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Maritime sector has always been influencing the global economy. Shipping facilitates the bulk transportation of raw material, oil and gas products, food, and manufactured goods across international borders. Shipping is truly global in nature, and it can easily be said that without shipping, the intercontinental trade of commodities would come to a standstill.

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DISTRIBUTED LEADERSHIP AND EMERGENCY RESPONSE: A STUDY ON SEAFARERS

Ms. Delna Shroff[1]

Abstract

Merchant shipping is an occupation with a high rate of fatal injuries caused by accidents and maritime disasters. The importance of safety leadership has been emphasized in many studies carried out within the maritime industry. However, there is a tendency for most research to focus on holders of formal positions. A lot of previous work on leadership has been carried out on the assumption that leadership rests with a single leader. The current study adopts a practice-based perspective to explore distributed leadership among seafarers. A mixed design is applied to explore the seafarer's implicit understanding of distributed leadership through semi-structured interviews. A simulation is then developed and used to analyse the relationship between distributed leadership and the emergency response of the bridge team members.

Keywords: Distributed leadership, practice, maritime, emergency response, safety, bridge operations.

1. INTRODUCTION

Accidents at sea can have devastating effects on the lives of those who are involved. Human error has been frequently linked as the main contributing factor to maritime casualties (Amir et al., 2014). The most significant problems affecting maritime safety include collision/contact, grounding, foundering, fire, capsizing and sinking. A maritime accident results in the loss of human lives, loss of property and pollution. Between 2003 and 2012, the industry's fatal accident rate was twelve times higher than that of the general workforce (S. E. Roberts, 2014). Maritime safety legislation and norms have seen significant advances, but accidents still occur.

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Inadequate leadership was found to be a significant contributory factor in ninety-four marine navigational mishaps in the U.K. in research conducted in 2013 (Sydnes, 2013). A human factor, particularly leadership, has been implicated in numerous maritime disasters (Kim et al., 2016). A recent study highlighted the lack of leadership as a contributory factor in many maritime accidents. There was a lack of leadership behind the decision-making failures, poor judgment, and improper management of the crisis, all falling under the leader competency problems (Vineet Kaur Sandhu, 2021). Another recent study by Kim T (2021) found a lack of empirically proven models for describing and measuring safety leadership in day-to-day operations (Tae-eun Kim, 2020).

It is evident from accident reports that leadership onboard the ship is very critical. Several studies have pointed out the role of human and organizational factors in maritime safety (Chauvin, 2013; Hetherington et al., 2006; Schröder-Hinrichs, 2010). The role of those factors is a central issue in collisions. In a study by Chauvin (2013), the analysis showed that most collisions were due to decision errors. At the leadership level, the investigation revealed the systematic planning of inappropriate operations and non-compliance with the Safety Management System (Christine Chauvin, 2013). This study also stresses the necessity to investigate the master’s decisions in critical conditions. These decisions concern bridge manning and vessel speed.

While several leadership studies have been carried out in the past, there is a tendency for most research to focus on holders of formal positions. The shipping industry's long-standing authoritarian leadership style has been one of the main obstacles to leadership growth. On board, a strict vertical structure is in place, with the ship's Master wielding unquestionable authority and dominion. Hierarchical authority alone should not determine his ability to govern. The international maritime industry is unique, making it challenging to apply leadership development concepts from other sectors (Katherine Devitt, 2010). The unit of analysis in most studies has been the 'individual'. This is more so in the case of the maritime industry, where there is an undue focus on leadership styles as antecedents of safety behaviours (Clarke, 2012). Further, most studies measured leadership through generic scales, providing a quantitative assessment of the leader's behaviour.

Making a shift from attributes and behaviours of individual leaders to a more practice-based perspective whereby leadership is conceived of as a collective social process emerging through the interactions of multiple actors seems to be the need of the hour (Bolden, 2011). Isolated

discussions about single actors (mainly the ship Master) and single causes in a system, no matter how important they are, will not lead to sustainable system improvements.

The proposed study adopts a mixed design to explore the practice of distributed leadership among seafarers. The follower forms an integral part of the dynamic leadership system. This study aims to investigate the phenomena of distributed leadership, its characteristics, and the role of distributed leadership in the maritime environment. Distributed leadership's popularity is increasing; however, there is little scientific information about its nature and impact in any organizational environment (Alan Bryman, 1996).

Adopting a distributed leadership model, leadership practice centres on what people do and how and why they do it. It is a product of the interactions of leaders, followers, and their situations. Recent research by Leithwood et al. (2007) has shown that different patterns of distributed leadership are critical in achieving organizational improvement and change. Their work reinforces the importance of planning, aligned, distributed leadership practice that is purposeful and focused. Research into shared leadership is just the beginning, and many more questions will be answered in this area in the future.

The researcher chose this study as leadership within the maritime context is a complex phenomenon that cannot be understood using a single qualitative or quantitative design alone. Hence there was a need to look at this phenomenon more holistically. Distributed leadership practice is unique in that it is a result of concerted action. It offers a way of rethinking the nature of leadership. While prior research has focused on transactional or transformational leadership styles, there is a need to examine leadership activity as a unit of analysis. The focus is on developing a maritime-specific framework for distributed leadership practice.

2. LITERATURE REVIEW

It is difficult to define what is meant by the phrase "Distributed Leadership (DL)." This phrase has been conceptualized and interpreted in various ways (Kenneth Leithwood A. H., 2007). The notions of shared, collaborative, democratic, and participative leadership are all examples of distributed leadership. Distributed leadership has a wide range of literature supporting it. Three essential elements related to the concept of distributed leadership are noteworthy:

- Leadership is seen as emerging in a network of people who interact.
- There is openness to the boundaries of leadership. This suggests that multiple people can contribute as there are no fixed limits.
- Different levels of expertise are distributed among many people.

According to traditional leadership theory, only one individual has the authority and influence to lead an organization's activities (Burke 2010). Distributed leadership theory, on the other hand, holds that any organization can benefit from the leadership abilities of many people. The crucial thing is how leadership is empowered, coordinated, and supported since that is the key to success. Distributed leadership implies that multiple individuals at different levels within an organization are involved in decision-making instead of a single leader at the top (Kenneth Leithwood B. M., 2009).

2.1 Distributed Leadership

The essence of the concept of distributed leadership is that leadership does not rest with a single person alone. It is a fluid or emergent property rather than a fixed phenomenon (Spillane, 2006). There seem to be standard theoretical bases among distributed leadership and its related concepts, including shared, democratic, and emergent leadership, but different countries and sectors apply many of these concepts. Distributed leadership as an idea has seen rapid growth in interest since the year 2000.

Distributed leadership is distributing leadership practices (Malloy, 2017). In this leadership style, the leader and followers interact (Spillane, 2006). Instead of focusing on position, individual expertise is essential in distributed leadership (Malloy, 2017). This type of leadership focuses on collective work and collective learning by working on goals through communication and interaction (Halverson, 2007). Teachers collaborate and thereby develop expertise. Leadership resides with everyone at every level and not just the individual at the top (Daniel Goleman, 2002).

2.2 Theoretical Roots

In the Handbook of Social Psychology, an Australian psychologist Gibb coined the term "distributed leadership" in 1954. He looked at several facets of influence processes to better understand how formal and informal organizations work together. A distinction was drawn

between "focused leadership" and "distributed leadership" in an attempt to find a means to measure these patterns of effect. When we say that a leadership activity was focused, we mean that only one person was involved. The word "distributed" connoted the idea that power would be spread among a large number of people. Distributed leadership emerged as a more contemporary notion in the late 1990s and early 2000s, referring to a network of leadership activities and interactions that spans people and contexts.

Spillane et al.'s (2001, 2004) study is the most widely used modern research on distributed leadership practice. This study, which lasted almost four years, examined leadership practices in great depth. The social backdrop and the interrelationships among individuals involved are essential to understanding leadership behaviour. Spillane's work suggests that one must understand how leadership practice is divided among leaders, their followers, and the context in which they find themselves. There were a lot of different leaders involved in this study, which was conducted in elementary schools. The conclusion that was drawn was that looking at the school as a whole was critical to understanding the practice of leadership and developing one's leadership skills. Leaders' interactions were characterized by their interdependence. Reciprocal, pooling, and sequential interdependencies were all found to exist. When two or more leaders work individually but they are mutually supporting one another, then leadership practice can be said to be reciprocal. Pooled interdependency is when two individuals pool their information through formal and informal meetings. At times two or more leaders perform actions in a definite sequence. To bring about a leadership routine, it is important that individuals are interdependent, and tasks are arranged in a sequence.

Spillane's theory of distributed leadership emphasizes how the social context is an important component in understanding how leaders think and act. The tasks, people, actions, and interactions evolve together as contributing factors to distributed leadership within the academic context (James P. Spillane, 2001).

2.3 Leithwood et al.'s Framework of Distributed Leadership

When Leithwood and his colleagues conceptualized the leadership distribution they were looking at, they didn't just focus on an idealized image and practice of distributed leadership. Instead, they looked at a more general theoretical framework for studying the distribution of leadership in organizations. There is a wide range of leadership functions' alignment and beliefs connected with

different types of alignment, such as a plan-full alignment, an anarchic misalignment, and spontaneous misalignment (Kenneth Leithwood A. H., 2007).

- Planful alignment: Gronn's "institutionalized practice" is a good analogue for this arrangement. Members of the organization have carefully considered the duties and responsibilities of people in positions of authority in this setup. Leaders have agreed on the best ways to carry out certain practices and responsibilities of leadership. Trust in the motives of one's leadership colleagues, well-grounded beliefs in the capabilities of one's leadership colleagues, and collaboration rather than rivalry as the best method to enhance productivity within the organization are all likely to be connected with planful alignment.
- Spontaneous alignment: There is a lack of preparation regarding the distribution of leadership roles and responsibilities in this type of distribution—unintentional and instinctive decision-making results in aligning roles and responsibilities among persons. There is little evidence that this type of alignment significantly impacts short-term productivity compared to planful alignment.
- Spontaneous misalignment: Unpredictable distribution of power is the norm. This type of (mis)alignment is ineffective for both short-term and long-term productivity. Organizational productivity suffers in the short and long term.
- Anarchic misalignment: In this distribution method, some or all organizational leaders actively resist or reject the influence of others. As a result, employees worked independently, competed for limited resources, and shared corporate objectives.

Short-term good organizational change can be achieved through both planned and random alignment patterns, according to Leithwood and colleagues (2007). Furthermore, planful alignment significantly impacts long-term organizational productivity more than other alignment patterns. The study indicated that spontaneous misalignment and anarchic alignment might severely impact organizational change and development. Distributed leadership needs to be better understood, according to the study's conclusions. Without this knowledge, it would be impossible to predict a significant link between DL and performance outcomes (2009). For leadership to be effectively distributed, two critical factors must be met: To begin, leadership should be distributed among those who already have or can acquire the necessary skills and knowledge to do the job at hand. The second prerequisite is that excellent organization and planning are required to spread leadership practice.

Leithwood et al. (2007) carried out early work in distributed leadership. They suggested that planful and spontaneous distribution configurations strongly predicted positive organizational change. Furthermore, planful alignment seemed more likely to contribute significantly than other alignment patterns to long-term organizational productivity. The research found that spontaneous misalignment and anarchic alignment were likely to affect short- and long-term organizational change and development negatively.

The work by Leithwood and colleagues cited above also suggests that the distribution of leadership may not necessarily be effective. What is more important is understanding how the distribution of leadership activity takes place.

A growing number of research studies are examining the effects of distributed leadership on classroom instruction and student achievement. There is now more information available on the types, effects, and nature of distributed leadership practice due to the conceptual, theoretical, and practical work being done in this area. Their approach emphasizes the importance of strategic planning and alignment with a clear end goal.

Research on distributed leadership and organizational development is encouraging but not conclusive. Distributed leadership practice has some challenges, but more research is needed to understand these issues (Harris, 2009) better.

2.4 Authoritarian Leadership

To paraphrase (Yukl, 2006), leadership involves encouraging people to recognize and agree on what needs to be done and how it should be done while supporting individual and group efforts to achieve common goals.

In their study (Zhen Wang, 2019), referenced authoritarian leadership. An autocratic leader exercises total authority and control over subordinates and expect complete submission from those under their command (Cheng, 2000) & (Scandura, 2008). Authoritarian leaders want their followers to accept and respect their subordinates' rigid and centralized hierarchy (HSIAO, 1990).

Studying the influence of authoritarian leadership on subordinate task performance was the focus of (Zhen Wang, 2019). According to the research, leader-member exchanges negatively impact subordinates' work performance. Members' reliance on the leader shields them from the adverse

effects of authoritarian leadership. Authoritarian leadership has a more substantial impact on leader-member exchange when there is lesser dependence on the leader.

Çelik (Çelik, 2017) examined the relationship between employee motivation and leadership. He referred to empirical studies from different firms and sectors. There was a reference to a study by Mine Turker on maritime employees. The results showed that employees identified their leader as more authoritarian in approach. A negative correlation was found between other leadership styles and employee motivation. The supportive leadership style was found to have the lowest correlation with employee motivation. It was expected that a chain of command should be established as maritime employees spend a lot of time with their senior managers and associates. For this reason, the authority will create a firm structure for following set rules.

Comperatore (Carlos A Comperatore, 2005) states that authoritarian leadership is one of the stressors that are prevalent in the maritime environment. This stressor combines with other stressors such as extreme temperatures, long working hours, mental and physical workload, isolation, and other stressors. This system of stressors affects the ability of crew members to remain alert and perform.

Surugiu and Dragomir (Dragomir, 2010) conducted a study to improve the training strategy for seafarers. They hold that there is a lack of orientation toward developing a training strategy based on leadership. Maritime leadership training should encourage seafarers to take extra responsibilities when given the opportunity. There needs to be a climate of trust and confidence on board. There is a lack of effective communication among authoritarian commanders, and a lack of communication contributes to many accidents.

2.5 Emergency Response

Life is in danger when an emergency occurs suddenly and unexpectedly. When disaster strikes, it might be anything from an earthquake to a terrorist attack to releasing dangerous materials (Schmidt, 2000). Even the most severe disasters usually result in the loss of life or property. Each step of emergency management is distinct, yet they frequently overlap in execution.

The response is the second part of emergency management. During and immediately following an emergency, this phase calls for action to be taken. As soon as things have calmed down, we may say that the response phase is over. Put your plans into action in this phase.

Emergency Response: An operational definition:

O'Toole (O'Toole, 2002) conducted an employee safety perception survey. Injury data was collected. This preliminary study showed that positive employee perceptions were positively related to a reduction in injuries. The study showed that emergency response was one of the crucial factors influencing employee perceptions. These perceptions influenced decisions related to at-risk behaviours on the job.

One definition of ''emergency response" is the coordinated effort by many entities to mitigate (Rhona Flin, 1996) the effects of a potentially life-threatening crisis that happens abruptly and unexpectedly (Goetsch, 2005). Emergency response is also defined as measures taken in an emergency to preserve lives and prevent additional property damage. Analysing emergency reactions at a team level is an attempt undertaken in the current study. The team's ability to respond to an emergency was observed and rated.

2.6 Workload, Power Distance and Safety Performance

Workload:

The concept of workload is discussed in transportation (Lützhöft, 2011), nuclear power operations (Sheridan, 1981), air traffic control (Shayne Loft, 2007), driving, and many others. De Zwart et al. (1995), for example, have a general awareness of physical workload, but the concept of mental workload needs further definition. Mental processing power or resources and task requirements are thought to have an inverse connection.

According to research, many maritime mishaps are partly caused by a person's mental workload. There is still a lot of work to be done in the field of mental workload. However, each method has its pros and downsides (Vidulich, 2006).

Mental Workload:

The cognitive burden is founded on the premise that as the complexity of an activity increases, so does the quantity of cognitive resources necessary to meet those demands (Wickens, 2008) & (Baddeley, 1992). According to research, performance improves for light to medium workloads but degrades as the workload increases (Staal, 2004). If you're engaged in an activity or work that

requires you to be in a specific location, you're more likely to be prone to distractions. A linear relationship between job load and performance has been seen (Marshall, 2002).

It is possible to think of workload as a multi-dimensional notion that considers time, mental tasks, physical tasks, and pressures. One of the most critical aspects of one's mental workload is how hard one works to meet the expectations of one's job.

Smith and Smith (2017) studied rail industry workers' workloads. Some of these risk factors included an unhealthy lifestyle, working shifts, and little control or support. They conducted a poll. A high workload level was also found to be connected to exhaustion, which in turn was linked to a higher likelihood of mishaps and a slower response time.

Hockey et al. (2003) examined the literature on safety in three main areas: critical themes of accidents, the role of human error, and intervention to improve security. Twenty studies were reviewed on the following areas: across the following areas: fatigue, stress, health, situation awareness, teamwork, decision-making, communication, automation, and safety culture. The results showed the relative contributions of individual and organizational factors in shipping accidents and also identified the methodological concerns with past research. It was concluded that monitoring and modification of human factors issues could improve safety performance in the maritime context.

Hockey et al. (2003) conducted an experimental study to analyze the mental demands of collision avoidance in a simulation. The findings revealed that high levels of a collision threat were related to an increase in mental workload and an impairment in performance on a secondary task. This study highlights the potential consequences of monitoring equipment simultaneously. In concert with a single job, this impairment could have severe consequences in a real-life situation.

With advanced technologies being introduced in the shipping industry, including Portable Pilotage Units, Remote Pilotage, advanced techniques of maintaining situational awareness, and autonomous Shipping, there is a strong need to understand mental workload during bridge operations and cooperation with shore personnel. An analysis of the mental workload of Captains, Pilots, and Tug Masters was carried out with the help of SWAT, ISA, analysis of communication, and collecting simultaneous electro-dermal activity of team members. The findings revealed that the EDA measure of workload is superior to the paper-based techniques. A lot of research has been done on individual workload in the past few years.

Work on measuring workload in a team setting is gaining attention. There is a tendency to measure team workload using a combination of individual workload measurements. For example, a researcher may collect workload ratings from each team member and create a team average from these ratings. The applicability of individual workload measures to a team setting is being debated; however, well-accepted standards of team workload are currently unavailable.

2.7 Power Distance:

According to Mauk Mulder (1977), a social psychologist, the degree of power disparity between a less powerful one and a more powerful other is characterized as the degree to which the two individuals belong to the same social system (whether it is loosely or firmly knit). Power distance has been extended by Hofstede (1997) to include a more comprehensive cultural idea. According to his definition, a country's lower-ranking citizens expect and accept that power is dispersed unequally.

Individuals, groups, organizations, and nations are differentiated based on the degree to which inequality is accepted either as inescapable or as functional. This value is termed power distance. Power is essential to all relationships; it is inherent in hierarchical organizations. Hence it is necessary to understand the concept of power distance. Daniels (2014), in a review of value taxonomies and elements of power distance, identified areas where additional research is required on power distance. The study outlined a plan for future research on this subject.

Hofstede (1980, 2001) refers to power distance as the extent societies accept inequalities. With the work context, it can be regarded as the perceived difference, i.e., inequality in the amount of power a supervisor has compared to that of a subordinate. The extent of this inequality is valued by both the supervisor and the subordinate and further reinforced by the social and national environment (Hofstede, 2001).

Power distance influences levels of participative decision-making, centralization, and formal hierarchy within organizations (Hofstede, 2001). In a culture with high power distance, individuals who possess more power are perceived as superiors, not accessible, paternalistic, and are expected to adopt an autocratic style of leadership (Hofstede, 1980). As these individuals are perceived as superior, others with less power accept their hierarchical position. They tend to trust their leaders and do not question their judgment (Kirkman, Chen, Farh, Chen, & Lowe, 2009).

They are generally docile, loyal, and obey their leaders (Bochner & Hesketh, 1994). High power distance is linked to more task orientation and fewer people exposure. High power distance cultures emphasize structure for task completion and maintain the social space in hierarchical relationships (Bochner & Hesketh, 1994). A higher value is placed on status, power, and prestige (Jaw, Ling, Wang, & Chang, 2007; Schwartz, 1999). In contrast, low power distance manifests itself, for example, as decentralized organizations, participative decision making, and consultative leadership (Hofstede, 1980).

Taras, Kirkman, and Steel's (2010) conducted a meta-Analysis. They found that power distance positively correlated with absenteeism, sensitivity to others, job satisfaction, perceived organizational justice, continuance commitment, normative commitment, trust, conformity, perceptions of directive leadership, openness to experience, and religiosity at the individual level. The results showed that power distance was negatively associated with emotional displays, feedback-seeking, exchange ideology, avoiding unethical behaviour, team commitment, teamwork preference, employee self-esteem, and perceptions of participative leadership. At the group level, power distance was positively correlated with group cooperation and negatively correlated with group performance. At the country level, power distance is positively associated with conformity, the importance of family values, agreeableness, neuroticism, and corruption and negatively correlated with life satisfaction, extraversion, openness to experience, wealth, human rights, gender role equality, and income equality.

Wang, Mao, Wu, and Liu (2012) examined (in part) how power distance moderates the relation between abusive supervision and justice.

Khatri et al. (2003) reviewed the literature on power distance orientation and its influence on different organizational behaviours. They concluded that people in high-power distance contexts are reluctant to participate in decisions over time. They become passive followers. As a result, decisions are taken by a few leaders autocratically. Communication also suffers. Tough decisions are made and implemented faster, and the quality of decisions is poorer. This is because of a lack of input from team members, poor communication, and poor information sharing.

A subordinate may regard their participation in decision-making as an indication of their superior's incapacity in a high-power distance cultural situation. This means bosses may make decisions without consulting or involving subordinates (Francesco and Chen, 2000). Because of the

potential for embarrassment, associates are reluctant to voice their opinions publicly. When people behave in this way, major communication breakdowns occur. Senior management and lower-level staff become estranged from each other over time. Senior management loses touch with the work being done at the bottom of the organization's structure, which causes employees at those levels to become unsure of what they may anticipate from their superiors (Mintzberg, 1993). Informal communication is absent in companies and cultures with a significant degree of power distance. Authority and decision-making are retained in the hands of a few people at the top (Hofstede, 2001).

According to Sinha and Tripathi (1994), authoritarian decision-making can be seen in most Indian companies. A more significant power disparity hinders the communication between superiors and subordinates. Because of this chasm in communication, it isn't easy to make informed decisions (Mintzberg, 1993; Khatri, 1996).

The study by Lu et al. (2016) looked at the impact of country culture on container shipping human errors. They discovered that aspects of national culture such as power distance, avoidance of ambiguity, collectivism, and a focus on the long term had a favourable impact on people's safety behaviour.

In a study by Robert et al. (2000), it was found that management practices relating to empowerment correlated negatively with job satisfaction found that management practices described to empowerment were negatively related to job satisfaction in high power distance national cultures and positive in countries low in this dimension. Thus, high power distance cultures are more likely to accept management decisions and leave it to the management to lay down procedures and safe work rules. Moreover, high power distance cultures are more likely to agree with some behavioural detection and monitoring levels when compared to cultures low in this dimension.

2.8 Research Objectives

- To explore how leadership manifests itself among seafarers aboard merchant ships.
- To examine the strength and direction of the relationship between planfully aligned leadership (one form of distributed leadership) and emergency response of the team members during navigation.

- To investigate the contribution of demographic measures, workload, and power distance in predicting the emergency response of team members during navigation.

2.9 Research Questions

The current research seeks to address the following research questions:

- *How does leadership manifest itself among seafarers* aboard merchant ships?
- What is the strength and direction of the relationship between planfully aligned leadership and emergency response among team members?
- Is planfully aligned leadership a better predictor of emergency response among team members than authoritarian leadership?
- What is the strength and direction of the relationship between planfully aligned leadership and emergency response, after controlling for demographic measures? What is the contribution of the demographic measures such as age and contract period in this relationship?
- What is the strength and direction of the relationship between planfully aligned leadership and emergency response after controlling for the workload on team members? What is the contribution of workload in this relationship?
- What is the strength and direction of the relationship between planfully aligned leadership and emergency response after controlling for power distance that prevails between the formal leader and team members? What is the contribution of power distance in this relationship?

3. RESEARCH METHODOLOGY

The research methods chosen for this study are referred to as mixed methods (Tashakkori & Teddlie, 1998) or ‘‘triangulation”.

3.1 Research Phases

The study was conducted in four phases.

Phase 1: The first phase was the qualitative phase. The purpose of this phase was to gain insights into the seafarers' implicit understanding of leadership, explore how leadership emerges among the team members within the maritime context.

Sample: The sample for this phase was sailing officers, both Deck and Engine Officers. 24 officers were interviewed to gain insights into how leadership emerges onboard the ship. The mean age of the sample was 34.6 years, and SD was 9.49. They were selected from six different ship management companies. The inclusion criteria for sample selection were officers of Indian nationality who had served at least two contracts with their present company. The samples for the qualitative phase were officers from both operational and management levels. They were on shore leave.

Procedure: Semi-structured interviews were conducted with the respondents to gain insights into their implicit understanding of leadership. An interview guide was developed, and five officers were interviewed during a pilot run.

Following this, the interview questions were slightly modified. The researcher adopted the Critical Incident Technique (CIT) because it enabled participants to describe memories of a specific incident clearly.

Measure used: Interview Guide

An interview guide was prepared after speaking to four experts/Programme Heads in the maritime field, reviewing the literature on distributed leadership, and analysing the pilot study results.

The interview guide consisted of three sections. The first section of the interview comprised generic questions related to leadership. The purpose was to build rapport and provide a context for more detailed questions. Once the connection was established, and the respondent was comfortable sharing, the researcher proceeded to the questions on distributed leadership.

The distributed leadership segment consisted of 10 questions; each key question was followed by probing questions. The third segment of the interview guide comprised queries related to safety culture. The focus was on understanding the meaning of safety culture and its relation to leadership. How does leadership relate to safety culture, and how does culture translate into safe behaviours? The researcher reassured the respondents of complete confidentiality and anonymity in certain conversation sections, where respondents had to describe a critical incident.

Phase 2: The second phase was a quantitative phase. The purpose of this phase was to further support the prevalence of planfully aligned leadership within the maritime context and measure planfully aligned leadership and the three dimensions objectively.

Sample: 216 sailing officers from both the operational and management levels were involved in this phase. Convenience sampling was used. The mean age of the participants was 30.7 years (SD = 5.39). The inclusion criteria for this phase were the same as that for the first phase.

Procedure: A survey-based rating scale was administered online to measure planfully aligned leadership among seafarers aboard merchant ships. The survey questionnaire was uploaded on an online platform, and the link was sent out to all the sailing officers. A list of sailing officers' details which included their emails, sailing background, and contact numbers (who met the inclusion criteria) was sent to the researcher by two training coordinators every week. The training coordinators were based at the Training Centre located in Mumbai. Every Monday, the researcher sent out an email to all the potential respondents with a briefing note and a link to the survey. Respondents were required to answer two sections of the survey instrument. Only the completed questionnaires (both sections) were considered for the current study. A total number of 301 respondents filled out the questionnaire. However, only 216 responses (71.8%) were considered for further analysis. Those responses were statistically analysed, and open-ended responses were coded.

Measure used: Survey Instrument

The survey instrument comprised two sections. The first section began with two open-ended questions followed by one closed-ended question. Questions were built from the salient themes that emerged from the qualitative data analysis and used the theory of distributed leadership as a conceptual underpinning to measure planfully aligned leadership. The purpose of these questions was to:

- Explore shipboard situations which required the immediate supervisor to lead.
- Gain an insight into the behaviours/actions taken by the immediate supervisor.
- Gain an understanding of how leadership emerged within the given context.
- Gain an understanding of what was perceived as effective/ineffective behaviours.

The second part of the survey encompassed a measure of planfully aligned leadership. Items for this scale were adapted from the ‘‘Core Practices” or ‘‘Basics” of successful school leadership (Leithwood et al., 2006). These practices were created from empirical studies carried out within the educational context. They were also validated by comparing them with behaviours associated with the instructional leadership model (Hallinger, 2003) and with practices of leaders which support student achievement. These behaviours fall into four categories which are mentioned below:

- Setting Direction.
- Developing People.
- Redesigning the Organization.
- Managing the Instructional (teaching and learning) Programme.

These practices have been implemented successfully within the educational context. Some practices have models of transformational leadership as their source, studies carried out by Burns (1978), and other empirical work by many other researchers. The survey was intended to generalize the findings which were obtained in the initial qualitative phase which focused only on 24 sailing officers.

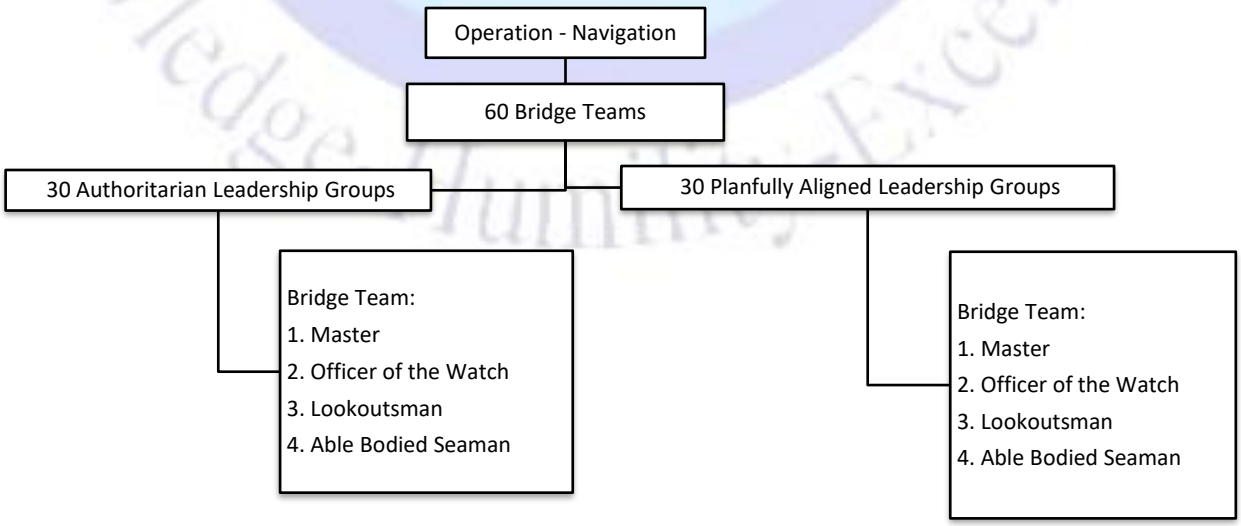
Phase 3: In the third phase, an experimental design was utilized to investigate the relationship between one form of distributed leadership, i.e., planfully aligned leadership, and the emergency response of the team members during a single shipboard operation. A simulation was designed and conducted to examine how planfully aligned leadership predicts emergency response, to study the team members' behaviours within their working environment, and thereby make observations of team performance in a complex maritime environment. The classic authoritarian style of leadership and planfully aligned leadership were compared and studied in a simulation. An event-based checklist was used to calculate the scores.

Sample: The study participants of this phase were sailing officers, both operational and management level officers. The sample was sailing officers comprising the Master, Chief Officer, and Second Officer. The Bridge Team consisted of the formal leader (Ship Master), Officer of the Watch (OOW), Lookouts man, and an Able-Bodied Seaman (AB). 30 planfully aligned leadership groups and 30 authoritarian leadership groups participated in the simulation exercise. The inclusion criteria for this phase were the same as that for the first and second phase.

Procedure: The study employed a between-groups, independent measures design. The experiment was conducted with different subjects in every group. As a result of a random allocation process, each participant was randomly allocated to one of 60 groups. The number of people on each bridge team remained unchanged; a typical bridge team included four people.

Figure 1: 360-degree Full Mission Navigation

Figure 2: Bridge Team Composition



Procedure:

Table 1: Procedure (Phase 3)

Day 1	**Day 2**		
	Step 1	**Step 2**	**Step 3**
Familiarization	**Briefing the Team**	**Briefing the Master**	**Simulation**
Each bridge team was guided to the Navigation Simulator on their respective day. The simulator operator was instructed to carry out a familiarization session. He provided an overview of the bridge equipment and gave a transit demonstration of the geographic area used for the simulation exercise. The demonstration took approximately 45 minutes. The 60 teams were randomly distributed between two groups, i.e. 30 teams functioned under planfully aligned leadership and 30 teams were under authoritarian leadership.	The group participants assembled in the meeting room in the morning on the day the simulation was conducted. The bridge team was shown the particulars of the voyage on a projector screen. The simulator operator (coached by the researcher) briefed the team members about their respective roles in the exercise. The bridge team was then guided to the simulator, but the Master was requested to stay back for further instructions.	The researcher instructed the Master to conduct a briefing with his team (using a script). The Master was given 15 minutes to read the script and familiarise himself with his approach. The Master was then asked if he had any doubts about his role. They were clarified before he entered the bridge in case there were doubts. Once the Master stated that he was comfortable playing his role, the Master (as instructed in the script) then entered the simulator, briefed the bridge team. The Master of the authoritarian leadership group laid down the expectations as per the script and did not allow any questioning or clarification of doubts. The Master of the planfully aligned leadership group set the direction, built trust (as per the script).	The exercise began. The Master had the con, and after about 15 minutes, he handed over the conn to the Officer of the Watch (Chief Officer / Second Officer). The Master remained on the bridge and was overseeing the operation. The lookout man performed his role as a lookout. The AB was at the helm and steered the vessel. The Master (in the authoritarian leadership group) demonstrated an authoritarian leadership style. The Master (in the planfully aligned leadership group) demonstrated the dimensions of planfully aligned leadership. Every Master was given a *small card* with simple script statements/actions which he had to say/do at specific intervals in the exercise.

Measure Used: Event-Based Approach to Training and Assessment:

Event-based training approach is widely used to evaluate individual and team performance (Fowlkes et al., 1994; Dwyer et al., 1997; Fowlkes & Burke 2005a; Fowlkes & Burke 2005b; Rosen et al., 2008). Event-Based Approach to Training (EBAT) is a methodology used to assess individual and team performance (Rosen et al., 2008). In this approach, critical events are inserted into appropriate contextualized scenarios. The scenario has a definite timeline; this helps the assessor understand what behaviours should occur and approximately when they should occur. Behavioural assessments are carried out in real-time. The checklist is used by observers to identify whether or not suitable responses to each important event were witnessed. The experiences are designed to elicit a specific set of responses. It is necessary to be able to observe and measure the behavioural responses.

3.2 Creating a Scenario Script:

Two nautical faculties/subject matter experts assisted in the creation of a scenario screenplay for the current investigation. A scenario script is a blueprint for the simulation's course of events and a means of keeping track of the many players involved. A well-written script makes certain that important events occur at the appropriate times. It also normalizes the simulation's non-critical noise.

In the current study, a script was created. The scenarios were identical for both the authoritarian and the planfully aligned leadership groups. 10 critical events (triggers) were introduced at definite intervals in the simulation. Images 5 and 6 show the route marked with the critical events which would be introduced at definite intervals in the simulation. Initially, about 10 minutes were given to the participants to get accustomed to the route. Gradually each critical event was introduced. Events ranged from simple situations to more critical ones, which required the team to respond.

The route was selected for this simulation keeping in mind the actual situation that exists when ships transit that area. Many factors of the environment, like weather, wind, traffic, etc., were taken into consideration and defined in advance. The participants' competency levels were also considered making sure the difficulty level of the exercise is neither too high nor too low and be carried out comfortably by the ranks involved. One faculty along with the researcher worked out the sequence of the critical events ranging from simple to more complex. Initially, a few trials

were carried out till all technical glitches were sorted, and the time intervals after which every critical event could be introduced were fixed.

The participants were observed from a one-way mirror/screen in the control room. All communication was also heard via speakers in the control room. The researcher and the simulator assessor independently monitored the scenario. The two observers, the simulator assessor, and the researcher entered their scores on two separate score sheets and made notes in the column named 'Comments' as they observed.

3.3 Evaluation:

After the debrief, a link was emailed to the participants in their emails to check the effect of fatigue and boredom. They provided their ratings on a brief scale using a 7-point rating scale. They were then briefed and sent another link and immediately guided to fill up their responses on three short scales to measure Power distance, Workload, and Distributed Leadership about the simulation they had just experienced. The participants immediately received the three links for the scales, and they filled up their ratings online. The participants were thanked for their time.

Other measures used in Phase 3:

Disengagement Scale

Multidimensional State Bored Scale (MSBS) of Disengagement modified by Shelley et al. (2013). The Disengagement subscale of the MSBS was used to examine the impact of participant weariness and boredom on their replies. There are three parts to it. Item 17 and item 28 (the Disengagement subscale items) of the MSBS scale were deleted since they were deemed unnecessary for the current investigation.

NASA Task Load Index

Individual workload is assessed by the NASA-Task Load Index (NASA-TLX), a multidimensional rating system. Mental, physical, temporal, performance, effort, and frustration are the six components that make up the six dimensions of mental and physical demand (F). An adaptation of the tool was made, and the workload was measured in terms of four dimensions: mental demand (How cognitively demanding was the task?), temporal demand (How hurried or rapid was the task?), and effort (How hard did you have to work to attain your level of

performance?). and frustration (to what degree were you aggravated, anxious, and angry at the time?

Power distance Orientation Scale

Individual-level investigations (Brockner et al., 2001; Earley 1999, Kim and Leung 2007) have led us to assess power distance direction (Earley and Erez, 1997). The original eight-item scale was deleted since five of the items did not apply to the current study.

- Research Variables.
- Operational Definitions of Study Variables.
- Independent Variable.

Planful Alignment: Distributed leadership implies that multiple individuals at different levels within an organization are involved in decision-making instead of a single leader at the top (Leithwood et al., 2009). Three dimensions were identified as subthemes under planfully aligned leadership:

1. Setting Direction: Leading a team to a shared understanding of the actions and goals of the group is an important factor that can promote a feeling of purpose or vision (Hallinger & Heck 2002).
2. Developing People: Individual assistance and intellectual stimulation, as well as setting an example for others, are all part of the process of cultivating others' potential and increasing their sense of purpose and commitment to the team (Leithwood & Jantzi, 2006).
3. Building Trust: Here trust is invested in role and status with a presumption of competence until proved otherwise (Bottery, 2002).

- Dependent Variable

Emergency Response: Emergency response is the action made during an emergency to avoid further damage.

- Control Variables

Age: Age here refers to the number of completed years of chronological age.

Work Experience: Work experience here refers to years of the contract period for onboarding the ship.

Power Distance Orientation: The degree to which a person accepts the unequal allocation of power in institutions and organizations is known as power distance. The term ‘‘associate’s orientation’’ refers to a construct at the level of a person.

Workload: Hart and Staveland (1988) describe workload as ‘‘the perceived relationship between the amount of mental processing capability or resources and the amount required by the task.’’

Phase 4: In the fourth phase, the qualitative phase, the participants who had participated in the simulation were selected randomly and contacted online. The fourth phase included semi-structured interviews to acquire more data that bolstered conclusions and provided a more thorough understanding of planfully aligned leadership.

Sample: The technique used for selecting participants was random sampling. A total of 14 officers were interviewed to gain a deeper understanding of the phenomenon as it unfolded in the simulator. The mean age of the sample was 34.6 years, and SD was 9.49. They were randomly selected from both planfully aligned and authoritarian leadership groups. The inclusion criteria for this phase were the same as that for the first phase.

The sample for this qualitative phase were Chief Officers, Second Officers, and Masters who played the role of Able Bodied Seaman in the simulation. Masters who played the role of Master in the simulation were excluded from this phase as the purpose was to understand the team members' experiences and how they responded to the emergency in the presence of the formal leader (the Ship Master).

Third officers were excluded from this phase as their competency level was lower than the other ranks, and the difficulty level of the exercise required a higher competency level.

Procedure: Seven interviews were conducted face to face in a separate room after the simulation. Seven interviews were conducted virtually as Mumbai was under lockdown due to the Covid -19 pandemic, and the training centre shut down for an extended period. All interviews were recorded with prior consent, and transcripts were prepared.

Methods triangulation was used for the analysis of the data. Methods triangulation is checking the consistency of findings using different data-collection methods. The reason for doing this was that using more than one method would help the researcher obtain more reliable data. It would

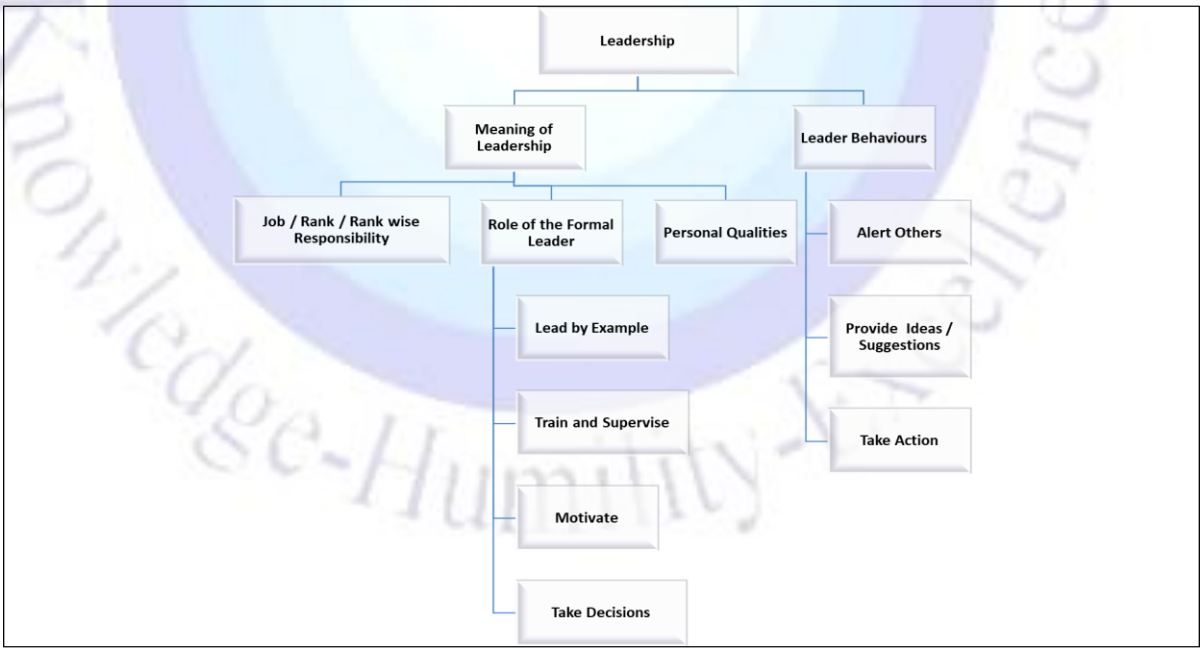
also offer a more holistic understanding of the phenomenon under study and its relationships with other concepts.

4. RESULTS

4.1 Phase 1

Thematic analysis of the interview transcripts revealed two themes – *the seafarer's implicit understanding of leadership* and *typical leader behaviours.* Leadership was understood as a *'job/rank/rank wise responsibility'*, as a *'role performed by the formal leader'*, and as *'personal qualities'* possessed by the formal leader. Figure 2 indicates the seafarer's implicit understanding of leadership.

Figure 3: Seafarers' Implicit Understanding of Leadership



Leadership comes with the Job/Rank

Within the maritime field, a unitary view of the leader seems to persist. Among the community of seafarers, leadership is strongly associated with one's rank on board the ship, it is perceived as a

part of an officer's job/job responsibility. Many of the respondents' understanding of leadership is that it comes with the job; when one takes charge, other crew members look up to you and follow. Some instances are presented below.

The Master associate's leadership with the rank of being a Captain. He says,

This leadership that we are talking about is leading the ship because this is more of a job; it's a job. So, the moment I started this career, the thought process was that I had to become a ship's Captain. The Captain of the ship was the driving force, and we knew that the Captain is the overall in charge of a vessel, so that's how this …

A Chief Officer (C/O) also considers leadership a requirement of one's job. To carry out various job responsibilities, he requires leadership to manage team members. He shares,

Firstly, because my job requires me to have leadership qualities, maintain my people under me, delegate tasks, make sure they are doing the tasks, make sure that they are in a happy condition while doing the task, perform well, and so on…. it requires me to have that leadership, and I enjoy it…

Leadership as a Role to be Performed

Some respondents perceive leadership as a 'role' that the formal leader performs. Leadership is perceived in terms of the 'role' that a person in authority performs – trainer, motivator, being a role model for others.

A Fourth Engineer shares,

After coming to the merchant navy, I have seen my seniors. When I stepped into the leadership role in the specific college event I mentioned, I was looking at my friends. For me, they were always friends rather than a leader. When I came on board, I saw this particular ranking like Master, Chief Engineer in the engine side per se.

Leadership in terms of personal qualities

A few respondents spoke of leadership in certain 'qualities' or personality traits that a leader possesses.

A 4/E states,

As you mentioned, in the vertical line of leadership, some people have a personality for it, and I am not against it. Some people don't have a personality, so I was the latter type.

C/O shares,

In the maritime context, leadership means that I'm a better leader as a Chief Officer than as a Master. That's what I feel. My boys also feel that way …so I told you a leader is not just rank-wise; it is the qualities that a person has within himself…

Leader Behaviours

A lot of the respondents, both operational and management level officers, revealed experiences where officers displayed behaviours that were critical to the outcome. Three prominent leader behaviours were identified– *alerting the team member/s, sharing ideas/suggestions with the crew member, and taking action.*

- *Alerting the team member/s:* This behaviour involves all team members reporting, checking, and questioning ambiguous situations. Positive reporting of actions completed and verbal alerts /challenges to actions that might have been missed or decisions that are not understood are essential to safe operations. The absence of such communication can lead to the breakdown of even the most experienced bridge team.

  For instance, a Master shares an incident where the 3/O alerted him in time about the rescue boat not being secured:

  We had a near miss on one of our ships where I was the chief officer, and we were supposed to lower the rescue boat. The 3/O was supposed to go in to lower the boat. So, I told him that you familiarise himself with the hooking arrangement because hooking arrangement is very critical. Once you go down, you will be injured if you don't hook it correctly and if the boat falls. Then, just before the entire operation, I went with him on the rescue boat, and I showed him the hook; see, this is the hook, you have to dismantle it from here, and this is where you have to lock it. So, I was about to unhook it. The third officer now, a young guy, his first contract, said, if you unhook, we will fall now. I told him that the boat was secured. He said, No Sir, the boat is not secured; a team member has removed the securing arrangement.

Somebody had removed it; so, luckily, in this case, the third officer's presence of mind saved us from an incident. Otherwise, we were down; both of us were down.

- *Providing ideas/suggestions:* Team members are engaged in problem-solving. A good team member should anticipate dangerous situations, recognize the development of an error chain, and offer suggestions for resolving the problem. If there is any ambiguity or element of doubt, team members should communicate and provide ideas and alternative solutions.

  A 4/E, for instance, suggested an idea promptly that aided the change over from diesel oil to heavy oil. He shared,

  OK. So, this is about the specific set of generators on my last ship. While doing maintenance, typically engine runs on heavy fuel oil, which is very hot. So, during major maintenance, you change it over to diesel oil. If it cools down, everything is stuck in the lines. So, all three would not start on diesel oil in this particular set of engines. It wouldn't start. We tried, and Chief Engineer was there, Second Engineer was there. I had an idea to drain the lines in this instance, so we opened up the lines and put a bucket there. The second engineer was there; he cracked open the valve and flushed it till all the diesel oil was gone, and the heavy oil came into play…idea was mine.

- *Taking action:* **An essential aspect of Bridge Resource Management on board is to recognize the development of an error chain and take appropriate action to break the error chain sequence.**

  A 3/O shares an incident where he noticed a fishing boat only five cables away and took prompt action. He shares,

  I was on watch; I was an independent watchkeeper. So, I told the Able-Bodied Seaman (AB) that you keep a good watch. I told the AB to go down and have some tea; by the time he opened the door, some reflection was observed. There was a fishing boat around five cables only; I took the proper action, took the wheel in hand steering, and altered the course. Then I called the engine room; I informed them that I would give a general alteration; please reduce the revolution per minute (RPM) if any load comes on the engine. So, I told them that everything was prepared, and I altered the course.

  A Master shared an incident where the C/O fell unconscious and the second officer, who is a rank below him, took charge of the situation. He shares,

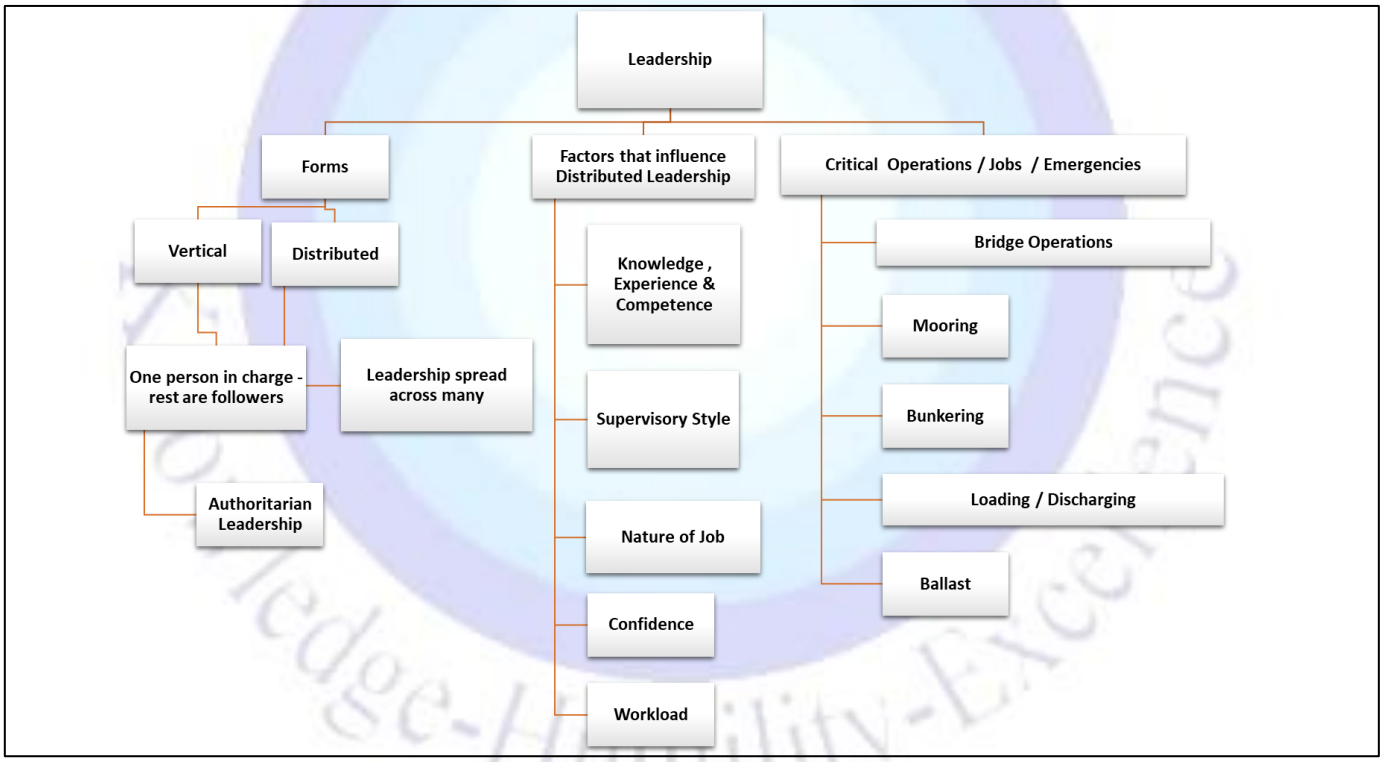
  I had an injury in a hold where, if a person fell from a certain height, he had to be transported from the cargo hold to the deck. Unfortunately, I had a C/O who fell unconscious after seeing

blood, so I saw my 2/O just taking charge and bringing him out. As I said, he was a well-performing guy. Everybody respected him, and he took over.

Forms of Leadership and Factors that influence its emergence

Three main themes that emerged from the data were prominent *forms of leadership, factors that affect/influence distributed leadership*, and *critical operations* that call for leadership to be displayed. Analysis of the interview transcripts revealed two forms of leadership that occur in tandem within the shipboard environment – *Vertical and Distributed*. Figure 3 depicts the forms of leadership and the factors that influence its emergence.

Figure 4: Forms of Leadership and factors that influence its emergence



Vertical leadership:

Analysis of the responses showed that vertical leadership is prevalent primarily because of the ship's hierarchical structure. The crew is organized hierarchically from Master downwards. Some of the responses suggesting the vertical hierarchical structure onboard the ship is mentioned below.

A Master emphasizes the hierarchical structure on board. He shares,

There is a hierarchy; I mean, it cannot be informal. Somebody is senior to somebody; somebody's junior to someone. All the time you're on board, everyone is aware of who's who, so it can never be an equal playing ground….

A C/E speaks of the authority vested in a single person. He shares,

Leadership is leadership, you know; your authority has to be there. For a country, you need a leader; for a ship, you also need a leader. So, there's a Captain and I don't see any difference.

While it is seen from the above instances that vertical leadership exists, a style of leadership that was considered rigid and not very effective by most respondents was the authoritarian style of leadership. This was quite evident from some of the responses below:

A C/O shared that the rigid approach is not effective when leading people. The essence lies in being more aware of people's needs and being diplomatic. He shares,

When I started, I used to be very hard in approaching people. I can understand that it does not work with humans; you have to be soft, you have to be diplomatic, and you still need to be very assertive. Just believing that since I have been given the responsibility and other people have been theoretically told to obey my orders, I used to take it very literally, but it didn't work. So, I needed to change myself and become more aware of people's needs, especially those under me, which seems to be working. It is working, and I am still improving.

A 3/O also shares his experience when being rude or arrogant was ineffective. He states,

I have experienced that being arrogant or rude cannot make much difference, guiding someone, and not being rude help…

Distributed Leadership: A Few Critical Incidents

All members of a team are encouraged to improve their leadership skills in a dispersed leadership paradigm. Everyone in the group has some level of leadership potential, and this is seen as a given. Leadership capacity and capability are not fixed, but they may be expanded. It is up to those in formal leadership roles to make sure that informal leaders can lead at the right moments and are supported in their efforts to make changes or innovate (Harris and Muijs, 2004). Below are some examples of leadership behaviours.

A Master shares an incident about a second officer who took charge. He shares,

I once had an injury in a hold where if a person fell from a certain height, he had to be transported from the cargo hold to the deck. Unfortunately, I had a C/O who fell unconscious after seeing the blood. I saw my 2/O just taking charge and bringing him out.

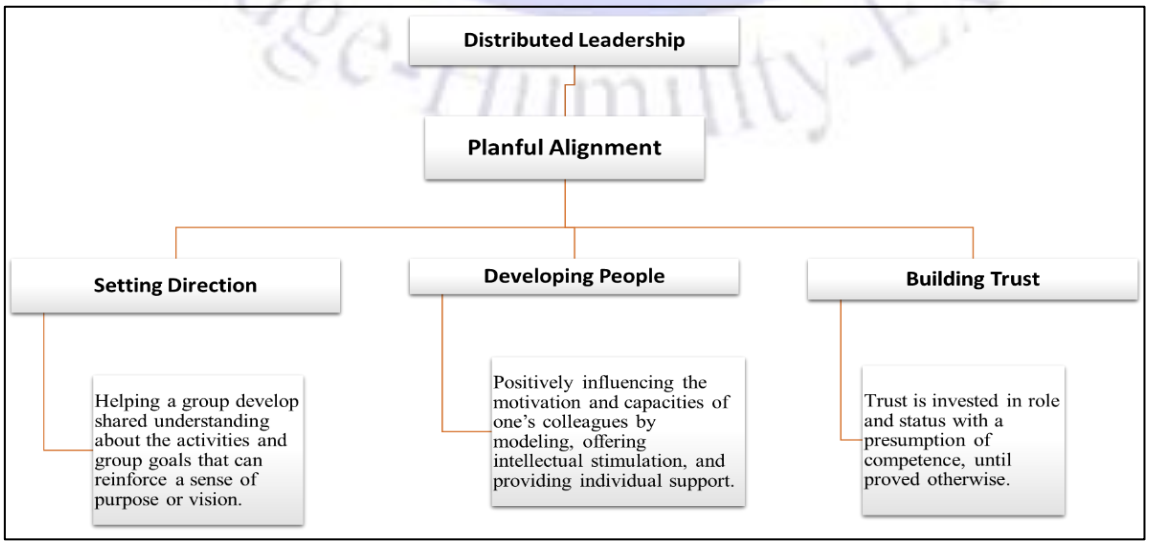
Distributed leadership does not imply that the formal leadership structures within organizations are removed or redundant.

Planful Alignment

Analysis of the transcripts revealed a configuration of distributed leadership where tasks or functions of ship officers were laid out and responsibilities were assigned to team members to carry out leadership functions. This form of leadership was called planful alignment.

Figure 4 depicts a framework of distributed leadership in the marine domain. Planful alignment was shown to be a common arrangement among sailors, according to the study. Organizational members have given careful consideration to the roles and responsibilities of people in positions of authority in this set-up. This agreement was reached among the sources of leadership about which source best carries out leadership practices or functions. Trust in one's leadership colleagues' motives, well-founded assumptions about one's leadership colleagues' capabilities, and a preference for cooperation over the competition as a way to increase productivity are some of the shared values and beliefs that seem likely to be associated with planful alignment.

Figure 5: Framework of Distributed Leadership



Three sub-themes under the central theme 'Planfully aligned leadership' were identified: *Setting Direction, Developing People, and Building Trust.*

- *Setting Direction:* To motivate their subordinates, leaders must use a series of techniques known as setting direction (Fullan, 2003). Settling down on a course of action is all about creating a common goal and expressing that goal to students. Educational leaders help to build shared meanings and understandings to support the school's goal because individuals usually respond based on how they perceive things. The validity and effectiveness of a school are bolstered when students' experiences, learning, and schooling are communicated to members of the community. (Liethwood and Riehl, 2003). Leaders that are adept at focusing attention on the most important components of the school's vision can convey the notion clearly and persuasively (Leithwood & Riehl, 2003).

  A Master shares how he initially sets the direction through meetings and conducting drills. This helps the team develop a shared vision and communicate the direction. He shares,
  See, there are times when we carry out meetings and a few drills; I get people to start up, and when I find they can manage, I take a step back, and then I let them lead. Because they are the future, I've had chief officers; at times, I've had second officers, even third officers…

  A Master shares,
  I observed that if you keep encouraging him, keep prodding him in the correct direction the behaviour changes. Still, the other problem in shipping is the paucity of time and multitasking, which you do quite a few times.

- *Developing People:* Developing People was the second subtheme of planful alignment. This is another component of planful alignment noted in most of the responses. Developing people comprises providing individualized support and consideration, offering intellectual stimulation, and modelling appropriate values and practices (Leithwood & Seashore-Louis, 2012).
- Effective leaders promote the learning and growth of professionals. Effective leaders lead by example and others emulate their behaviour. Leaders strengthen peoples' beliefs about their abilities and capacity to bring about change (Leithwood and Riehl, 2003). Instances of developing people were identified in the transcripts.

A Chief Officer shares how his Master used to teach him to pick up the next rank's (Chief Officer's) job. He says,

One Captain, he was teaching me literally; you come, sit down, I'll teach you how to when I was a 2/O. He used to teach me, saying, I know that you are 2/O now; you will be C/O tomorrow. He used to call me and say, come sit down. Then for half an hour or forty-five minutes, he would teach me something.

- *Building Trust:* The third subtheme of planful alignment is Building Trust. A third component that was explored is termed 'building trust' for the current study. This is also similar to building a collaborative culture. Drawing from education, effective school leaders help develop school cultures that encourage caring and building trust among team members. The shipboard environment sets the atmosphere and the context in which work is carried out.

A 3/O speaks of when his chief officer trusted him to perform ballasting and deballasting. He shares,

When I was a cadet, I didn't have much responsibility or many things on my shoulders. Hence, the chief always trusted me with something, whether it was ballasting, deballasting, anything to do in port, or anything like that; the crew always looked up to me and said, ''OK, this guy knows his job though he's a trainee.''

Within the maritime system, safety rules, regulations, and procedures are all aspects of the situation that play a crucial role in encouraging safe work practices. As such, these elements are deeply interconnected and mutually constitutive. It involves more than one leader. It is viewed as a product of the interactions of leaders, followers, and their situations. The follower forms an integral part of the dynamic leadership system.

5. SUMMARY

It is clear that there has been a change in the way leadership is perceived over the years. From a commanding authoritarian style which was prominent in the good old days of shipping, there

seems to be a shift towards the leader delegating responsibilities and other team members displaying leadership to avert a dangerous situation from developing. The follower or team member also plays an integral role in performing the assigned activities.

Qualitative analysis showed that planfully aligned leadership was prevalent among seafarers. Responsibilities are deliberately distributed to those individuals and groups best placed to lead a particular function or task. It is interesting to note how leadership is distributed onboard the ship. This second form of leadership prevalent onboard is 'distributed leadership'; however, seafarers seem to have little or no understanding of this approach.

There were several instances in the qualitative responses where operational level officers/those of a junior rank rise to the occasion and manifest leader behaviours. Rather than viewing leadership in terms of a single person at the top, leadership is a practice involving the careful alignment of roles and responsibilities. Leadership does not rest with the Master alone; it is extended to the team members to take prompt actions when required.

Analysis of the responses concerning the behaviours displayed during critical operations revealed that it is not a one-man show. While one cannot deny the presence of the formal leader, there are instances of leadership among other crew members who interact with the formal leader and emerge as leaders in that situation.

5.1 Phase 2

Descriptive Statistics and Reliability Index

Data were summarized using descriptive statistics to provide a comprehensive picture. Table 2 summarizes the findings. It illustrates the mean and standard deviation of data collected from 216 individuals in a study.

Table 2 shows the reliability index for the three dimensions of the planfully aligned leadership scale. The mean score of the planfully aligned leadership scale was 4.16, and the reliability index was 0.99. The mean score of the dimension Setting Direction was 4.18, and the reliability index was 0.95. The mean score of the dimension Developing People was 3.63, and the reliability index was 0.99. The mean score of the dimension Building Trust was 4.14, and the reliability index was 0.99.

Table 2: Descriptive Statistics and Reliability Index

	Minimum	Maximum	Mean	SD	Reliability
Planfully aligned leadership scale	25	125	4.16	0.81	0.99
Setting Direction	1	5	4.18	0.81	0.95
Developing People	1	5	3.63	0.75	0.99
Building Trust	1	5	4.14	0.84	0.99

*N = 216

The above findings suggest that planfully aligned leadership was prevalent among seafarers. Behaviours associated with setting direction, developing people, and building trust were also identified. Behaviours associated with setting direction, developing people, and building trust were also evident from the means scores.

Summary:

The quantitative findings suggest that planfully aligned leadership practice was prevalent among seafarers aboard merchant ships. Behaviours associated with setting direction, developing people, and building trust were also identified.

The responses to the qualitative section suggested instances of planfully aligned leadership and effective leader behaviours such as alerting, informing, and reporting.

Responses showed that planfully aligned leadership was evident in the shared roles which emerged between the team members involved in the critical incidents cited by the respondents.

Qualitative analysis also showed that vertical leadership was evident in many situations; the authoritarian leadership style was identified in many of the responses. Behaviours associated with this leadership style were described as ineffective.

5.2 Phase 3

Results:

This section addresses research questions two to seven.

RQ 2: What is the strength and direction of the relationship between planfully aligned leadership (PAL) and emergency response (ER) among team members?

Ordinary least square (OLS) regression was employed to determine if leadership contributed to the effective response of team members to the emergency. As Table 3 indicates, there is a positive and significant relationship between PAL and ER. Table 6.13 displays effect size measures (R2) and adjusted R2 for the model, and Table 6.14 displays pooled unstandardized regression coefficients (B) and standardized regression coefficients (β). The Ezekiel adjusted R2 value indicates that PAL predicted just 47.8 percent of the variability in ER.

Table 3: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.297	.261		-1.140	.259
	PAL Mean	.526	.071	.698	7.423	.000
a. Dependent Variable: ERM						

Table 4: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.962	1	12.962	55.097	.000[b]
	Residual	13.644	58	.235		
	Total	26.606	59			
a. Dependent Variable: ERM						
b. Predictors: (Constant), PAL Mean						

RQ 3: What is the strength and direction of the relationship between the three dimensions of planfully aligned leadership viz. SD, DP and BT, and ER?

When the three dimensions of PAL were examined individually, each dimension appeared strongly linked to emergency response. However, Developing People is the most potent contributor as it independently explained about 49.5% of predicted ER.

Table 5: SD, DP, and BT Dimensions of Planfully aligned leadership as a Predictor of Emergency Response from Ordinary Least Squares Regression

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.673[a]	.453	.444	.50083	.453	48.072	1	58	.000
a. Predictors: (Constant), SD									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
2	.710[a]	.504	.495	.47700	.504	58.936	1	58	.000
a. Predictors: (Constant), DP									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
3	.662[a]	.438	.429	.50758	.438	45.269	1	58	.000
a. Predictors: (Constant), BT									

Table 6: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.058	1	12.058	48.072	.000[b]
	Residual	14.548	58	.251		
	Total	26.606	59			
a. Dependent Variable: ERM; b. Predictors: (Constant), SD						
Model		Sum of Squares	Df	Mean Square	F	Sig.
2	Regression	13.410	1	13.410	58.936	.000[b]
	Residual	13.196	58	.228		
	Total	26.606	59			
a. Dependent Variable: ERM; b. Predictors: (Constant), DP						
Model		Sum of Squares	Df	Mean Square	F	Sig.
3	Regression	11.663	1	11.663	45.269	.000[b]
	Residual	14.943	58	.258		
	Total	26.606	59			
a. Dependent Variable: ERM; b. Predictors: (Constant), BT						

RQ 4. After controlling for demographic measures, what is the strength and direction of the relationship between PAL and ER? What is the contribution of the demographic criteria such as age and contract period?

The hierarchical OLS regression analysis was performed between emergency response as the criterion variable, age and contract period as predictor variables in the first block, and leadership as a predictor variable in the second block. Tables 7 to 9 display effect size measures (R2), change in R2, adjusted R2, F Change, and its Significance level for the entire model. Table 6.19 displays pooled unstandardized regression coefficients (B), standardized regression coefficients (β), and model significance p-value. R2 was statistically insignificant for the first block but highly significant for the full model. The final adjusted R2 value indicates that about 50 percent variability in emergency response was predicted by leadership and demographic measures. The role of age and contract period as predictors were insignificant. The change in R2 for the second block was 47.4 percent.

It indicates that the strength and direction of the relationship between PAL and ER are positive and strong after controlling for demographic measures. The contribution of the demographic criteria such as age and the contract period are almost trivial.

Table 7: ANOVA

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.162[a]	.026	-.008	.67423	.026	.764	2	57	.470
2	.707[b]	.500	.473	.48733	.474	53.106	1	56	.000
a. Predictors: (Constant), ContractPd, Age									
b. Predictors: (Constant), ContractPd, Age, PAL Mean									

Table 8: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.695	2	.347	.764	.470[b]
	Residual	25.911	57	.455		
	Total	26.606	59			
2	Regression	13.307	3	4.436	18.677	.000[c]
	Residual	13.299	56	.237		
	Total	26.606	59			
a. Dependent Variable: ERM						
b. Predictors: (Constant), ContractPd, Age						
c. Predictors: (Constant), ContractPd, Age, PAL Mean						

Table 9: Coefficients Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.994	.608		1.633	.108
	Age	.018	.024	.132	.723	.473
	ContractPd	.008	.039	.040	.218	.828
2	(Constant)	-.711	.498		-1.428	.159
	Age	.014	.018	.101	.772	.444
	ContractPd	.004	.028	.017	.131	.896
	PAL Mean	.520	.071	.690	7.287	.000
a. Dependent Variable: ERM						

RQ 5. After controlling the workload, what is the strength and direction of the relationship between PAL and ER? What is the contribution of workload?

Hierarchical OLS regression analysis was performed between emergency response as the criterion variable, workload as the predictor variable in the first block, and leadership as a predictor variable in the second block. Tables 10 to 12 display effect size measures (R2), change in R2, adjusted R2, F Change, and its Significance level for the entire model.

Table 6.22 displays pooled unstandardized regression coefficients (B), standardized regression coefficients (β), and model significance p-value. R2 was statistically significant for both blocks. The adjusted R2 value in the first block indicates that about 28.5 percent variability in emergency

response was predicted by the workload on leaders. The changes in R2 for the second block when leadership was introduced became 53.8 percent and the R2 difference was 25.7%.

It indicates that the strength and direction of the relationship between PAL and ER after controlling the workload is positive and strong. Workload variable also plays a vital role in the emergency response. However, its relationship with the emergency response is negative and statistically significant.

Table 10: ANOVA

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.545[a]	.297	.285	.56782	.297	24.520	1	58	.000
2	.744[b]	.554	.538	.45627	.257	32.825	1	57	.000
a. Predictors: (Constant), WL									
b. Predictors: (Constant), WL, PAL Mean									

Table 11: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.906	1	7.906	24.520	.000[b]
	Residual	18.700	58	.322		
	Total	26.606	59			
2	Regression	14.739	2	7.370	35.400	.000[c]
	Residual	11.867	57	.208		
	Total	26.606	59			
a. Dependent Variable: ERM						
b. Predictors: (Constant), WL						
c. Predictors: (Constant), WL, PAL Mean						

RQ 6. What is the strength and direction of the relationship between L and ER after controlling for power distance that prevails between the formal leader and team members? What is the contribution of power distance?

Hierarchical OLS regression analysis was performed between emergency response as the criterion variable, power distance as the predictor variables in the first block, and leadership as a predictor

variable in the second block. Tables 13 to 15 display effect size measures (R2), change in R2, adjusted R2, F Change, and its Significance level for the entire model. Table 6.25 displays pooled unstandardized regression coefficients (B), standardized regression coefficients (β), and model significance p-value. R2 was statistically significant for both blocks. The adjusted R2 value in the first block indicates that about 29.1 percent variability in emergency response was predicted by power distance. The change in R2 for the second block when leadership was introduced was 51.2 percent and the R2 change was 22.5%.

Table 12: Coefficients Results

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.631	.421		8.633	.000
	WL	-.286	.058	-.545	-4.952	.000
2	(Constant)	1.143	.550		2.077	.042
	WL	-.152	.052	-.290	-2.922	.005
	PAL Mean	.428	.075	.568	5.729	.000
a. Dependent Variable: ERM						

It indicates that the strength and direction of the relationship between PAL and ER are positive and robust after controlling for power distance. The variability caused by power distance on emergency response is 29.1 percent which is statistically very significant. The coefficient results indicate a negative and significant relationship between power distance and emergency response.

Table 13: ANOVA

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.551[a]	.303	.291	.56536	.303	25.239	1	58	.000
2	.727[b]	.528	.512	.46921	.225	27.207	1	57	.000
a. Predictors: (Constant), PD									
b. Predictors: (Constant), PD, PAL Mean									

Table 14: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.067	1	8.067	25.239	.000[b]
	Residual	18.539	58	.320		
	Total	26.606	59			
2	Regression	14.057	2	7.028	31.925	.000[c]
	Residual	12.549	57	.220		
	Total	26.606	59			
a. Dependent Variable: ERM						
b. Predictors: (Constant), PD						
c. Predictors: (Constant), PD, PAL Mean						

Table 15: Coefficients Results

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.817	.257		10.970	.000	2.303	3.331
	PD	-.262	.052	-.551	-5.024	.000	-.366	-.158
2	(Constant)	.602	.475		1.266	.211	-.350	1.553
	PD	-.115	.052	-.242	-2.231	.030	-.218	-.012
	PALMean	.427	.082	.566	5.216	.000	.263	.590
a. Dependent Variable: ERM								

RQ 7. Is distributed leadership a better predictor of emergency response among team members than authoritarian leadership?

We conducted an Independent Sample T-test to observe the mean difference in the emergency response of team members of the two experimental groups, i.e., PAL and AL. The mean of the PAL group (M = 2.15, SD = .31) is significantly higher than the AL group (M = 1.0, SD = .36). The p-value of Levene's test is $p > 0.05$. A non-significant p-value of Levene's test shows that the variances are equal, and there is no difference in variances of both groups.

Therefore, we counted only on the p-values obtained from the independent samples t-test, which is statistically significant, $p < 0.001$.

It indicates that distributed leadership or PAL is a better predictor of emergency response among team members than authoritarian leadership.

Table 16: Group Statistics

	L	N	Mean	Std. Deviation	Std. Error Mean
ERM	1.00	30	2.1567	.31479	.05747
	2.00	30	1.0033	.36102	.06591

Note: ERM:

Table 17: Independent Samples Test Results

			Levene's Test for Equality of Variances		t-test for Equality of Means						
										95% Confidence Interval of the Difference	
			F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
ERM	Equal variances assumed		.021	.886	13.188	58	.000	1.15333	.08745	.97828	1.32838
	Equal variances not assumed				13.188	56.944	.000	1.15333	.08745	.97821	1.32845

Note: ERM:

5.3 Summary

This phase was an attempt to examine the relationship between leadership and emergency response. A simulation was used to analyse the relationship between planfully aligned leadership and emergency response and authoritarian leadership and emergency response. In the simulation, an attempt was made to increase the workload gradually.

A manipulation check was used to gauge the effectiveness of the manipulation in this simulation. *The T-test results indicated that team members' responses to the two types of leadership prompt*

in the manipulation were triggered by the manipulation. The participants in both groups were meticulously involved in the simulation, and they were not subject to boredom or fatigue. Hence, the probability of boredom and disengagement impacting the emergency response of team members was ruled out.

Quantitative analysis of the findings showed a positive and significant relationship between planfully aligned leadership and emergency response. When the three dimensions of planfully aligned leadership were examined individually, each dimension appeared strongly linked to emergency response. However, Developing People was the most substantial contributor as it independently explained about 49.5% of predicted ER. Results indicated that the strength and direction of the relationship between planfully aligned leadership and emergency response after controlling for demographic measures were positive and strong. The contribution of the demographic criteria such as age and contract period were almost trivial. Results indicated that the strength and direction of the relationship between planfully aligned leadership and emergency response after controlling for workload were positive and strong.

The workload variable also played a vital role in the emergency response. However, its relationship with emergency response was negative and statistically significant. The findings also showed that the strength and direction of the relationship between planfully aligned leadership and emergency response after controlling for power distance were positive and strong. Lastly, the results showed that planfully aligned leadership was a better predictor of emergency response than authoritarian leadership teams.

6. CONCLUSION

Among merchant mariners on board ships, researchers examined how distributed leadership practices affect safety. Qualitative and quantitative analyses of data suggested that merchant mariners have a strong preference for leaders who are strategically oriented.

There is a strong and positive correlation between emergency response and planfully aligned leadership. After controlling for demographic variables such as age, experience, power distance, and workload, planfully aligned leadership predicts the emergency response of team members considerably. Workload and emergency response have a negative and significant association, as

do power distance and emergency response. Planfully aligned leadership is a better predictor of emergency response than authoritarian leadership.

Theoretically, distributed leadership is a fairly recent idea to emerge. Individual leaders, their qualities and behaviour, the standards they should meet (Gronn 2003), and their influences on followers (Camburn et al. 2003) have dominated the leadership literature. The fact that we have taken so long to notice and establish the conceptual frameworks that go along with distributed leadership is astonishing. We must not become blinded by the concept's constraints and our inability to think about it outside of it once we've begun to explore it. New ways of thinking about leadership practice and implementing practice in a deliberate manner are necessary. This shift is made possible by the use of distributed leadership.

6.1 Practical and Theoretical Implications

This research has contributed to knowledge in leadership and has implications for leadership training and development. Instead of focusing on 'what' leadership is, it delves into the 'how' of leadership and how leadership is manifested in seafarers' day-to-day operations and interactions. Considering the literature on distributed leadership gaps, this study helps broaden the scope beyond the educational context. The review of empirical and theoretical findings indicated that most work on the concept of DL is carried out in the academic context, especially on teacher leadership.

While prior studies limit the understanding of safety leadership, a distributed approach to leadership broadens one's understanding of this phenomenon by considering the follower and the situation. The findings of this study challenge existing leadership views as being focused and individualistic.

Implementing distributed leadership practice within the maritime context has important implications:

Distributed leadership can only work and thrive when the cultural and structural conditions for it are established by people in positions of formal authority. An organization’s structure establishes the specific tasks and roles of each employee within the larger framework of the business. The prevalence of informal interactions and a low power distance between supervisor and subordinate make DL techniques an ideal fit for the workplace.

Distributing leadership in any form may not necessarily be the answer. How leadership may be distributed is dependent on the organizational culture, people's readiness to change, and the developmental needs of the organization. Relationships among people and trust among people involved also play an important role.

6.2 Limitations and Pointers for Future Research

Literature on distributed leadership is still not thorough enough to offer a deeper understanding of the anatomy of distributed leadership and the relationship between distributed leadership and organizational development and change. This study explores planfully aligned leadership among seafarers and its relationship to emergency response and makes it worth further investigation and scrutiny.

Future research could delve into how leadership is distributed in other high-risk environments. It would be worthwhile to analyse the factors that facilitate distributed leadership, such as team member motivation, competency level, and self-efficacy. Future studies could also consider applying and validating the distributed leadership framework studied in this research. Studies exploring the organization's culture, readiness to change, and developmental needs would be beneficial to broaden the scope of distributed leadership within the maritime industry. Research studies using longitudinal design would be beneficial to explore distributed leadership further. Looking into hybrid patterns of distribution is also another key challenge for researchers.

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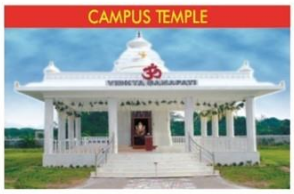

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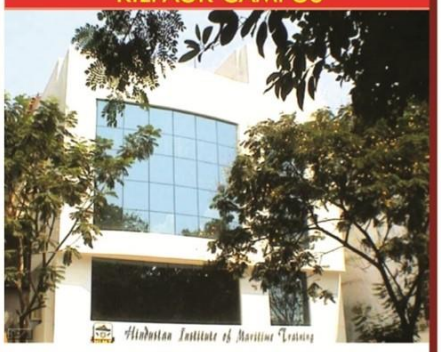

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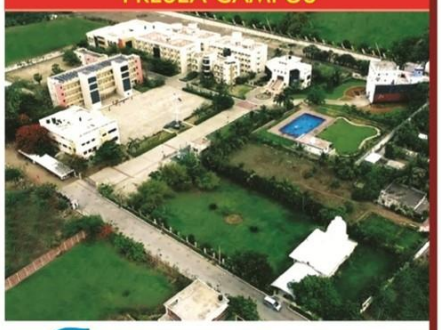

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