform. Government Information Quarterly.

SwiftRead. Everything You Need to Know About Average Reading Speed. https://swiftread.com/blog/average-reading-speed analysis

Uflaz, E., Akyuz, E., Arslan, O., & Celik, E. (2022). A quantitative effectiveness analysis to improve the safety management system (SMS) implementation on-board ship. Safety Science, 156, 105913.

UNCTAD, 2022. Review of maritime transportation 2022. Paper Presented at the United Nations Conference on Trade and Development. New York and Geneva. https://unctad.org/system/files/official-document/rmt2022_en.pdf

Vogel, L. (1994). Prevention at the Workplace: An Initial Review of How the 1989 Community Framework Directive Is Being Implemented. European Trade Union

Technical Bureau for Health and Safety, Brussels.

Walters, D. (1996). “Trade unions and the effectiveness of worker representation in health and safety in Britain”. International Journal for Health Services, 26(4).

Walters, D. (2001). Health and Safety in Small Enterprises: European Strategies for Managing Improvement. Brussels: PIE Peter Lang.

Wokutch, R. and Vansant, C. (2000). “OHS management in the United States and Japan: the DuPont and the Toyota models”. In: Frick, K., Jensen, P., Quinlan, M. and Wilthagen, T. (eds.) Systematic Occupational Health and Safety Management: Perspectives On An International Development. Oxford: Pergamon, Elsevier Science.

Appendices

Appendices 1 Interview questions (one)

Semi-structured interview with management from shipping company

Sociodemographic and work-related characteristics:

1. Can you briefly talk about yourself, such as your present rank, your sea experiences and the company presently you served?
2. What task are you responsible for?
3. How long have you been working in this position?
4. How many company/ships have you served?
5.Have you ever carried out any paper work on board?

Qualitative analysis-reply RQ1：How to implement SMS on board with too big in size?

General questions of implement SMS:

6. Do you know about the size of the SMS in the company you served?
7. What is the actual size of SMS?
8.how much time needed to read such SMS?
9, what is the purpose of SMS, to get certificate for business or enhancement of Occupational health and safety in the maritime industry?
10. What is the company's and middle manager's role in implementation of SMS? Do you take any training course in implementation of SMS? What was the duration of your initial training? What is the content? Any content related to Documentation burden?
11, Do you ever have the sea experience before you worked as the manager in charge of implementation of SMS?
12. How often do you conduct internal audits on ships? Is there standard procedure or checklist for internal audits? What area did you focus on?

13, how does the SMS developed in your company, did you do the documentation yourself or copy it from another company.

14.Can you describe the process your company has used to implement the SMS, especially considering its size of over four thousand pages?

15.What strategies have been most effective in managing the complexity of a large SMS during the implementation phase?

16.How does your company ensure that all crew members are aware of and can access the relevant sections of the SMS?

17.What challenges have you encountered in implementing such an extensive SMS, and how have you addressed them?

18.How do you prioritize the various elements of the SMS when onboarding new staff or conducting training?

19.Can you share any specific examples where the size of the SMS has impacted operational efficiency or safety on board?

20.How does your company approach the review and update process for such a large SMS?

21.What role does technology play in the implementation and management of your SMS?

22.How do you ensure compliance with the ISM Code while managing an SMS of this size?

23.What feedback mechanisms are in place to continuously improve the SMS, and how do you incorporate crew input?

Appendices 2 interview questions (two)

Part 1: The role of employer in the establishment of SMS

1. Have you ever audited whether a SMS meets the requirements of the ISM Code?
Follow up: does it adapted to suit the actual conditions of your own company?

2. When it comes to the size of SMS, some employer thinks that “the larger, the better”. What do you think of it?
Probing question (if necessary): Do you have a view of “the larger, the better”?

3. What are your views on the quality of SMS?
Follow up: What characteristics do you associate with a high-quality SMS?

4. how does the SMS developed in your company, did you do the documentation yourself or copy it from another company.

Part 2: The role of employer in the implementation of SMS

4. How do you assess the alignment between the SMS and its actual implementation?
Follow up: Are there specific key areas you focus on?
Probing question (if necessary): Beside the consideration of the alignment, do you think the SMS can really be effective in protecting seafarers from workplace risks?

5. Some scholars argue that “the SMS is to get certificate for business only”. What do you think of it?

6. Regarding audit findings, what are the main types of major non-conformity (MNC)?

Follow up: Do seafarers, particularly captains, report on the effectiveness of the SMS to the company, and are they involved in the SMS review process?
Probing question (if necessary): Have there been instances where major non-conformity was downgraded to non-conformity (NC)? Do you always look for NC and MNC?

7.How is the effectiveness of corrective actions monitored following an audit?
Follow up: Is there a follow-up process to ensure compliance?

8. Have you encountered instances where feedback from external audits led to significant changes in how a company implements its SMS?

Part 3: The role of employer in size reduction of SMS

1. Do your think the excessive size is the problem impacting implementation of ISM on board?
2. What motivated your company to consider reducing the size of the SMS?
3. How have you identified which parts of the SMS are essential versus those that can be streamlined or eliminated?
4. What methods have you used to effectively reduce the size of the SMS without compromising safety or compliance?
5. How have you communicated the changes to a streamlined SMS to your crew and other stakeholders?
6. What has been the impact of reducing the SMS size on the overall safety culture and operational efficiency of your vessels?
7. How do you maintain oversight and ensure the reduced SMS remains comprehensive and effective?
8. What were the main obstacles you faced when trying to reduce the size of the SMS, and how were they overcome?

9. How do you measure the success of your efforts to reduce the size of the SMS?
10. Can you provide any examples of how the reduction in SMS size has led to improved safety outcomes or operational efficiencies?
11. How do you see the balance between the need for detailed safety procedures and the benefits of a streamlined SMS?

Appendices 3 WMU Research Ethics Committee Protocol Approval

WORLD MARITIME UNIVERSITY

WMU Research Ethics Committee Protocol

Name of principal researcher:	Li Anxian
Name(s) of any co-researcher(s):	No
If applicable, for which degree is each researcher registered?	MSc in Maritime Safety Environmental Management (MSEM) Specialization
Name of supervisor, if any:	Professor Chen Hai quan
Title of project:	Streamlining Safety Management Systems from the employer's perspective: Enhancing Implementation and Reducing Documentation Burden in Compliance with the ISM Code
Is the research funded externally?	No
If so, by which agency?	
Where will the research be carried out?	Dalian, China
How will the participants be recruited?	EMPLOYER from shipping company and seafarers will be invited by the researcher
How many participants will take part?	8 EMPLOYER and 8 seafarers will be interviewed
Will they be paid?	No
If so, please supply details:	
How will the research data be collected (by interview, by questionnaires, etc.)?	By semi-structured interview and focus group
How will the research data be stored?	In a secure virtual drive linked to a World Maritime University email address with a strong password.
Is a risk assessment necessary? If so, please attach	No

- I am a student carrying out the research as part of a Master's level programme of study. I will delete all data completely as soon as my degree is awarded.

Signature(s) of Researcher(s): Date: April 20 2024
LI AN XIAN
Signature of Supervisor: Date: April 20 2024
Chen Haiquan

Please attach:

- A copy of the research proposal
- A copy of any risk assessment
- A copy of the consent form to be given to participants
- A copy of the information sheet to be given to participants
- A copy of any item used to recruit participants