

# **STAKEHOLDERS INFLUENCE ON VESSEL OPERATIONAL SAFETY AND EFFICIENCY**

**Candidate name: Faisal Fiaz**

**Buskerud and Vestfold University College**

Faculty of Technology and Maritime Sciences

**MASTER THESIS**

**15 May 2014**

### **Abstract**

In the performance of a voyage, a vessel master has to perform different vessel activities. He takes orders, advices and information from different parties and is under the influence of various expectations. The vessel operations are surrounded by different stakeholders each having their own objectives and interests. Among a number of different stakeholder's interests in vessel operations "safety and efficiency" are of significant importance. The purpose of this research is to seek how vessel operations are influenced by different stakeholders and aims at the identification and influence analysis of stakeholders concerning the factors of safety and efficiency. The research performed was a qualitative research with cross-sectional research design. The main data collection techniques were semi-structured interviews and secondary data. Stakeholders' analysis has been performed and a conceptual network model of stakeholders influence on vessel master, with different vessel operations, has been shown. This research found that stakeholders of the vessel operations have varied level of influence and relationships related to safety and efficiency which are dependent on the vessel operational stage and contract type. External stakeholders and legislative authorities are found to be safety influencer whereas charterers as efficiency influencer. The shipowners are safety focused with the exception of voyage charter party, where the focus is efficiency. Both shipowners and charterers, when having the responsibility of commercial management of vessel, have negative influence on the vessel operational safety.

*Keywords:* Maritime stakeholder analysis, Maritime network model, Safety and efficiency in maritime, Stakeholders influence

### **Acknowledgement**

Foremost, I would like to articulate my sincere gratitude to my advisor, Professor Kjell Ivar Øvergård for his continuous support and motivation. His guidance helped me in all the time of my research and writing of this thesis report. I could not have imagined having a better mentor and advisor for my research work.

Besides my advisor, I would like to express my special thanks to all those who provided me the possibility to complete this report.

In addition, I would like to acknowledge and thanks to interview persons who help me in this research work.

Finally, to my caring and supportive wife, my deepest gratitude also goes to you. Your encouragement when the times got rough is much appreciated. Your support was a constant source of comfort and relief and helped me to complete the project within the limited time frame.

## Preface

This report is the master thesis report which is the mandatory requirement for the Master of Maritime Management at Buskerud and Vestfold University College, Norway.

The report is very useful for those who are working in Maritime sector. As the work presented in the report is the first effort in the Maritime sector and will be beneficial for the industry people. The author develops a stakeholder network model for the vessel's operation. This research work conducted by author is original, unpublished and independent work.

I would firstly thank my supervisor Professor Kjell Ivar Øvergård, Head of Research, Department of Maritime Technology and Innovation. From the beginning till the end his constructive feedback and suggestions has made the accomplishment of the study possible. Without him, I could not have dealt with such a challenging project and could not have completed it in time.

Buskerud and Vestfold University College

May 15, 2014.

Faisal Fiaz

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### List of Abbreviations

COLREG	Collision Regulations/ Convention on International Regulations for Preventing Collisions at Sea
ETTO	Efficiency-Thoroughness Trade-off
IMO	International Maritime Organization
ISM	International Safety Management
LL	Load Line
MARPOL	Marine Pollution
SOLAS	Safety of Life at Sea
STCW	The International Convention on Standard of Training, Certification and Watch keeping for seafarer
UNCLOS	United Nations Convention on the Law of the Sea
VTS	Vessel Traffic Service

## 1. Societal Relevance

‘Who really counts?’ is and has been a critical question in the business world which getting growing attention and needs to be answered. This thought widens the horizon of doing business, to look outside the boundaries of the firm and to address the environment surrounding the firm. This helps a firm to frame the relationship of actors inside and around the firm. The term ‘stakeholders’, is broadly used as a mean to describe a wider and more inclusive public involvement. For any firm, to meet its objectives, it is necessary to understand the existence and importance of people inside and around. It is of vital importance for success, to meet the expectation of the key people in specific and generally of the society.

‘Why stakeholder matters?’ the notion of stakeholder itself signifies that any state of affairs in a social world is surrounded by various entities having some kind of stake related to the situation. The stakeholder interacts and depends on each other in meeting their objectives. The increasingly interconnected nature of the world further increases the importance of the stakeholders to be attended properly. The world has scarce resources and shared power, no single business or entity is capable of functioning alone. This is said differently, “*those groups without whose support the organization would cease to exist*” (Mitchell, Agle, & Wood, 1997, p.858).

The concept has been translated and being used in various disciplines and businesses for the purpose of stakeholder management, stakeholder analysis, policy making and research. This wide spread conceptualization in various areas signifies the importance of stakeholders “*persons, groups, neighborhoods, organizations, institutes, societies even the natural environment*” (Mitchell et al., 1997, p.855) and their potential to influence the “*objectives of organization*” (Freeman, 1984). Stakeholders influence the outcome by using their power in their desired direction (Karim, Rahman, Berawi, & Jaapar, 2007). To better understand stakeholder environment, stakeholder analysis as a tool which helps to identify, manage and analyze the impact of involved actors influence.

Although the concept is widely used but maritime sector lacks on the literature of stakeholder analysis. The purpose of this research is to seek how vessel operations are influenced by the conglomerate of stakeholders and aims at the identification and influence analysis of stakeholders concerning the factors of safety and efficiency.

## 2. Research Background

### 2.1. Stakeholder Analysis and Maritime Sector

The concept of Stakeholder analysis is universally used in the business management literature and practices. Stakeholder analysis provides valuable insight regarding the characteristics (actions, attitudes, behavior and interests) of stakeholders. The review of literature gives an impression of significance and existence of stakeholders and their influence. However, the maritime sector has a complicated universe of stakeholders which influence the operations of a vessel to achieve their desired objectives. Their nature of stake determines their objective and hence the level of influence.

Among a number of different stakeholder's interests in vessel operations "safety and efficiency" are of significant importance. The increasing trend in global trade give rise to market competition which put commercial operator of vessel under huge pressure. This increases the concern for efficient vessel operation which is influenced by a number of stakeholders. The purpose of any commercial voyage is to earn profit through an efficient but at the same time safe voyage. However, in past, lack of safety standards leads to a number of accidents which give rise to strict safety rules. For example, in 1912, the collision of Titanic with iceberg leads to the adaptation of SOLAS convention which is also considered as the most important document on safety for the commercial vessels (IMO). Moreover, it is also pointed out by IMO that most of incidents were caused by the faults of management or absence of the compliance with the safety rules (IMO). More often, objective pressure of various stakeholders may make it viable to compromise on the standards of safety or efficiency. The extent for safety and efficiency may vary from stakeholder to the stakeholder. For example, IMO concerns for safety will be different as compared to the charterers who apply low safety standards to achieve high profitability margin.

The stakeholder theory has been applied to a number of different fields including corporate social responsibility, education, environmental management, ethics, health, information technology, management, public policy and research management (Kivits, 2013). However, the literature lacks in considerable work on stakeholder influence analysis on vessels operations; safety and efficiency, which are key determinant of vessel operations.

## 2.2. Vessel Operational Safety and Efficiency

Market requires the transfer of goods from one geographic location to another location but with constrain of time, cost, fuel, speed and many more. Shipping is the backbone of the world trade. It is generally accepted that ninety percent of the world trade is seaborne mentioned by a number of authorities i.e. IMO, International chamber of shipping etc. The global market is changing, economic ups and downs makes market place more vulnerable. In this commercialize market place, safety and efficiency has become more important than ever before besides other factors like the human casualties, environmental and infrastructural damage and vessel and cargo damage. The safety is a major concern for many stakeholders because if accident happens, it has multiplying effects on many parties.

Maritime safety, generally, implies the safety of life, vessel, cargo and marine environment. The same principles of safety guide the vessel operations. Vessel operational concept of safety is constructed of safety of life, crew, cargo, marine environment, port infrastructure and other vessels while performing the vessel operations. The vessel operational safety can be categorized among external and internal factors. Internal factors are related to the vessel itself, which includes the condition and seaworthiness of vessel, on board equipment, safety procedures of operation performance, safety of on board crew etc. External factors effecting safety can be numerous and includes vessel owner, charterer, port authorities, VTS, pilot, on shore loading and unloading equipment, weather etc. The positive effect of combination of internal and external factors leads to a successful and safe voyage. However, the negative impact of these factors may result in compromise on the safety standards.

More often safety is compromised for achieving high efficiency. Efficiency means here minimum utilization of the resources for the achievement of the objectives. The determinants of efficiency can be many but factors associated with efficiency of a voyage can be cost, fuel, speed, time and distance. Moreover, a voyage related efficiency can be classified as technical efficiency and economic efficiency. Our aim here is to consider the process of whole voyage. A voyage requires operational efficiency in the performance of operations i.e. technical efficiency whereas the major aim of any commercial voyage is to achieve economic efficiency.

A voyage can be regarded as efficient if it consumes less fuel, savings in distance and time by incurring less expense which leads to greater profitability. However, a voyage is

comprised of various operations and the efficient performance of all operations can only result in an efficient voyage.

The level of efficiency is a function of various factors and can vary if the circumstances change like a different voyage, shipping sector or ship type. However, one of the most important considerations is the involvement of stakeholders that can affect the efficiency related factors. Efficiency influencer stakeholder weighs efficiency as expense per revenue i.e. how much expense is occurred in getting the revenue, which is the desired objective.

Safety and efficiency are both at the heart of vessel operations. Every operation should be performed in such a way that makes the operations efficient without scarifying the standard of safety. In reality, the vessel operations are surrounded by a universe of parties having their own stake which can affect safety and efficiency. The achievement of objectives of different stakeholders influences the vessel master to make tradeoff between safety and efficiency. A master is responsible for the safety of his crew, vessel, cargo, marine environment, with compliance of rules and regulations, above all, he needs to consider the interests of many parties in relationship i.e. charterer, shipowners, cargo owners etc. All this build up the mountain of pressure and limit him to perform professionally rather than under pressure or influenced.

Trade-off between safety and efficiency is not new. People and firms came across many everyday working situations where they made choices. They have to make decisions between safety and efficiency or between efficiency (resources spent on doing an activity) and thoroughness (resources spent in preparation of an activity) as explained by the Hollnagel (2009). He presented the theory of ETTO principle (Efficiency-Thoroughness trade-off) and argues that *“If demands for productivity or performance are high, thoroughness is reduced until the productivity goals are met. If demand for safety is high, efficiency is reduced until safety goals are met”* (Hollnagel 2009, p.15). Greater thoroughness has impact on enhancing the safety. However, both things are not possible to exist together in the real situations. Further, he pointed out the reasons for trade-off which also include limited resources i.e. time or commercial pressure to do thing in the ordered way(Hollnagel, 2009)

Shipping history is full of such incidents where commercial pressure influences the vessel master to take such decisions which he would not have taken otherwise. One of such accident is of M/V Lena, a dry cargo vessel, on 08/06/79, started journey from Glasgow and was heading to Rouen/France. The weather conditions were not favorable and visibility was near to

zero due to fog. The master was required to reduce the speed due to bad weather but he did not do so reduce the speed in bad weather and collided with a fishing boat. The master was under pressure by the office instructions “*urgent arrival at Rouen, immediate loading and departure*” (Goulielmos & Gatzoli, 2012, p.75). These orders influenced captain to not reduce the speed in bad weather and to fulfill the office instructions.

In another incident, *Shen Neng* went grounded due to the similar reasons, by going through unsafe shortcut in Australia’s Great Barrier Reef to save time and resulted in oil spill (Goulielmos & Gatzoli, 2012). There are many other incidents which show the pressure on master to take decision in the interest of involved parties by compromising safety or efficiency.

An analysis of the stakeholders is required to identify and determine the influential capacity of stakeholders in vessel operation. In the light of literature, it is necessary to have a stakeholder identification theory to distinguish between stakeholders and non-stakeholders (Mitchell et al., 1997).

For the positive impact of the stakeholders, they should be identified and mapped to assess their power and influence (Bourne & Walker, 2005). Furthermore, each firm individually should be focusing on the strategies to identify the most influential stakeholders and analyze their influence (Bakker & Hond, 2008).

### 2.3. Maritime Shipping Segments

In the commercial shipping segment, two types of freight shipping can be identified; tramp and liner shipping. Each of the shipping trade segments has its own distinctiveness and characterizes various types of stakeholders. Moreover, trade segment also impact how the stakeholder influence the vessel operations. These both shipping trades are present in deep and short sea shipping segments. Liner shipping provides the transfer of cargo or passengers at fixed schedule between two named ports whereas tramp shipping has no fixed schedule or predefined ports and can be hired for single voyage or for frequent use. The tramp trade is characterized with all types of ships carrying all types of cargoes but most frequently it is used in bulk, oil and gas.

This research also studies the vessel operations in the tramp shipping segment. In comparison with liner shipping, it can be considered that tramp trade has more scope in terms of varying relationship and stakeholders because it exemplifies different contracts types. Further,

with no fixed schedules or business will increase the competition and build market pressure on the ship operator to search business for the vessel. This gives a better ground to assess the influence of stakeholders rather than in liner trade where everything is fixed and scheduled. Moreover, in the tramp trade, ships are provided on hire or chartering which also indicative of various relationships among stakeholders and hence produce different levels of influence on vessel operations. Tramp shipping is contract carrier and they are involved in voyage, time and bareboat charter party contracts.

Chartering is a contract in which shipowners rent out the vessel to the charterer for the use. It is a way for shipowners to earn revenue and for charterer to use the vessel for transporting the goods or passengers. Charterer may hire the vessel for a single voyage, for some specific time, or for long term basis. Who, ship owner or charterer, perform management services, technical and commercial, depends on the contractual relation. Technical management includes; compliance of vessel with laws, dry docking, repair, alteration and supply of spares, stores and lubricating oil etc. and commercial management includes, arranging employment of the vessel, bunker fuel, calculating freight or hire, providing voyage instructions and assigning agent etc. All the negotiations between charterer and owner are written down in the charter party which defines their roles and responsibilities. The three main categories of chartering a ship are voyage charter party, time charter party and bareboat charter party.

**Voyage charter party.** In voyage charter, a vessel is chartered for a single voyage between designated ports, for transporting specified cargo (Branch, 2007). The owner charge freight either a fixed lump sum amount or on the basis of per unit/weight. Charterer does not play any role in the operations of vessel. His main duty is to deliver the goods at loading port and to make arrangement for receiving the goods from discharging port. The vessel management, both commercial and technical management is with the owner. All the costs are borne by ship owner like financial costs (equity, loan capital, interest), voyage costs (bunkers, port cost, loading/discharging cost, and commissioning etc.) and daily running costs (crew, insurance, repair, maintenance, stores etc.).

**Time charter party.** In time charter, a vessel is chartered for some specific period of time (Branch, 2007). It depends on the charterers that how many times they use the vessel within that agreed time. They are free to use the vessel to fulfill their purposes but by keeping within the contractual limits. The charterer pays hire for that time period, mostly in advance. The owner is



responsible to provide technical management while commercial management is with charterer. Financial costs and daily running costs are borne by the shipowners while charterer is responsible for voyage related costs like cost of bunker fuel and store consumed.

**Bareboat charter party.** Bareboat charter is the vessel hire by the charterer for a long period (Branch, 2007). So the vessel is delivered to the charterer for agreed period of time and charterer has to arrange for the crew, fuel, insurance, and other provisions. Hire is paid for the vessel, mostly in advance, either on the basis of per day or per dwt. Both the technical and commercial management is with the charterer. Shipowners only pay financial costs of the vessel. While the voyage costs and daily running costs are with charterer.

#### 2.4. Vessel Master

Despite of the shipping segment, trade or ship type, master is “*absolute in charge of the vessel*” (Branch, 2007). He has a number of duties and responsibilities to perform. He acts as the ship owners’ representative and responsible for all the voyage activities and operations. Master holds a wide authority over the vessel’s activities for the efficient running and safety of the vessel. The International safety management code (ISM), resolution A. 741(18) part A section 5, requires the management companies to define the authority of the shipmaster with regard to safety matters. However, commercialized era has made the successful performance of his duties more complex.

In the performance of vessel activities, master interacts with a number of different parties surrounding the vessel operations arena. He takes orders, advices, information etc. from a number of parties and acts under the expectations of various parties. During the performance of vessel operations, considerable pressure is placed on master, directly or indirectly, which position him at the center of all commercial pressure.

He can be seen as a core person in the vessel operations who has to perform his duties and responsibilities as well as take care of the interests of the involved parties. In spite of his absolute authority over all the activities, he is under day-to-day commercial pressure which limits his authority to make operational decisions.

## 2.5. Vessel Operations

The vessel operations are the all activities performed in the completion of a voyage from berth to berth. A commercial voyage comprises of various vessel activities. The completion of the voyage successfully is dependent on the accomplishment of vessel operations with due diligence from start till end. These operations are of varying nature; technical, commercial, legislative and administrative etc.

The performance of vessel operations is characterized by the involvement of various stakeholders. Each stakeholder has his own preference, interest and behaviors and impact the master in the accomplishment of his desired objectives. In the commercial business, most of the objectives of the stakeholders are directly related and have impact on vessel operations and lead to varying effects on the factors of safety and efficiency.

All the operations are performed in association with different parties where vessel's master as the authoritative performer of all the activities. A voyage can have numerous operations and activities but operations described below are among the major operations without which a commercial voyage can be regarded as incomplete. This research takes into consideration the activities performed before voyage, during voyage and port operations. These vessel operations include voyage planning, cargo handling, navigation and port entry/leaving.

**Voyage planning.** Voyage planning is started by the vessel master after getting the voyage order either from shipowners or charterer, depending upon the contractual type. Voyage planning is a detailed description of the procedures required for the completion of a voyage from berth to berth. The detailed procedure of voyage planning is described in the IMO Resolution A.8939 (21) "*Guide lines for voyage planning*". This plan includes leaving the port, vessel on route, approaching the destined port and mooring of the vessel. The planning stage is most important and critical which lay down how the voyage will be performed. Vessel master has the authority and is responsible to make the plan. However, many factors may hinder the master's ability to draw a plan without the involvement of others. Some of the factors may include company's cost cutting policy, legal rules and regulations, short cut for routes and charterer interests etc.

**Cargo handling.** The cargo handling activities involve the activities and services performed during the process of loading and unloading of cargo. SOLAS, CH VI and VII, provides the guidelines on cargo handling, carriage, securing, packing and stowage of cargo. To

perform a particular voyage a vessel has to load the cargo from one port and unload it on the other port. The question of who will have the responsibility to perform the actual loading and unloading depends on the contract terms. This operational activity is characterized by the involvement of diverse stakeholders which may include port authorities, on shore management and cargo handling persons.

**Navigation.** The process and activities performed during the route of the voyage. When the voyage plan is made the vessel is ready for the voyage. Navigation is the performance of the voyage according to drawn voyage plan. During the navigation, involved stakeholders are focusing on the actual performance of the voyage according to their interests. The charterer and shipowners may have different objectives whereas legislative authorities have different expectation from a vessel while navigating.

**Port entry/leaving.** The port entry/leaving are a stage when a vessel is in a country or territorial waters where it is under the official supervision of that port state. Port entry and leaving is a crucial stage in a voyage where the master has to interact with many parties for the passage and to reach at the berth. Every port authority has rules which are required to be followed and vessel needs to safely navigate through the port.

## 2.6. Research Focus

Many research studies have already been conducted with the major aim of doing a stakeholder analysis but the researcher do not know about similar studies for the maritime sector. This research emphasizes on the stakeholder analysis in the maritime sector.

The primary focus of the research is to perform a stakeholder analysis at vessel operational level. The vessel operations selected for the purpose of this research include voyage planning, port entry/leaving, navigation and cargo handling. These operations will be studied from the perspective of tramp shipping. The stakeholder analysis will be performed to assess the influence of different stakeholders on master, while performing the vessel operations, with respect to Safety and efficiency.

Finally, this research aims to present a graphical conceptual model representing the interaction of involved stakeholders at different vessel operation stages along with the influence on safety and efficiency.

## 2.7. Research Question

This research set forth the following questions to investigate the stakeholders' influential patterns and impact on the safety and efficiency

**“What is the influence of stakeholders on vessel operations related to the issues of safety and efficiency?”**

To answer the question, this research also seeks to answer other secondary questions.

1. Who are the involved stakeholders at different operational stages in a voyage?
2. What are the roles, responsibilities and interests of the stakeholders?
3. How, why and which stakeholders influence the safety and efficiency?

## 2.8. Research Structure

The body of this research work consists of twelve chapters that are representative of mainly six parts. The first part exhibits the historical background of the study and develops the research question (chapter 1 and 2). The second part, theoretical framework, examines the literature relating to the stakeholders, stakeholder theory and their influence. Further, it describes the stakeholder network model and safety and efficiency trade off model (chapter 3, 4 and 5). In the third part, methodology of the research is presented (chapter 6). The Findings, the fourth part, is the main part of the research and is further divided into three parts, stakeholder analysis, stakeholder networks and contractual relationships (chapter 7, 8, 9, 10). The fifth part is the discussion of the findings (chapter 11). Finally; last part presents the conclusion (chapter 12).

### 3. Theoretical Framework

The conception of stakeholder has been deeply embedded in the management literature (Donaldson & Preston, 1995; Mitchell et al., 1997) since the last three decades (Feng, Crawley, Weck, Keller, & Robinson, 2010). Freeman's (1984) landmark book *Strategic Management: A stakeholder Approach* can be traced as an emergence of the stakeholder theory. Since then, the impressive research and development enrich the concept from various prospective and dimensions.

This section starts with the review of different philosophical prospective of stakeholder theory along with an analysis of the term "stakeholder". Furthermore, an attempt has been made to review the literature on stakeholder influence. The literature review focuses principally on the basic concept of stakeholder and stakeholder theory, different philosophical views related to it, theory development and stakeholder influence. Such literature can provide a foundation for the application of the stakeholder theory and methods in the maritime sector.

#### 3.1. Stakeholder Theory

Stakeholder theory as articulated by Freeman (1984) has its origin in strategic management but its roots have linked with sociology, organizational behavior, business ethics and management science. Since its inception, this approach gained a lot of discussion and became part of many of the management books and articles (Donaldson & Preston, 1995). Freeman himself further drew on a number of studies to further develop the approach. He defines his theory as a theory of "*Organizational management and ethics*" which focuses on the managerial issues of firm's purpose and management responsibility towards stakeholders. He argues that the foundation of the theory is based on moral content i.e. the firm should work for the benefits of the stakeholders (Robert Phillips, R. Edward Freeman, & Wicks., 2003). Stakeholder theory describes the relationship of the firm to the environment and its behavior in this environment (Key, 1999). Vessel operations' environment is representative of many stakeholders. The environment can be considered as internal and external. The internal environment represents the employees, shipowners or the management company, who is operating the vessel. Moreover, for the performance of the voyage many external authorities i.e. flag states or IMO provide guidelines on the operations of the vessel. Stakeholder theory can help in studying the vessel operational environment and the behaviors of the stakeholders.

The theory has been integrated with the concept and ideologies of various disciplines. Contributing disciplines include ethics, strategy, law, economics and organizational theory (Freeman & Phillips, 2002). Friedman and Miles (2002) have identified thirty different standards of stakeholder theory (Kivits, 2013). However, the stakeholder theory has not been studied from the perspective of maritime sector or vessel operations, which is one of the world's biggest sector and have many players around the globe having various stake in the industry. The study on maritime sector can bring many new perspectives to the theory.

The noteworthy contribution in the development of the theory was the categorization of theory by Donaldson and Preston (1995). They proposed three main aspects of the stakeholder theory i.e. descriptive, instrumental and normative, which are different but are interconnected theories. According to them stakeholder theory is *descriptive* because it explains the how and why of company's behavior. It is considered *instrumental* because it describes the relationship between the company's objectives and the stakeholder. And the theory is *normative* because they considered the stakeholders as the persons or groups having interest, which is of intrinsic value i.e. for their own benefit (Donaldson & Preston, 1995). In addition, a study by Jones and Wicks (1999) is noteworthy that they identified two divergent philosophical approaches of stakeholder theory: (1) a social science approach, (2) normative ethic approach. They further argue that both approaches rely on each other and present a convergent stakeholder theory by combining these approaches. The literature on stakeholder shows that hundreds of studies have been conducted in support of some particular perspective or conforming to specific approach. Multiple views make it confusing and questionable. In response to this vagueness freeman (1999) emphasized the need for more divergence in the theory which shows different but useful ways of understanding organizations in stakeholders' term. He further argues that there is no distinction between different types of theories and this makes the existence of the convergent theory vague. The base for the theory is instrumental preserving its original theme (Freeman, 1999).

Taking the contrary view, many authors criticized the theory. Many authors argued that stakeholder theory is not perfect and has shortcomings (Fassin, 2009). Stakeholder theory is weak on normative bases (Laplume, Sonpar, & Litz, 2008). He questions the scientific basis of the theory and argues that Stakeholder theory can be considered as an alternate to the economic theory of the firm to describe the behavior of the firm. However, Stakeholder theory does not fulfill the requirement to be called as scientific theory and is not descriptive of the firm behavior

(Key, 1999). Some also claim that stakeholder theory is based on false assumptions (Fukukawa, Balmer, & Gray, 2007). Moreover, stakeholder approach is associated with moral obligation towards its stakeholders, however it is inherently misleading and unable to provide guidance to managers to fulfill these moral obligations (Heath, 2006). Carson (2003) further argues that it limits the managers in respect of professional obligation (Stieb, 2009) and its implementation is questionable (Kaler, 2006).

Many scholars tried to widen the concept of stakeholder and included such issues which are not in the framework of theory. Scholars tried to embed the theory according to the philosophical view of their own discipline by making reference to the relevant part of the theory. Freeman himself is not satisfied with the development of the theory and wants to eradicate the misconceptions and weaknesses (Freeman, Wicks, & Parmar, 2004). Donaldson and Preston (1995) criticized the stakeholder theory on the basis that it alone is insufficient for the profitable firm.

Although, stakeholder concept is controversial but important, it is undoubtedly valuable and used widely across different academic and business areas. Some scholars comment on the maturing of the theory (Laplume et al., 2008) and such popularity reflect the acceptance of the concept across various disciplines. The current thesis is also an example of development of the concept to include maritime sector. As popularity grows and concepts develop, various new dimensions become part of the theory; this is reflected in the definition of the term “stakeholder” itself.

### 3.2. Definition of Stakeholders

The term “stakeholder” has been defined by the scholars in multiple contexts and literature represents a number of different definitions, each weighing the nature of stake against certain criteria. This gives an impression of ambiguous; inconsistency and vague nature of the term. Mitchell, Agle and Wood (1997) indicated twenty-seven different definitions of stakeholders. There is no single unanimously accepted definition by the scholars. The hall and verdict (2005) give reason that the concept is “*idiocentric*” and “*context-specific*”. The concept undoubtedly seems situation specific; because every business is different and represents different stakeholders i.e. the vessel operations is a sectors which is different from many other businesses

or operations. The nature of operations, procedures, education, skill and personal involved are different from other sectors and so will be the nature of the stake of stakeholders.

However, the most well-known and acceptable definition of stakeholder was given by Freeman (1984) in his landmark book *Strategic Management: A stakeholder Approach*. He defines stakeholders as “*any group or individual who can affect or is affected by the achievement of the organization’s objectives*” (Freeman, 1984, p. 46). The undefined nature of the stake virtually includes everyone as a stakeholder with the exception of those who do not influence the firm (Mitchell et al., 1997).

Many scholars discussed Freeman’s definition and was considered as the broadest definition present (Mitchell et al., 1997). In opposition to this broader definition some authors restrict to a narrower definition considering the real world phenomenon of constrained resources, time and attention. Generally, narrower definitions define stakeholders as groups having direct influence on firm’s economic activities (Mitchell et al., 1997) and broader definition includes everyone who get affect or has ability to affect (Bender, 2009). Bender (2009) concluded that the definitions given by different authors show their societal view of their objectives. He goes further and argues that Freeman’s focus was strategic management and is shown in his definition as he emphasized that “*an effective strategist has to deal with the groups that can affect him or her*” (Bender, 2009, p. 6).

Between the views of broader and narrower concepts the stakeholder has been defined through specific criteria which states stakeholders such as risk bearers (Clarkson, 1995), claimants (Cornell & Shapiro, 1987) and contract holders (Freeman & Evan, 1990). Literature identifies that whatever is the prospective; broad or narrow, it has the impression of scholars own discipline or it is confined to some specific situation or context.

The literature on the stakeholders defines stakeholders in a number of different ways and different types of entities can be stakeholders such as “*persons, groups, neighborhoods, organizations, institutes, societies and even the natural environment*” (Mitchell et al., 1997).

Scholars have identified stakeholder groups in numerous types. Freeman (1984) classified stakeholders into primary and secondary group. Mitchell, Agle and Wood (1997) took a broader view and have divided stakeholders into eight types by combining three attributes power, legitimacy and urgency. Further classification include key stakeholders, potential and influential (Isakhanyan, 2010), non-key stakeholders (Salam & Noguchi, 2006) and



identification of key stakeholders prior to non-key stakeholders is necessary. Moreover, some scholars divided stakeholders between internal, external and distal (Sirgy, 2002). However, different types of stakeholder identification is currently a debatable issue (Mitchell et al., 1997).

### 3.3. Stakeholder Influence

Stakeholder theory plays vital role in defining, identifying and managing stakeholders in an unambiguous business environment. In the light of stakeholder theory, it is challenging to determine the influence of stakeholders (Bakker & Hond, 2008). Bourne and Walker (2005) identified different influential philosophical prospective of stakeholder theory. Social science stakeholder theory explains moral influence of stakeholders on the outcome through the social concept of equality, justice and social right. Instrumental stakeholder theory tends to view the influence of stakeholder as vested in their relationship and the one with direct impact on the objectives of the firm will be the one having influence over the firm. Contrary to this, convergent stakeholder theory holds a view that stakeholder's actions and reactions to the change empower them to get attention by the firm (Bourne & Walker, 2005). Further, stakeholder theory helps in identifying the potential stakeholder who are most influential and can affect the decision making. Many authors attempt to determine that members of stakeholder group might have conflicting interests (Harrison & Freeman, 1999) and result of these conflicting interests affect the organizational performance (Bakker & Hond, 2008). They influence the results by using their power in the direction of their interests (Karim et al., 2007). The research undertaken also seeks to reveal the influential patterns of the stakeholders in the vessel operations. Performance of a voyage characterizes many stakeholders having direct or indirect authority over the operations which can influence the operations of the vessel. Further, in the shipping business conflict of interest arises when the question is to seek high revenues or performance of the operations according to the standards this may requires trade-off.

Most of the discussion on the stakeholder has taken either the demographic approach to identify stakeholder's attributes or structural approach to relate stakeholders with the firm. Demographic approach is widely used by many of the authors as compared to the structural approach (Bakker & Hond, 2008). Frooman (1999) suggested proper management of both stakeholders' attributes and their relationships for better results. But his focus was mainly the structural approach. He identified four relationships between firm and stakeholders, firm power,

stakeholder power, high interdependence and low interdependence on the basis of “*who is dependent on whom*” by incorporating resource-dependency theory. The firm can be and cannot be dependent on the stakeholders and stakeholders can be and cannot be dependent on the firm, depending on the resources which they possess. He made development in stakeholder theory by investigating stakeholder’s influence strategies to perceive stakeholders actions and make plans accordingly, rather than focusing on firm’s response strategies and considered it a part of stakeholder theory.

The importance of stakeholders is judged by the level of influence they have on the decisions. Power, legitimacy and urgency are the three main attributes which distinguish different categories of stakeholders and hence their influence level. They are explained in this way, (1) the stakeholder has power to influence the firm by imposing their will on the firm, (2) the legitimacy of stakeholder is when its actions seems desirable towards the firm with in the appropriate societal norms, values and beliefs, (3) the urgency of the stakeholder’s claim on the firm. Influence is strong if a stakeholder has all the three attributes and weak with one attribute. (Mitchell et al., 1997). In contrast, a bundle of literature suggests power as only function of influence. Several authors has contended that influencing capacity of the individuals is dependent on the power they have (Bourne & Walker, 2005). The concept of power has been defined by scholars in different ways. Studies such as (Bourne & Walker, 2005) use the power categorization of Yukl (1998) to describe power as “position power” having control on organizational matters, “personal power” is individual’s own leadership characteristics and “political power” is ability to influence due to authoritative position. More the power the stakeholder has, more he is influential and more the importance a stakeholder has, more he is needed in the decision making. However, some important stakeholders are less influential. In the perspective of the vessel operations, the control over the vessel activities can make a stakeholder powerful and hence make him able to influence the operations.

Grouping of stakeholders for the determining their characteristics are very common for analysis purpose. Most common group is primary vs. secondary stakeholders (Freeman, 1984; Mitchell et al., 1997). Primary stakeholders are the ones who are directly affected by the decisions while the secondary stakeholders are indirectly affected but have strong impact. The rise in societal issues related to environment, safety, social responsibility, legitimacy and transparency led to increase the influence of the secondary stakeholders on the decision making

(Bakker & Hond, 2008). In addition, throughout the different stages in the firm's life cycle, different stakeholders affect the firm more than others. So firm's success is in identifying those stakeholders at each stage and develop strategies to fulfill their demands (Jawahar & McLaughlin, 2001). To the present, just a little study has been done on the stakeholder influence. To be successful, a firm has to effectively response to the demands of the influential stakeholders.

#### 4. Safety and Efficiency Trade-off Model

Safety and efficiency are two important parameters which are taken in this research to study the influence of stakeholders. In vessel operations it is not rare to do tradeoff between the safety and efficiency. But the question remain unanswered why there is a tradeoff between safety and efficiency? Or why stakeholders are more safety conscious or efficiency conscious?

The theoretical framework described in the previous section can help to answer the question that stakeholders are the entity who has a stake in a vessel operation and they can affect or get effected by the vessel operations in terms of safety or efficiency. This gives impression that stakeholder has stake/interest in the vessel operations and two of the important stakes are safety or efficiency. The nature of stake of stakeholders gives an inherited reason for the tradeoff between the safety and efficiency. The regulatory authorities have more concern for safety related issue so their interest is to enhance the safety. On the other hand, the vessel operator wants the maximum earning and he may concentrate to increase the economic efficiency.

Safety-efficiency trade off can be studied in the light of ETTO principle. Hollnagel (2009) presents Efficiency-thoroughness trade-off principle explaining that individual and organization in their daily routine make decision between efficiency and thoroughness. The ETTO principle defines trade-off as *“If demands for productivity or performance are high, thoroughness is reduced until the productivity goals are met. If demand for safety is high, efficiency is reduced until safety goals are met”* (Hollnagel 2009, p.15). The principle implies that it is not possible to have Efficiency-Thoroughness or Efficiency-Safety at the same time and dependent on resources.

Every organization desires to be efficient and safe, as suggested by ETTO principle, at the same time but it's not possible. Efficiency is required in vessel operations to be profitable whereas safety is required to make sure that vessel operations are not effecting crew, cargo, vessel or environment.

People do trade-offs for many reasons, they have limited resource i.e. time or effort, they're not capable of doing it or they are under social or organizational pressure. For example, vessel operations present many situations where it is required to made trade-off between safety and efficiency. When vessel is on time charter party, charterer having vessel for limited period of time pressurize the vessel master to perform the voyage as early as possible to catch other business which enhance the profitability.

People make the trade-off between the choices because of the benefits sought by choosing the choice. Charterer want the economic efficiency because he perceived high profit if he utilize the vessel according to his desires. The tradeoff may favor safety or efficiency depends on the concerns.

In shipping this trade off can also be explained by using the law of diminishing return as the basic idea along with the principles of ETTO principle. Trade-off does not simply exist on a linear line as we typically view them as presented in the figure 4-1.



Figure 4-1 Safety vs. Efficiency linear trade-off

In fact trade-off is characterized with an inverse relationship. The two extremes are not on the same line. They ETTO principle seemed to follow law of diminishing return where increase in one measure can cause the high cost for other measure. For example, we can have extremely safe vessel operations but they will increase the cost of doing the operations. And it is the one most important reason why increasing safety will have decreasing effect on the efficiency.

The figure 4-2 shows a perfect trade-off situation between safety and efficiency. The perfect trade off exist at an angle of forty five degree which follow the law of diminishing return. As we move towards the extremes ends a point on the curves come which can be named as

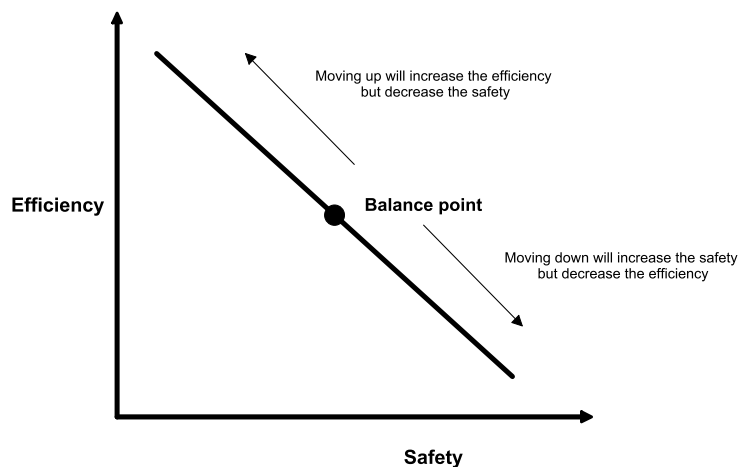


Figure 4-2 Safety-Efficiency trade-off curve

“balance point” beyond this point any improvement in one parameter will negatively affect the other and vice versa. Moreover, there is no situation or point on the curve where these two

extreme can exist together i.e. very high safety and very high efficiency or vice versa. ETTO principle also describe that two maximum extremes are not possible. This situation can be regard as the most ideal situation and such ideal situations are rear to exist in the real world.

Safety parameter represents the definition of safety defined in introduction part which illustrate that safety is safety of vessel, cargo, crew, equipment and environment. Whereas, parameters of efficiency are consisting as the best combination of speed, distance, time and expenses to enhance the economic efficiency.

As we move along the curve the combination of efficiency parameters will compromised over the safety parameters. There can be a balance point between safety and efficiency where the combination of efficiency parameters is not affecting the safety parameters. This model will be applied to vessel operational to see how stakeholders influence on the issues of safety and efficiency and will help in explaining the trade-off.

## 5. Vessel Operational Stakeholder Modeling

The term ‘model’ can be described as the behaviors of actors in an environment that can be represented by mathematical formula, processes or systems that help in calculation or predictions. The researcher concern here is to present a conceptual model of a stakeholder network, which describe a framework to understand the influential behavior of the actors making up the vessel operational environment. The aim is not to present statistical model but to make a conceptual model that describes how the system in a stakeholder network operate and behave in terms of influencing the network. However, the vessel operational arena is characterize by the properties of real-time concept where human actors act in a non-linear way. This present the challenge of a model that cannot have predefined system. This implies that the vessel operational network model can depart from the consideration of a designed system and possibilities exist of a system without boundaries.

### 5.1. Stakeholder Network Model

The presentation of stakeholder in a graphical manner is not new. Stakeholder and their relationship have been presented graphically before by Freeman stakeholder model. Freeman (1984) presents the first stakeholder model which maps the firm as the hub of a wheel and stakeholders as end of the spokes(Freeman, 1999). Most common form of the model is presented in the figure 5-1.Later, Freeman include more stakeholders to refine the model. The representation of model by the freeman was quite generic in nature and did not take into account

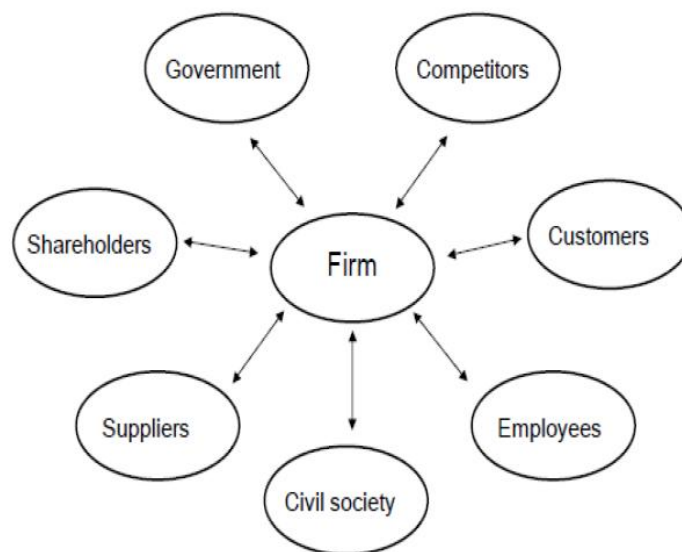


Figure 5-1 Freeman's stakeholder network

the whole environment of interacting stakeholders. Rowley (1997) present a stakeholder model which include multiple stakeholder and goes beyond the dyadic relationship of individual with firm and study simultaneous influence of multiple stakeholders. This model was based on the social network analysis to represent the influence through the structural characteristic in a network of relationship. To understand the stakeholder environment in the vessel operations, the researcher present here the network model which draws its basic assumptions from the Rowley (1999) “*A network theory of stakeholder influence*”.

## 5.2. Network Model

Stakeholder environment does not exist in a vacuum it consist of relations, interactions and interdependencies among each other. Social network analysis as a tool helps us to study and understand the relational system. Social network analysis emphasizes on the behavior of the entire stakeholder network rather than examining the behavior of the individual stakeholder. The underlying concept is to consider the interactions and behaviors between the actors and to study how the interaction constitutes a network structure.

Stakeholders in a network are considered as the social actors (nodes) having relationship (ties) with others, and the pattern of their relationship, defines their influential behavior. This structural model is all about the ties between the nodes. Stakeholders can have direct relationship with each other or indirect. They behave in a network, linked directly or indirectly, a stakeholder behavior can influence the network as a whole. The center point of the network is not always the firm; it all depends upon the stakeholders and their relationship with each other's. In fact, the stakeholders have stake in the principle issue, have interconnected relationship with each other and with the central actors which is called the central node.

The nodes in a network are not related to each other's in any hierarchical way. They are linked to each other's through different connections such as flow of information, order or economic resource. We cannot relate to any broad or widely used network theory, not any such single theory exist, scholars have used different theories as found suitable in their field.

To determine the relation between actors it is needed to know how they influence. Further social network analysis considers that the social actors are not independent bodies rather they depend on each other and influence in their own way in a network. Their position in the network is also an important factor to analyze their influential behavior/pattern.



Further, the network model is an example of a social system. System implies here the set of nodes that interact, interdependent on each other and integrated together to form a whole (Luhmann, 1995). The whole system can be consisting of many sub-systems. The system has a structure which is govern by the behavior of interconnecting nodes.

The concept of system is widely used in network approach and social sciences to study human societies. The vessel operations are a perfect example of a system which can be depict through the network model. The system can be categorized as a closed or open system dependent on the stakeholder environment. If the nodes are interacting with each other and with the environment they regarded as an open system otherwise a close system. This system level approach will further help in understanding vessel operational environment and its stakeholders.

**Network behavior.** There are number of network theories used by different scholars to explain the network behavior in terms of explaining the relational ties between the nodes. In this research, researcher explained the network behavior based on the resource dependency theory used by the Frooman (1999) to explain the Influential behavior of stakeholders. The stakeholders are interconnecting with each other in a system with each stakeholder has its own objective and possess resources necessary to run the system. To achieve their goals they are dependent on each other and share resources to achieve the objectives. The relational structure exists due to the resource dependence among the stakeholders. However, the nature of resource can vary from material, financial to informational. According to resource dependence theory, ones desire of acquiring resources gives other opportunity to use power over them. Resource dependence theory focuses on the power(Frooman, 1999).

**Network characterization.** Network characterization helps in understanding the roles and interest of the individual actors, group of actors or overall network. Individual level characteristics may explain how many ties one node has with other nodes or network. The individual level analysis studies the interaction of the individual in the network and how these collections of two-party relationship build up whole system. The involvement of the individual actors impacts the outcome of the whole network.

Individual level analysis will help us to study how the interacting nature of relationship impacts the principal node and other interacting nodes. Further, it help us in understanding how the stakeholders influence in the network and finally, how the network structure changes if there is relational change in the network or outside the network.

Moreover, group characteristics help researcher to study degree of connectivity between the nodes and the distance between the nodes. The far the node is from the center, the less it is influential.

**Network density and centrality.** Density is a term used to describe the network structure as a whole in social network theory. It shows the ties that link actors in a network and a comprehensive network shows all the possible number of ties that exists. On the other hand, centrality focuses on each individual interaction in the social network. Centrality is explained by number of ties of an actor in a network. As the number of ties increases, connection level of the actor is considered strong.

The network model explained was the potential to take into consideration the social interactions, environmental characteristics of the involved actors. It is the correct framework to operationalize the interaction of social actors in the vessel operation area and to study how relational system influences the vessel master.

## 6. Methodology

The purpose of this section is to explain the methodological and philosophical stance underpinning this research. It defines the research process and stakeholder analysis process. Furthermore, it describes scope, limitations and ethical considerations.

The research strategy adopted is based on the qualitative research. Cross-sectional research design is chosen to collect data. The research method for data collection is a combination of primary and secondary data sources. The main data collection techniques used is semi-structured interviews and qualitative content analysis.

This section starts with the explanation of the philosophical approach adopted and follows with description of the stakeholder analysis process and network model. Next, research design and data collection methods have been discussed. Finally, this section concludes with the discussion on the issues of reliability, validity and ethical considerations.

### 6.1. Research Approach

To determine the relationship among the stakeholders, their interest and how they influence the issues of safety and efficiency, this research considers deductive and inductive approach. The research process undertaken by any research mostly involves either deductive or inductive approach, depending upon the researcher's interests and goals. Deductive approach emphasizes the testing of the already existing theory and inductive approach is concerned with the building of the theory (Bryman & Bell, 2007). In this research work, the interest of the researcher is to develop a conceptual stakeholder network model in the maritime sector, with particular focus on tramp shipping segment. A combination of inductive and deductive approach seems valid, based on the research goals. The theoretical framework, discussed in the previous sections, is the deductive part of this research which provides a ground for building the research. On the other hand inductive approach helps researcher to drive finding from the data collected supported by the theory. This kind of approach guide researcher to conduct an in depth study to understand the research area.

This research undertakes the qualitative research strategy. Qualitative stance of ontological position is constructionism and of epistemological position is interpretivism. This assumes that social constructions are built up from the actions and interactions among the social actors' (Bryman & Bell, 2007). The knowledge of reality can only be gained through social

constructions. The focus of the study under consideration is not only on the events taking place (vessel operations) but also on the participants (stakeholders) and the way they behave (influence) in the social world. The participants are the part of the reality and they are continually being involved in building the reality, which the researcher is trying to understand through this research work.

Thus, the focus of the research is qualitative study to understand the behavior in the real setting without manipulating the behavior. The adopted research strategy helps the researcher to understand the issues of influence and in solving the question of why and how a particular stakeholder affects the vessel operations.

## 6.2. Stakeholder Analysis Process

Vessel operations are performed in collaboration with a number of diverse stakeholders. However, the vessel's master is direct in charge of all the vessel activities and he take orders, advices or information etc. from various stakeholders to perform the operations. To uncover stakeholder influence, stakeholder's analysis is a vital tool. In carrying out the analysis, some questions need to be answered regarding the position, interest, influence and other characteristics of the stakeholders (Freeman, 1984). This analysis aims to evaluate the stakeholders from the perspective of vessel master who is the center of influence i.e. what is the influence of stakeholder on master? A stakeholder analysis essentially involves three steps.

1. Identification of stakeholders. Stakeholder identification is the starting point in persuading the stakeholder analysis. It is necessary to draw a line between stakeholders and non-stakeholders (Mitchell et al., 1997).
2. Description of stakeholders interest/stake. Once the stakeholders are identified their roles, characteristic and interest need to be assed in order to answer the question of "why" they are associated with the vessel activities.
3. Assessment of stakeholder influence. How stakeholder achieve vested interest in vessel operations, uncover the influential capacities.

This process facilitates the researcher to identify the influential capacities of the stakeholder and to further develop the stakeholder network model thereafter.

### 6.3. Stakeholder Identification Methodology

In persuading the stakeholder analysis, the preliminary requisite is the identification of the stakeholders. The vessel operation areas provide bases for pre-assumed direction for the identification of stakeholders to be considered in the context of the thesis research.

Researcher proposed here a methodology for stakeholder identification that allows in defining the boundaries for identification process. This methodology is based on the freeman's (1984) definition of stakeholder, which is considered as the broadest definition in the literature and is presented in the literature review section. The basic stakeholder analysis technique of Bryson (1995) is used as a way of identifying the potential stakeholders. This technique has been used due to its simplicity and quickness to get a starting point for further identification and analysis. The rest of the identification process is based on the under laying concept of snowball sampling technique. This idea taken by the technique is suitable to identify any unknown stakeholder for the in-depth and finer analysis.

Figure 6-1 depicts the proposed identification process which is articulated by the amalgamation of the “basic stakeholder analysis technique” and “snow ball sampling technique”. The combination of these techniques along with the criteria set by the broader definition of stakeholder serves as a stakeholder identification tool for the research work.

**Initial identification.** The stakeholder identification process starts by applying basic stakeholder technique presented by Bryson (1995). This technique is simple and fast way of identifying stakeholders, their characteristics and stake. This technique involves several steps, initial steps of the technique will help in the stakeholder's identification process and rest of the steps will guide in describing the characteristic and interest which is the second part of the process. The steps of the techniques are as follows:

1. Brainstorming the list of potential stakeholders.
2. Prepare a separate chart sheet for each stakeholder by placing their name on the top of separate sheets.
3. Draw a narrow column down to the right side of the page and leave it blank.
4. To the left of the narrow column, list the criteria that stakeholder would use to affect the vessel operation (or list how vessel operations can affect the stakeholders)
5. Identify and record the interest of the stakeholders.
6. Specify how each stakeholder influence vessel safety or efficiency.

By following the steps of this approach one can easily achieve the goals of analysis. In the beginning, by using the brainstorming techniques all the possible stakeholders will be listed down which seems to have any association with the vessel activities as assumed by the researcher. It will provide the researcher a starting point for the analysis process with a mix list of stakeholders and non-stakeholders.

**Initially selected stakeholders.** After the generation of list by brainstorming technique, the next step asks for the selection of a stakeholder among them to proceed with further identification process. The initially selected stakeholder is a recognizable person, entity or group and the questions were asked to the interviewed master regarding the each selected stakeholders regarding nature of his relevance with vessel operations.

Semi-structured interviews were conducted for stakeholder analysis purpose. The aim of these interviews was to unfold the interest and the influential capacity of stakeholders. Furthermore, every respondent were ask to identify the potential stakeholder which was not in the list generated in the beginning of the process. Other than interviews, secondary data has been used for the identification and description of the interests. Limited time availability for the research allows four interviews which truly serve the purpose of uncovering the stakeholder network.

**Unidentified stakeholders.** This step requires the detection of the person, entity, group or subgroups which remains unidentified in the previous stages of identification process. The snowball sampling technique has been applied in this step. In this technique respondents were asked to identify people, entity, group or sub-groups with the similar traits of interests. Usually the technique is applied when the subject of the study are rare or difficult to find (Noy, 2008). However, aim here is to bring the unknown stakeholders to the surface which can be included as the part of the thesis research. Most of the stakeholders are easily identified by the brainstorming technique but an effort has been made to include any entity which has the potential to influence the vessel operations.

This technique, however, is criticized to produce a biased sample. To mitigate this risk, firstly, the respondents were asked to point out any stakeholder not present in the list generated in the initial stage. This was opposite to original technique, where respondents under consideration

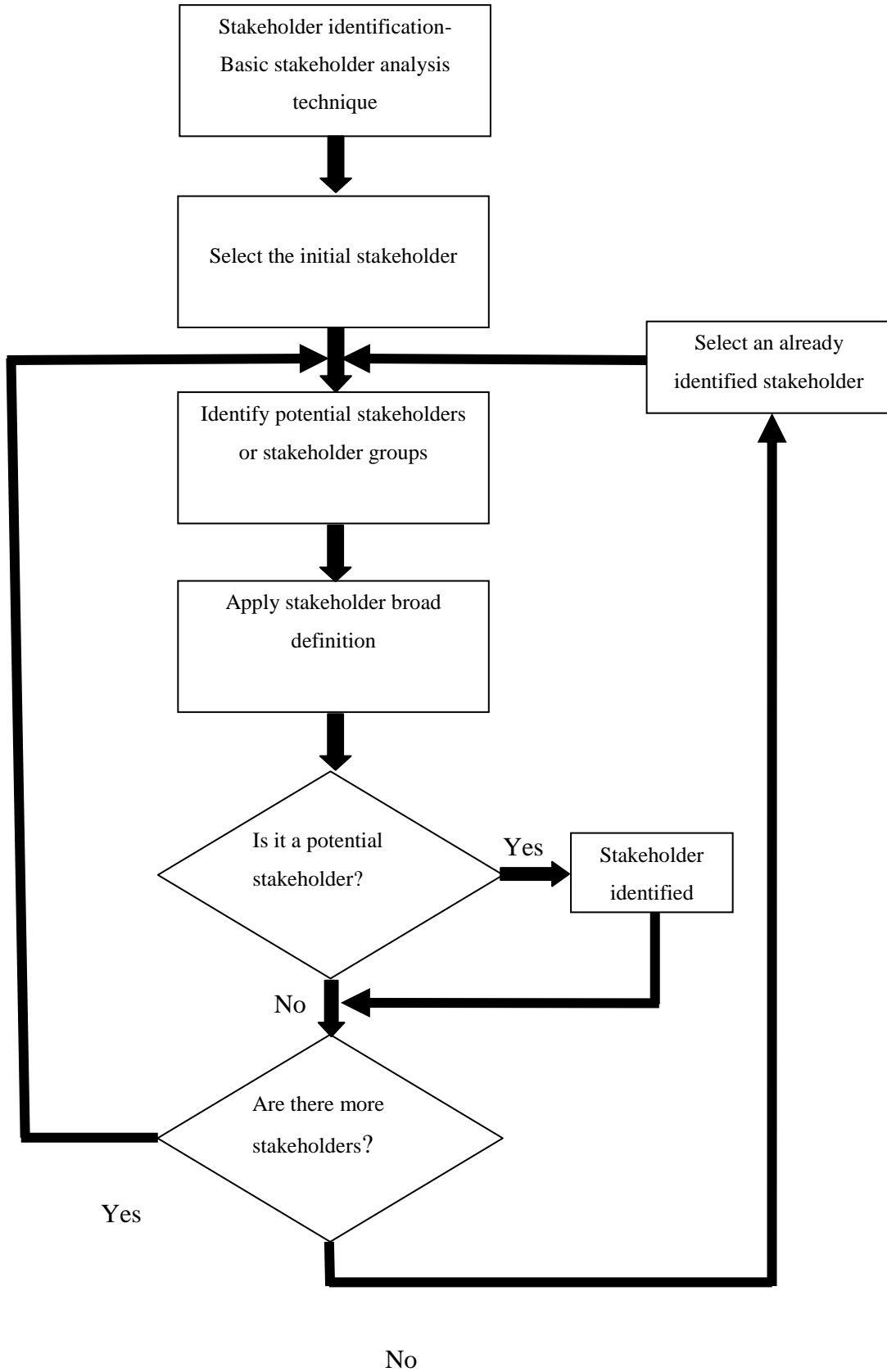


Figure 6-1 Stakeholder identification methodology

nominate other respondents they knew well, which lead to a specified small group of the entire population. In each interview the respondent were shown the list of stakeholders and ask for any unknown stakeholders. Finally, combinations of other techniques have been applied rather than just relying on the single technique, to obtain more accurate data. Other techniques include brainstorming, internet, maritime magazines and maritime literature. To find out the relationships, characteristics and influential capacity of these newly identified stakeholders, interviews and secondary data research is conducted to register them as a potential stakeholder.

**Acceptance test.** This step is the most critical and important step in the identification process. This step asks for the application of our stakeholder broader definition to qualify them as a potential stakeholder. The definition can be presented as:

‘A stakeholder is any group or individual who can directly or indirectly affect or is affected by the achievement of the vessel operations.’

The rationale behind considering this broadest definition as a criterion is to include anyone who has the slightest degree of relevance. This will provide a comprehensive list of potential stakeholders with minimal chances of exclusion of any stakeholder from the network. At this stage no ruling out of stakeholder will occur. The nature of relationship identified at this stage may be weak but still we will be able to detect it and that will be eventually filtered out in the subsequent process. The individual or group whose test result turns out to be positive will be regarded as an accepted stakeholder. This constitutes a potential stakeholder and can follow the further steps of analysis.

**Identified stakeholders.** The positive result of the acceptance test is indicative of a potential stakeholder. The list of identified stakeholders will go further to the other steps of analysis process by applying rest of the steps of the stakeholder analysis techniques. That will further describe their interests to build up their relationship and to uncover the entity, by whom they can get affect and to whom they can affect.

Stakeholder identification is a cyclic process. It does not represent the characteristics of one time process; it is and needs to be a cyclic process which enables the identification of more and more stakeholders at each cycle. This cyclic process keeps on going until no new stakeholder is identified. This process is represented by the lines going back to starting point of the identification process. The respondents were asked to point out further stakeholders in the network and the process is repeated with the newly identified stakeholders by passing them



through the acceptance test to see if they are potential stakeholders or not. This step wise cyclic process allows researcher to review the relationship of the different stakeholders within the network.

It is important to give due consideration to the reoccurrence of the identified stakeholders. This is a source to uncover the networks and finding out the interdependency among stakeholders.

This cyclic process is a way towards the comprehensive identification and developing the network without any controlled factor or criteria. However, this identification process has more comprehensiveness if interviews conducted for almost every identified stakeholder but it has accurately served the purpose of identify the stakeholders for this research. In the next step of the analysis process, assessment of the interest and characteristics has been done. At that stage any irrelevant stakeholder can be filtered out due to unrelated interest in the vessel operations related to safety and efficiency.

#### **6.4. Description of Interests and Characteristics Methodology**

Stakeholder's interest in the vessel operation is the determinant of their stake and hence identifies their relationship within the network. After the identification of the stakeholders in the previous part it is important to seek answer to the question that what are the interests of these stakeholders. Every stakeholder concerned with the commercial voyage has some expectations. These expectations can be translated into their interests in the vessel operations and give a reason of their influence on vessel operations.

Stakeholders have different interests at various stages of vessel operations with particular reference to the safety and efficiency. Identification of the interests help the researcher in finding out common interests of stakeholders and more importantly the conflict of interests especially on the factors of safety and efficiency, which direct the researcher to identify the stakeholder as safety conscious or more divergent towards the efficiency. Description of interest also provides a mechanism for filtration of stakeholders and identifies their position in the stakeholder network. Finally, the question, how they achieve their interest? Identify the influential capacities which will be discussed in the next part.

Interest-based analysis is conducted by using stakeholder analysis technique as a tool to list down the interests of all potential stakeholders, by following the steps of the technique as

described in the previous part. This technique is adopted due to its simplicity and it corresponds to the aim of the research. This technique requires filling in the interest of the stakeholders on the separate sheets. Primary and secondary research data helps the researcher to describe the interests of stakeholders. Semi-structured interviews were conducted with a particular section specified to identify the interests of in-question stakeholders and the interests of the other stakeholders from their perspectives. However, as the interviews were not conducted with all the potential stakeholders, secondary data retrieved from websites, maritime news and magazine, books, articles and published reports helped the researcher in identifying the interests of stakeholders. Data gathered helped researcher to prepare a ground to assess the influence of the stakeholder and how the vested interest give reason to influence in certain way.

### 6.5. Assessment of Stakeholders Influence Methodology

Stakeholder influence is determined by aggressive achievement of the interests. The nature of interest, describes their stake and relationship. A stakeholder can be considered as a safety influencer or efficiency influencer, depending on the stake. However, to determine the influence it is important to know ‘how’ and by ‘what means’ a stakeholder achieve its objectives.

A way of identifying the influence is the relationship among the stakeholders. According to our criteria of stakeholder identification; an inherited relationship exists if they pass the test of “can affect or get affected”. This gives the bases for relationship in an influential network model.

Another way of defining relationship among the stakeholders is by the type of resources they possess. Stakeholders bring different resources depending on the relationship and these resources will affect the issues of safety and efficiency differently.

Frooman (1994) work, presented in the literature review section, defines relationship of the stakeholder by using resource-dependency theory. He argued, the nature of resource will decide “*who depend on whom*” and give them power to influence. He used the term “*Resource relationship*” to identify relationship based on the resources. In Table 6-1, researcher identifies various resources which constitutes a relationship and give power due to possession of those resources.

**Table 6-1***Types of Resources*

Resource Type	Explanation
Physical resources	A material resource necessary to perform the vessel operations i.e. port infrastructure, cargo etc.
Economic resources	A commercial voyage always involves large sum of money by various parties in different ways i.e. freight income, charter income etc.
Informational resources	Information plays a vital role in vessel operation. The source of information can be VTS, charterer or vessel owner etc.

Furthermore, the degree of influence, which can be low or high, is indicative of the influential pattern of stakeholders in the network. In the vessel operational area, the stakeholder can be categorized based on the relationship and degree of influence.

**Primary stakeholders.** The individuals or groups who directly affect the safety and efficiency related issues of the vessel operations are primary stakeholders. These stakeholders are in direct relationship with the vessel master and may possess valuable resources to influence the vessel operations in the direction they desire.

**Secondary stakeholder.** The individuals or groups who have indirect impact on the operations of the vessel are secondary stakeholders. This type of stakeholders may possess important resources but they impact the vessel operations through their counter partner in the network. Secondary stakeholders are important as primary stakeholders are, but due to indirect line of authority they are not on surface.

**External stakeholders.** Have no direct or indirect relationship but influence the vessel operations significantly. For example, International maritime organization (IMO) and legislation bodies provide a guideline for the whole industry without being in direct or indirect connection with the vessel activities.

Defined categories of stakeholders have different sources of power to influence the vessel activities and vessel master. The type of influence varies based on the interest, relationship and resources. Table 6- 2 describes some of the sources and types of influence as criteria to answer 'how' and by 'what means', stakeholder have influence upon the vessel activities.

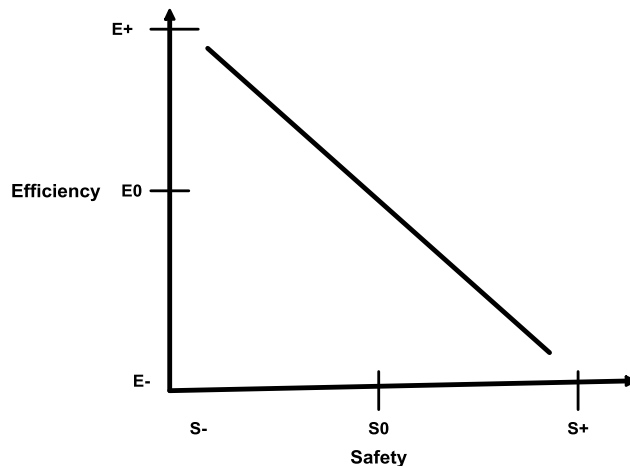
**Table 6-2**

*Type of Influence*

Types	Explanation
Formal influence	The power one individual or group has due to its position or hierarchical authority. This type of influence enforces legal implementation.
Economic influence	The influence appears due to the financial benefits, which can be positive or negative.
Social/Moral influence	It is based on norms and values and do not influence through financial benefit or legal authority.
Informational influence	Influence created by conveying some important piece of information.
Operational influence	The influence is based on the operational power which impact on the decision making in performance of the activities.
Collaboration influence	When two actors, in a network join hands to become more powerful.

**6.6. Safety-Efficiency Matrix**

To understand the influential capacities semi-structured interviews and secondary data



**Figure 6-2 Safety and efficiency trade-off model**

sources were considered. These sources provide considerable help in revealing the influential patterns of the stakeholders. Moreover, a qualitative measure base on the safety-efficiency trade off model (figure 6-2) is used to gauge the influence of stakeholders.

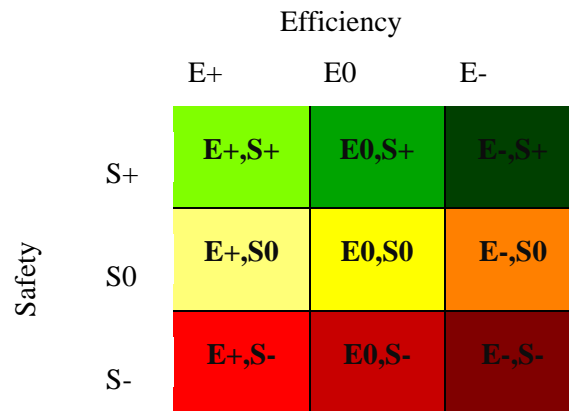
The safety and efficiency trade-off model (figure 6-2) represents the safety and efficiency on x-axis and y-axis respectively. The degree of influence can range from -, 0 and +. The explanation of the degree of influence is given in Table 6-3. The degree of influence on each axis increases from low (-) to neutral (0) and to high (+).

**Table 6-3**

*Degree of Influence*

Influence	Influence on Safety		Influence on efficiency	
Zero(0)	S0	No influence on safety	E0	No influence on efficiency
Low(-)	S-	Less or negative influence on safety	E-	Less or negative influence on efficiency
High(+)	S+	Considerable or positive influence on safety	E+	Considerable or positive influence on efficiency

Based on the trade-off model (figure 6-2) safety-efficiency matrix has been constructed which will aid in drawing the stakeholder influence. This matrix (figure 6-3) represents all the



**Figure 6-3 Safety-Efficiency matrix**

possible influence combination of safety and efficiency. For each set of Safety and efficiency (E, S) a different color has been used to separate it from other. The lines in the network mode will be drawn according to the specific combination of the (E, S) as shown in figure 6-3. The colors

scheme will help in quick assessment of the network model and readers can easily depict the influential pathways of stakeholders in the network.

### 6.7. Stakeholders Network Model

The analysis process described in the previous part will help the researcher in mapping the stakeholders in a network called stakeholder network. The idea behind the stakeholder network model is derived from the social network theory. Network approach, as explained by (Rowley, 1997), helps in studying the relationship between different stakeholders. The social network theory interprets the social structure where the relationship ties define the network.

The network model shown in the Figure 6-4 shows a conceptual abstraction of the stakeholders. This model depicts a way of representing the stakeholder in the network. Through the contextual analysis, described in the preceding part, the researcher will identify stakeholders, their interests and influential capacities. This will lead to the mapping of position in the network.

The degree of influence varies among primary, secondary or external stakeholders. The categorical mapping is dependent on direct or indirect relationship and quantity the resources, they bring to accomplish their interests. There is a network of the relationship between stakeholders; every involved party is having its own relationship network and can enforce pressure to varying degrees. The analysis will uncover the patterns of stakeholders working within the network. Primary stakeholders have direct relationship ties to influence the vessel master whereas secondary have connection with the primary stakeholders to induce their actions. On the other hand, external stakeholders may have direct influence or through some intermediary actor but they are not in direct connection with the master. The pressure enforced by each party will definitely affect many other involved parties in the network and possibility is there to affect the integrated network.

Network model allows understanding the relationship ties at a glance and how the behavior of an actor has affected the network. Some of the important term of stakeholder network model needs description.

*Actors/Nodes* are stakeholders which can be individuals, groups or organizations having relationship in the network.

*Relational ties* are the characteristics connecting actors together. The link between the actors is the flow of resources of any kind. There can be various types of relationships, depending on the type of resources, which shows their power in the network.




*Dyad* is a relationship between two actors, having some common characteristic in between both of the actors. It is common to see more than one relational tie in between the actors which shows multiple common characteristics.

*Triad* is same like dyad but shows relationship between three actors. To elaborate it further, for example, if X is affecting Y and Y is affecting Z than X will also affect Z.

The network model provides the visual relationship between the stakeholders which further allows the qualitative analysis of the relationships. In the network model, researcher identifies the actors and is shown in circles. Different colors have been used for different stakeholder's i.e. Primary, secondary and external as shown in the (Table 6-4). Moreover, identified relationships between the nodes are drawn with a line. The colored line has been used to draw the ties between the nodes. The color of the line shows the degree of influence whereas the direction of the arrows shows the communication i.e. the single arrow line is indicative of one way communication and double arrows represent two way communications. The degree of influence is trade-off of efficiency and safety (E, S) which is drawn in accordance with safety-efficiency matrix (figure 6-3) and general model is presented in figure 6-4. These lines are also tagged with the notion of (+, - or 0), safety and efficiency dependent on the concerns of the stakeholders.

**Table 6-4**

*Color scheme for stakeholders*

Type of stakeholders	Representation of stakeholders
Primary	
Secondary	
External	

Furthermore, time limitation in the research work allows interviews with few stakeholders, which makes researcher unable to construct the network solely based on the

research findings. This is conceptual model which is drawn through the input from the interviews, content analysis and in view of the market practices.

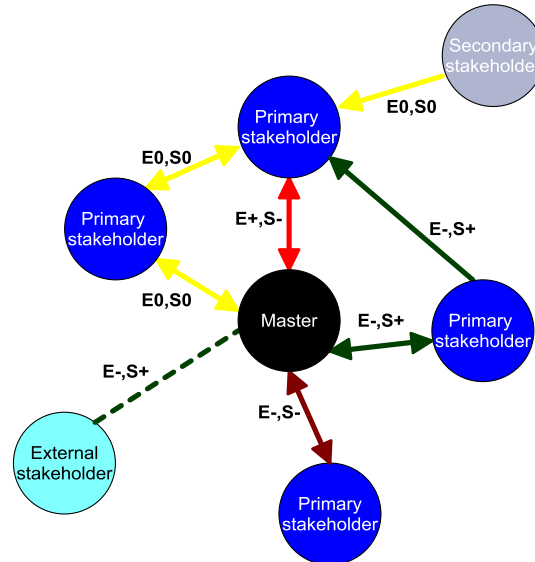


Figure 6-4 Stakeholder network model representation

## 6.8. Research Design

Qualitative research most often begins with not clearly defined research design. It usually gets in the proper structure during the research process and is in constant stage of alteration required according to the research. Research design is selected by considering several points in mind as it has an impact on the further decisions. It helps in providing guidelines regarding procedures and techniques for collecting and analyzing the data. Further, selection of research design is also dependent on the availability of time and money. As well as these different research designs also vary in reliability and validity of the conclusions.

In order to investigate the question of this research, application of different research designs can be considered. The five most common research designs are experimental, cross-sectional, longitudinal, case study and comparative study (Bryman & Bell, 2007). For the study under consideration, cross sectional research design is appropriate according to the objective of the research. By using cross-sectional design, data can be collected on more than one case at a single point in time (Bryman & Bell, 2007). This design allows different research techniques for



collection of the data such as through surveys, interviews and content analysis. Further, cross-sectional design is preferred as the most suitable design for administering this research after considering time, money and other constraints.

### 6.9. Data Collection

The following section elaborates the data collection methods and gives reasons for their selection in this particular research.

Research was started by reviewing the secondary research available on the stakeholders. This review includes the stakeholder theory and its development from various prospective with primarily focus on the objective of the research. The researcher has mainly reviewed the articles which have been published in Academy of management journal, Academy of management review, Journal of business ethics and Business ethics quarterly along with other journals and conference papers. These journals were access through the databases of Jstor, Emerald, Science direct and Google scholar. The review has been presented in the literature review section which provide a theoretical framework in conducting the research

For the data collection, the researcher has used both the primary and secondary data sources. Primary data has been collected by semi-structured interviews. It was done after getting enough insight of the topic through the secondary research. Multiple Secondary data sources were used for detailed and in-depth understanding. Moreover, secondary sources are cost effective and less time consuming but assurance is needed that the data is accurate, valid and reliable. Further, secondary data also helped in removing the risk of the biasness for the primary data. For the purpose of this research, secondary data is the main source of information to perform the stakeholder analysis and to further draw the network model. However, in-depth semi structured interviews were also conducted to ensure proper construction of the model.

### 6.10. Sampling

For this study, sample was selected from the shipping companies in Norway. Stakeholder sampling which is a kind of purposive sampling alternative (Ted Palys, n.d) has been applied to collect data. In this approach, the sample is consisting of identified stakeholders for the study. This technique truly serves the objective of the research and relevant data can be collected based on this approach. Further, snowball sampling technique has been used, by asking respondent to

refer and point out new stakeholders which falls in the criteria of study and who can be included in the research as potential stakeholders.

**Interview.** To get deep insight into information about the expected stakeholders, their interests and influence semi structured and in-depth interviews have been conducted. Interviews can be conducted through face-to-face, telephonic, email and online chat. The method adopted under this research was face-to-face interview after considering its benefits like clues from body language, easy to probe and to get in-depth information through prompting.

Interviews were made with a total of four masters in tramp shipping segments. They provided the information to get better insight of the topic and to develop the viewpoint. The discussion was conducted on various vessel operations to seek how stakeholders influence the vessel activities. The questions were also included regarding other stakeholders in the network and how probably those can effect vessel operations. Some Standardized questions were also asked from the participants. This made the comparing and analyzing of the answers easier.

Before conducting the interview, the researcher contacted the informants with electronic mail to brief about the topic, confidentiality, and anonymity and the way data will be collected (See Appendix). Further, also to get his consent. After meeting the interviewees rapport was tried to be developed quickly. It was difficult to note the answers of the respondents exactly as well as due to the time constraint. So recording was preferred after the permission of the interviewee. Follow up questions were also asked where it seem necessary. The interview was constructed in an open way and questions were asked according to the interviewee interests. Interviews were started with wide topic and were constructed in a way that respondent can answer in his or her own way. But sometimes a situation was faced when respondents did not provide full or detailed answer or when some required information was missing; probing was done to encourage the participants to keep on talking on the same topic and to expand their answers. They were asked to say something more regarding that. Although face to face interviews were time consuming but they helped in collecting rich and deep data. Further, another main factor led to selecting the face-to-face interview was the language difference. Neither of the party has English as the mother language, so there was a chance of misunderstanding each other's. By using probing, the topic was explored in depth. It also led to improve the accuracy of the data collected.

The interviews were conducted in between February and April 2014. All in all four interviews were conducted to gather the data. However, the interviews were in-depth and each

interview lasts almost one and a half hour. Time constraint of study and availability of vessel masters are two of the major hindrance for interviews. All the interviews were face-to-face and were recorded by using recording machines.

**Secondary data sources.** Other than the primary data, secondary data is also collected. The aim behind collecting secondary data is to use already existing data that is properly collected and analyzed, to support and complete the research in time. Secondary data sources are the main source of data for the purpose of performing stakeholder analysis. For this research, data is collected through websites, books, maritime newspapers, maritime magazines, published reports and scholarly articles. These data sources helped researcher to get a wider prospective on the research issues.

#### 6.11. **Reliability, validity and Representativeness**

There is a need to ensure the quality of the qualitative research. The researcher is concerned that the research design used will provide appropriate outcomes or not. The two most common criteria for evaluating the research are reliability and validity. But the application of these two concepts in qualitative research is argued by some researchers and alternative measures, ‘trustworthiness’ and ‘authenticity’, are suggested (Bryman & Bell, 2007). While some other researchers proposed its application in qualitative research (Kirk & Miller, 1986) and considers that it is not impossible to achieve reliability and validity in qualitative research. This research also uses reliability and validity as evaluation criteria.

Reliability of the research was improved by using standardized methods and by completely recording all the stages of the research process (Silverman, 2011) and by comparing the analysis of the data collected with other respondents. Further, to improve measurement validity, measures were developed carefully to keep in check that whether the measures developed does really measure the concept that they are supposed to be measuring. Internal validity of the research can be argued because the questions were asked from the respondents to collect the data and researcher himself had not been at their place. Respondents are the only one to determine the internal validity and researcher had no other option but to believe on their answers. External validity of the research can also be criticized because probability sampling techniques are not used to select sample due to wide range of population and time constraint so generalization can be questioned. Furthermore, research aims to build a conceptual model which

requires further testing of its implementation in vessel operations. However, data has been gathered from the stakeholders relevant to the tramp shipping and the result will therefore be applicable for this sector.

The qualitative research undertaken is stronger in ecological validity. The study is performed with the aim of the application of the finding to the people's everyday life. The researcher tried to keep the setting as natural and asked open ended questions to keep the study ecologically valid.

#### 6.12. **Ethical considerations**

Throughout the process of the research, due consideration was given to the ethical issues. An approach has been opted to conduct the research within the ethical standard. The researcher has made utmost attempt to be honest, unbiased and present the true result. A care has been taken to avoid such acts or procedures which may harm the respondent. Research participants were selected on their informed written consent by the electronic mails with no pressure to participate. Prior to conducting the interview every participant was sent an electronic mail describing the research aim, scope and objective with an ethical guideline. The guidelines included issues related to no harm to participants, confidentiality of the data provided, and anonymity while collecting, recording, analyzing and interpreting. The voluntary participation encouraged to give detailed information which led to increase the detailed and in-depth responses.

The interviews were taped to avoid any miss interpretation with the permission of the interviewee. The explanations were given on why the researcher is recording the interview and what will happen to the taped interview after analysis. Voluntary participation gave right to the participants to withdraw from the research any time without giving any reason. Finally, due consideration was given in analyzing and presenting the result as fair, unbiased and truly representative of research conducted especially in case where the result is drawn from respondents answers.

## **7. Stakeholders Analysis and Network Model**

This section presents the results of the stakeholder analysis of the selected vessel operations i.e. voyage planning, navigation, port entry/leaving and cargo handling. The primary objective of the study was to identify the stakeholders involved in the vessel operations and presentation of the influence pathways through a generic model. The results are presented in the light of vigorous reviews of conceptual modeling and the interviews conducted with the ship masters.

The stakeholder analysis identifies and describes the stakeholders in the tramp shipping operational environment. The identified stakeholders are modeled by a graphical presentation with the aid of network model. The mapping of stakeholders shows the influential patterns in the system of network according to the desired interests and objectives of stakeholders.

The results are divided into three parts. First part of this section presents the stakeholder analysis. Next part shows the different networks of vessel operations and the influence they have on a vessel master. Finally, last part illustrates the change in network structure and interactions among the stakeholders due to change of contractual environment in the tramp trade.

### **7.1. Stakeholder Analysis Steps**

The stakeholder analysis is based on the analysis process describe in the methodology part. The stakeholders' analysis process consists of three steps:

1. Identification of stakeholders
2. Descriptions of the interests
3. Assessment of the influence

### **7.2. Identified Stakeholders**

The analysis of the commercial voyage outlines the stakeholders which are presented in the Table 7-1. This also answers the questions who are the involved stakeholders at different operational stages in a voyage? The list of stakeholders presented indicates their presence in the defined vessel operational stages. The stakeholders can have direct, indirect or external influence on the vessel master regarding the issues of safety or efficiency.

**Table 7-1**  
*Identified stakeholders*

Vessel operations	Primary stakeholder	Secondary stakeholder	External stakeholder
Voyage planning	Shipowner Charterer Vessel crew Port agent	Cargo owner	IMO Flag state Port state authorities Classification societies Water canals/coastal waters/straits Educational institutes/guidelines publisher Navy Pirates
Navigation	Shipowner Charterer Vessel crew Water canals/coastal waters/straits Educational institutes/guideline publisher		IMO Flag state Classification societies Pirates Cargo owner
Port entry/leaving	Port state authorities VTS Pilot Port agent Vessel crew Neighboring vessels Navy		IMO
Cargo handling	Port agent Port state authorities Vessel crew Stevedores Terminal operator	Charterer/Shipowner Cargo owner/Cargo owner agent	IMO

### 7.3. Description of Stakeholders' Interests

The following section will provide a descriptive account of the identified stakeholders. This part contains the description and also answers to the question, what are the roles, responsibilities and interests of the stakeholders?

**Shipowner.** Shipowner is a person who owns a vessel and is responsible to fulfill the certain tasks like commercial and technical management, safety management, legislative tasks and recruitment of vessel crew, equipment, tools, and documents. Shipowners transport the cargo on freight rate as per the quantity of cargo or get a hire against the vessel hire for certain time. They can manage ships themselves and perform these tasks or the vessel can be operated through a ship management company. They can outsource some or all of these management activities. Usually, the Shipowners are known through the ship management company and perform the technical management through the company. Moreover, Commercial operations of the vessel can be delegated to third party known as charterer.

Ship operators, as the Shipowners, play a key role in meeting the responsibilities and can set the guidelines for the operations of the vessel. They desire the commercial deployment of the vessel throughout the year which increases the profit generation from the vessel without sacrificing the safety standards. Shipowners have the direct authority over vessel in all the circumstances. Despite the overall authority, the role changes according to the contractual relationship and the extent for safety and efficiency also changes depending on the contract. In general, most of the shipowners try to improve the safety standards. However, safety and efficiency concerns are situation dependent for an owner i.e. contractual relationship.

**Charterer.** A charterer is a party who hire the vessel from shipowner to perform the commercial operations. A charterer can be cargo owner or a party without cargo who hires the vessel and transport the cargo for other parties.

The relationship between shipowner and charterer is governed through the charter party agreement. The charterer transports the cargo for a single voyage and pay the shipowner according to the quantity of the cargo transported i.e. voyage charter part. Charterer can hire a vessel for specific time period i.e. time charter party or for a long term bareboat charter party. The charterer roles and responsibilities are agreement based where his interests is also bound to the agreement. In any case, Charterer is commercial entity whose interest is always towards the financial efficiency to get the maximum profit.

**Cargo owner.** Cargo owner is a person or company who owns the cargo which needs to be transported. The cargo owner is usually responsible for providing and receiving the cargo and makes all the related arrangements and documentation. For the transportation of the cargo, the

cargo owner can contact with the vessel owner if he operates the vessel himself or contact the chartering companies.

The cargo owner desires the safety of the cargo and timely delivery at the described place. He has no concerns how the owner/charterer will perform the vessel operations other than his cargo and specifically in the light of the analyzed vessel operations.

**Shipping agent.** Agent is person who is the representative of shipowner, cargo owner or charterer. Agent acts on the behalf of the shipowner/charterer/cargo owner and they are legally responsible for the acts of the agent.

**Port agent.** Vessel master cannot perform all the duties, arrangements, documentation and legislative work and in need of a person who has specialized knowledge and can prepare and handle all the work at port. The port agent is hired by the shipowner or charterer, depending on the contract agreement. Port agent does all the communication with the port state authorities and master, prepare and fill the documents, make arrangement for cargo acceptance, delivery and operations. Port agent communicates the shipowner/charterer message to master and master has the duty to accept the orders from the agent. Port agent acts according to the interest of the person who has hired him. However, he ensures all the arrangements for a safe, short and efficient stay of vessel in the port. The role of port agent changes in different vessel operations and the influence levels.

**Cargo owner agent.** Cargo owner agent represents the cargo owner in the port operations. He acts on the behalf of cargo owner by signing and fulfilling all the requirement of necessary documents for the delivery and receipt of goods. The contract between the cargo owner and charterer/shipowner defines the roles of cargo owner agent. For example, if the cargo owner performs the loading/unloading then the scope of the duties and interaction of cargo owner agent with the master will change. This in turn made him effect on the safety and efficiency differently.

**Neighboring vessels in port.** When the vessel enters or leaves the port it has to navigate through the huge traffic of vessels especially in the big and congested ports. Neighboring vessels are always a threat in the safe navigation through the port. They have no direct relationship and influence on the vessel master. But master is under pressure to safely reach the berth without any contact or collisions with other neighboring vessels. Neighboring vessels are identified by an



agent and can influence safety and efficiency. The collision can affect the vessel safety as well as the efficiency in the port entry/leaving.

**Vessel crew.** Vessel crew on board is identified as an important stakeholder and has presence at every vessel operation. Vessel crew members assist master in performing the vessel operations and have assigned roles and responsibilities. Vessel owner recruit and train the vessel crew and they have major role to play in every vessel operation.

Vessel crew act on the directions of the master but considered as separate entity they have influence on the safety and efficiency of the vessel operations. They are trained and specialized in their area of operations to perform the operations in a safe and efficient manner.

The knowledge, skills and experience of vessel crew influences to perform the operations in a safe and best possible way to enhance the safety and efficiency. In fact, under the command of master they can deviate from their perceived and required behavior. But seem them as a separate entity they have positive influence on safety and efficiency.

**IMO.** IMO has a central role to play as a regulator of maritime industry. IMO is a “*specialized agency of united nation, for the global standard-setting authority for safety, security and environmental performance of international shipping*” (IMO). IMO constitutes regulation for shipping industry which are adopted and implemented globally. IMO works on every aspect and maritime sector to prepare a framework for safe, efficient and secure shipping industry.

IMO provides legislative framework, guidelines, recommendations and advice to enhance the safety of the maritime industry. The major safety related issues for a merchant trade are covered in SOLAS and environmental safety related issues are dealt in MARPOL. IMO does not impose the regulation but the states signatory to IMO conventions, make sure that the rule and regulations are followed. IMO also provide procedures to properly implement the regulations. All the maritime authorities work under the umbrella of IMO to ensure the safety of a life, environment and prevent pollution.

**Flag State.** A vessel registered under the flag of a nation obliged to follow the rules of the flag state. Flag state has the administrative, technical, social and juridical authority to enforce its law on the vessel flying its flag. Flag state roles and responsibilities have been described in a number of various international conventions and regulations. These conventions include SOLAS 1974 CH V, MARPOL 73/78, STCW 2010, COLREG 1972, LL 1966 and UNCLOS 1982 Article 94. Flag state has the responsibility and control over the safety of the vessel register

under their flag. Flag state should ensure that the vessel meet the international standards and provides the vessel with the documentation and certificates related to the inspection, safety and pollution prevention. The documentation provides a proof that the vessel has been inspected and follows the international standards. Flag state draws its regulations under the framework provided by the IMO and may impose more rule as required. Signatory states to the IMO conventions have the responsibility to ensure the compliance with convention regulations.

**Port state authority.** Port states are the loading or unloading ports where vessels berth for transfer of cargo. Port states authorities operate, manage, equip and maintain the port operations. These various services facilitate the operations of foreign vessel. Port authorities enforce rules and regulations while a vessel is in the port. Port ensure that vessel in the port is in compliance with the international rules and regulations. The vessel is inspected by the port state control to verify that the vessel meet the international standards and have valid documentation and certificates of inspection, safety and pollution prevention provided by the flag state. The port can detain the vessel which does not fulfill the required standards. The major responsibilities of the port state are; safety of vessel, prevention of accidents in port, safety of environment and safety of infrastructure.

**Terminal operators.** Terminal operators have privately owned terminals at the ports which provide the cargo handling, transfer of cargo and other necessary facilities to perform the loading and unloading of cargo. The terminal operators are privately owned entities with the major objective of earning profit. Port state controls the terminal operations and conduct inspection to ensure compliance with the rule and regulations. The level of services to ensure safety and efficiency vary from terminal to terminal. However, the terminal operator found to have negative influence on safety and efficiency due to inadequate facilities, language difference, no law enforcement and port control, no safety procedures, equipment and untrained personnel of port operators are some of the contributing factors. Further, they followed the instructions from the charterers and work accordingly.

**VTS.** Vessel traffic service is service provided by the port authorities. VTS monitor and track the passage of the vessel in port and ensure the navigational safety of the vessel in the limited geographical area. VTS contributes to safety of life at sea, safety and efficiency of the

navigation and protection of the marine environment, adjacent shore area, work site and offshore installation from the possible adverse effect of the maritime traffic (IMO).

**Pilot.** In many of the ports where navigation is unsafe for master, it is necessary to have a compulsory pilot on board before entering the port area. The port authorities are responsible for providing the piloting services. IMO provides the guide line and recommendations on the training, certification and operational procedure in carrying out the piloting process.

Pilots have the expert and detailed knowledge of the local waterways. Pilot guides and assists vessel master to navigate the vessel safely and bring it to the port. Pilot plays an important role in the navigational safety of a vessel entering or leaving a port.

The port authorities also publish informational guides including the topics; rules and regulations, required documentations, guidelines on port safety, navigation, security and services.

**The coastal waters/water canal/straits.** The coastal waters are the territorial waters of a country where it can exercise its jurisdiction. According to UNCLOS, part II section 3 article 17 and part III section 2 article 38, vessels are free to navigate through the high sea and they have also the right to pass through the territorial waters of any country until or unless the vessel is not a source of any kind of harm while passage.

The passing vessel must adhere to rules and regulations of the coastal states and ensure safe navigation, safety of environment and infrastructure and maritime traffic. Usually, coastal states do not interfere to the passing vessel until or unless it is not abiding by the rules.

The strait is the narrow passage of waterways which comes under the jurisdiction of a country. The same rule applies for a vessel passing through the strait which are for coastal waters. However, the passage should be regarded as innocent passage and the state can enforce its own rules in consultation with IMO regarding safety of navigation and traffic scheme.

Water canal have own rules, navigational regulations and traffic scheme to ensure the safe passage through the canal.

**Stevedores.** Stevedores are the persons who perform the actual work of loading and unloading of the cargo. The stevedore company provides workers, cranes, forks and other equipment for the cargo handling as required.

Stevedores are hired by the entity that is responsible for loading/unloading of the cargo which is dependent on the terms of the contract. The stevedores are hired by shipowner/charterer

and works under the supervision of the master and vessel crew to ensure the safety of cargo and vessel. The stevedores are experienced persons in cargo handling but different type of vessel, cargo and different handling procedure can affect the cargo and safety of vessel if the cargo is not stowed properly. Moreover, the stevedores are under the influence of the party who hires them and work according to their interests.

**Classification societies.** Classification societies provide classification and constitutional services to the shipping industry and the maritime regulatory bodies. Classification societies ensure that the vessel meets the structural, technical and operational standards sets by the regulatory bodies. Classification societies made their own rules in compliance with the international legislative and regulatory bodies to meet the safety standards. The role of classification is more important in the shipbuilding stage and once the vessel is in commercial operations, it is owner's responsibility that vessel satisfy the class rules.

Classification societies safeguard safety of vessel and compliance with the classification rules by conducting the schedule surveys. The classification societies notify the flag state if vessel is unable to maintain the class and as a consequence the flag state invalidates the vessel certificate regarding equipment and construction.

Classification also assists the flag state in performing the inspection of the vessel regarding the compliance with the safety and pollution prevention standards. Flag state may not have the expert and detailed knowledge in performing the inspection. SLOAS gives right to flag state to delegate the survey and inspection of vessel to recognized organization (classification society). Further the classification society can give navigational or operational notion to the vessel.

**Navy.** Navy has been identified as a stakeholder in the vessel operations due to its ability to restrict navigation to certain areas. It has no concern for the vessel operational safety or efficiency. In fact, vessel master must take into account the navigation to any prohibited area during the voyage planning and when the vessel is navigating.

**Pirates.** Piracy is one of the major issues in the maritime transport. Pirates can adversely affect the safety of vessel, cargo and vessel crew and to the efficiency as well, especially in the seas of western India, Somalia and gulf of Guinea and Aden. They can push a master to devise an alternate safe route which may costs more and decrease economic efficiency. Master can take risk to pass through the pirate area to save fuel and time but then the safety may be at stake.

**Educational institutes and guideline publishers.** Educational institutes conduct research on the safety and efficiency issues and provide the maritime industry with different solutions to the problems. They are identified as positive contributors to safety and efficiency in terms of providing guidelines, research and recommendations which enhance the operational safety and efficiency. Vessel master take into account such materials to enhance the operational safety and efficiency.

Guideline and chart publisher has a vital role to play especially in the voyage planning stage. The publication can impact the quality of the drawn voyage by providing updated information and guidelines.

## **8. Results of stakeholder Analysis**

Stakeholder's analysis is performed for all the operational stages separately. The analysis describes the roles, responsibilities and interests of identified stakeholders along with type and degree of influence. This analysis also answers the questions of how, why and which stakeholders influence the safety and efficiency? The results are presented in table 8-1, 8-2, 8-3 and 8-4 for voyage planning, navigation, port entry/leaving and cargo handling respectively. The results presented here will help in mapping the stakeholder network that is described in next section.

**Table 8-1**

*Stakeholder analysis of voyage planning*

Vessel operational stage	Stakeholders	Roles and responsibilities	Nature of interest	Type of influence	Degree of influence	
					Safety	Efficiency
Voyage planning	Shipowner	Provide voyage information	Safe and efficient plan	Formal	S+	E-
		Provide equipment, training and system	Depend on the contractual relationship	Informational		
	Charterer	Provide voyage information	Less expense ,time, fuel and distance	Informational	S-	E+
				Formal		
	Vessel crew	Provide assistance, experience and knowledge	Planning according to legislation and company guidelines	Informational	S+	E+
				Operational		
	IMO	Provide rules, regulations and guidelines	Plan according to rules Safety of life, environment	Informational	S+	E-
	Port state authorities	Provide guideline and regulation on port entry/leaving	Compliance with the rules and guidelines	Informational	S+	E-
				Formal		
	Port agent	Provide Updated information	Provide information as requested	Informational	S0	E0
	Flag states	Set rules and regulations	Compliance with state and international rules	Formal	S+	E-
				Informational		
	Classification societies	Classification of vessel based on rules and regulation	Safety and efficiency of vessel	Formal	S+	E-
Informational						
Operational						
Water canals/coastal waters/straits	Provide guideline and regulation for passage	Safe navigation of vessels through territorial waters	Formal	S+	E-	
			Informational			
Cargo owner	Provide cargo and voyage related information	Safe and schedule cargo transportation	Informational	S+	E+	
Educational institutes/guideline publishers	Advices and guidelines on voyage planning	Safe and efficient voyage plan	Informational	S+	E+	
Navy	Provide information and regulation for vessel navigation	No illegal activity or violation of law	Informational	S0	E0	
pirates	-	-	Financial	S-	E-	

**Table 8-2**

*Stakeholder analysis of navigation*

Vessel operational stage	Stakeholders	Roles and responsibilities	Nature of interest	Type of influence	Degree of influence	
					Safety	Efficiency
Navigation	Shipowner	Give orders for any change	Safe navigation to meet schedule	Formal	S+	E-
		Provide assistance		Informational		
	Charterer	Give direction regarding any change	Fuel and time saving	Formal	S-	E+
		Provide assistance		Informational		
	Vessel crew	Assist master in navigational and onboard operations	Performance of activities according to standards	Operational	S+	E+
				Informational		
	Water canals/coastal waters/straits	Monitor the passage of vessel	Follow the traffic scheme Safe navigation No damage or violations to regulations	Informational	S+	E-
				Formal		
	Cargo owner	Inform charterer/ shipowner any change	Performance and position of the vessel	Informational	S0	E0
Provide regulatory framework		Safety of life, crew, vessel, environment	Informational	S+	E-	
Flag state	Ensure the vessel on voyage meet all the international regulations	Compliance with state and international regulations	Formal	S+	E-	
Classification societies	Guidelines on the vessel operational capacity	Safety of vessel, equipment and operations	Informational	S+	E-	
	Notification to flag state on if class not maintained					
Educational institutes/guideline publisher	Advice and recommendation on operational efficiency and safety	Safe and efficient navigation	Informational	S+	E+	
Pirates	-	-	Economic	S-	E-	

**Table 8-3***Stakeholder analysis of port entry/leaving*

Vessel operational stage	Stakeholders	Roles and responsibilities	Nature of interest	Type of influence	Degree of influence	
					Safety	Efficiency
Port entry/leaving	Port state authorities	Provide guideline, assistance, services, rules and regulations	Ensure compliance with regulations and International standards	Formal Informational	S+	E-
	VTS	Monitor and track the vessel passage Provide assistance	Ensure the safe passage	Informational	S+	E-
	Pilot	Provide assistance onboard to navigate through the port area	Ensure the safe passage	Operational Informational	S+	E-
	Port agent	Provide Assistance in all port operations Act according to party who hired them	Safe and short stay at port	Formal Informational	S0	E+
	Vessel crew	Provide assistance for safe port entry/leaving	Performance of activities according to standards	Operational Informational	S+	E+
	Neighboring vessels	Follow the instructions of port state and traffic scheme		Economic	S-	E-
	Navy	Monitor the vessel movements	No entry to prohibited areas	Informational	S0	E0
	IMO	Provide regulatory framework to port authority Provide guidelines for port operations to master	Safety of life, vessel crew, vessel, environment	Informational	S+	E-



**Table 8-4***Stakeholder analysis of cargo handling*

Vessel operational stage	Stakeholders	Roles and responsibilities	Nature of interest	Type of influence	Degree of influence	
					Safety	Efficiency
Cargo handling	Port agent	Made arrangements for loading /unloading operations	Safe and efficient loading and unloading	Informational	S+	E+
	Port state authorities	Provide guideline, assistance, services, rules and regulations	Ensure compliance with regulations and International standards	Formal Informational	S+	E-
	Vessel crew	Assistance in cargo handling operations	Safety of cargo, vessel and workers	Operational Informational	S+	E+
	Stevedores	Perform the cargo handling	Do the job as instructed	Operational	S-	E-
	Terminal operator	Provide facilities and services for cargo handling	Performance of operations as instructed	Operational	S+	E+
	Charterer/ Shipowner	Instruct the port agent about cargo handling	Timely loading /unloading	Informational	S+	E+
	Cargo owner/Cargo owner agent	Receive /deliver cargo	Timely and safely receiving and delivering cargo	Informational	S+	E-
IMO	Guideline on cargo handling	Safety of cargo, vessel, vessel crew, workers and environment	Informational	S+	E-	

## 9. Stakeholder's Network

Stakeholder's network presented in this part is the visualization of the results found in the preceding part. The intention is that these networks can become a part of a structured analysis of how safety and efficiency in ship operation can be included by changes in network structure.

It was one of the objectives of this study to construct a network showing the involved parties at different operational stage of voyage planning, port entry/leaving, navigation and cargo handling. The network presented will be based on the network model described in the introduction part; it will map the involved parties and influence patterns of each stakeholder. The network will also depict the level of influence on safety and efficiency in each relationship which is influencing the master.

The structural relationship pattern of the network will be based on the assumptions, that commercial management of the vessel rest with the charter who is responsible for the deployment of the vessel and pay a lump sum hire to the shipowners. Shipowners have the responsibility of manning and technical management of vessel. This assumption represents a situation when the vessel is on time charter party. Time charter party gives a better ground to study interaction and influence where most of the vessel operational stakeholders are present. Further, TCE (time charter equivalent) is also the most common practice in the industry to measure the performance in the shipping industry especially in tramp trade. The shipping companies calculate the earnings of the vessel on the period to period bases. They assume that the vessel is on time charter despite of its deployment on voyage or bareboat charter to calculate the earnings for particular period. These assumptions will help in constructing a model based on the industry financial performance indicator and will be representative of all the stakeholder of vessel operations. The model, systems and sub-systems built in this section are based on the defined assumption. In reality, the structure changes as the nature of relationship changes which is the topic of the next part. This assumption will help in building the basic structure of model.

This section will follow a systematic pattern by presenting the network environment of voyage planning, navigation, port entry/leaving and cargo handling respectively. The network structures presented in this part are mutually exclusive of whole voyage. Each operational stage presents only the stakeholders and interaction relevant to particular operational stage. In fact, there may be relational ties among the stakeholders which are not shown in the representation of the individual stages and will be shown in the whole voyage presentation.

### 9.1. Influence Pathways

Stakeholder analysis reveals that vessel operational environment is composed of various stakeholders who are part of a complex network. The intact environment is consisting of several multiple ties between the nodes. The operational environment found to be consisting of many sub-systems that build up the whole network. The research has also identified that structural pattern is formed by the influence pathways. The influence pathways or ties are the path formed as a result of stakeholders induced influence. These influence pathways found to be the building blocks of sub-systems, systems and thus the whole network. This part identifies all the systems and sub-system along with influence pathways at each operational stage that finally leads to the construction of whole voyage network system. The figure 6-3, as described in the methodology part, will lead to the mapping of influence pathways in the vessel operational environment.

The influence pathways also provide a measure to assess the whole network system in terms of safety focus or efficiency focus. These structural characteristics can be used to measure the influence patterns represented by the network structure of the different vessel stages. The ratio between E+, S- and E-, S+ is good measure of an operational stage to be regarded as efficiency or safety focus stage. The ratio can be calculated by counting the number on influence pathways/lines representing E+, S- and E-, S+ respectively.

### 9.2. Voyage Planning

Voyage planning stage is found to be of the most important stages of the voyage which vessel is going to perform. It lay down all the procedures in a pre-specified way which includes all the necessary information for a vessel from berth to berth.

Voyage planning stage characterizes with the number of different stakeholders with each having diverse nature of interest, roles and responsibilities and relationship. The voyage planning stage found to have two sub-systems, described in the following part.

**Shipowner and charterer influence network for voyage planning.** This network (figure 9-1) illustrates three overlapping sub-systems and depicts the influence pathways between the interacting nodes. First sub-system shows interactions of charterer, shipowners and master. Second sub-system represents the relational ties between charterer, port agent and master and last sub-system in the network shows the shipowners, vessel crew and master interactions.

This network of sub-systems represents the primary stakeholders influence on master in the voyage planning stage.

The charterer interacts with the cargo owner, who is the provider of the cargo and all the information related to voyage and ports. The cargo owner, has no direct interaction with the master rather charterer act as intermediary party between them. He is not directly influencing the master and thus considered as secondary stakeholder. However, despite his position as secondary stakeholder he is the source of deployment of the vessel and provider of necessary information for drawing the voyage plan. The charterer disseminate this information to shipowners who are having the technical management and manning responsibility and liable for the performance of the voyage. Their relationship exists due to the contractual relationship between them. Moreover, this information is also passed on to the master with special instructions from the charterer to draw such a plan which brings overall profitability.

The shipowners are the owner of the ship and master is the representative of the ship owner. This give shipowners a formal authority to excise his orders (IMO). This let master under the formal influence of the owner due to the nature of his relationship. Further, in the voyage

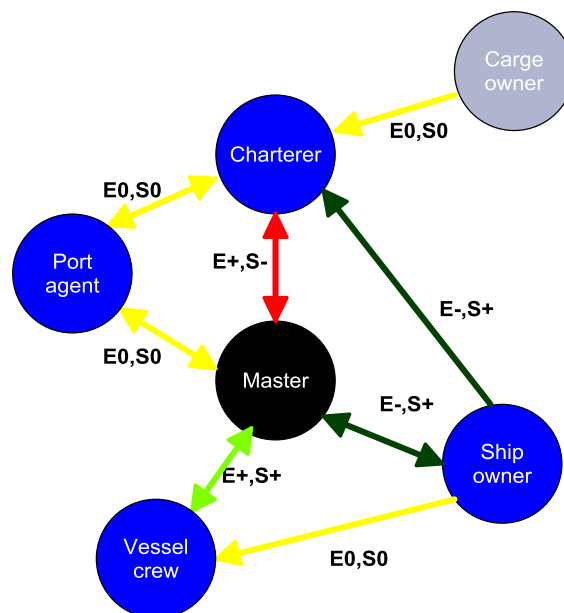


Figure 9-1 Shipowners and charterer influence network for voyage planning

planning stage owner is more safety conscious and provides information and assists master in drawing a voyage plan which is safe for vessel crew, environment and cargo. The plan will be drawn according to the orders by the charter but the shipowners influence the master in drawing

a plan with consideration to every aspect of safety. The owner has less emphasis on the efficiency because he is getting hire from the charterer which is fixed in nature and diverts his attention from efficiency matters to safety.

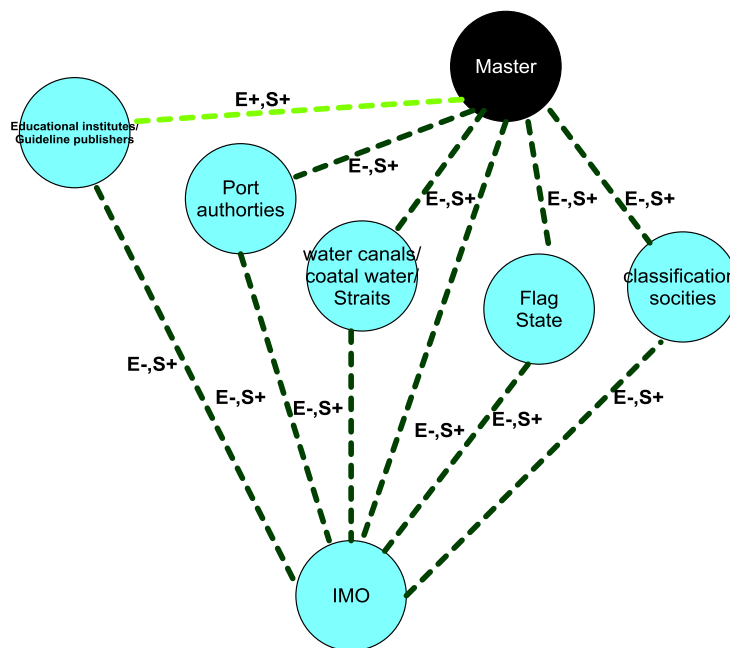
The charterer performing the commercial operations give directions to master about the voyage from loading port to unloading port. However, sometime as required, the master contacts port agent, hired by the charterer, to get further information regarding the port. The port agents have updated information and they are well aware of any new development in rule regulation or other issues particular related to port. At the voyage planning stage the relationship with agent exist as the provider of information based on the master query. This information can be useful in drawing an efficient and safe plan. However, the agent itself is not a factor of influence on the master in the voyage planning stage because he just acting as an informer without any power to influence.

The vessel crew and master has important tie in the voyage planning stage. The vessel crew share their information, skill and education in drawing the voyage plan. The navigational officer has the responsibility of drawing the voyage plan under the direct supervision of the master. Although, the navigational officer works under the command of master but his responsibility is to build such a plan which is efficient without compromising the standards of safety. He can suggest master alternate routes, short cuts or may suggest more long but safe route. The master work together with the navigation officer and most of the time totally relay on it.

The navigational officer and all the vessel crew have the responsibilities for safe operations beside the master that has the ultimate responsibility. Vessel crew seen as a separate entity from master is obliged to perform every operation safely and efficiently. However master who is under influence by other stakeholder is the reason of variation in vessel crews perceived operational characteristics.

The charterer has the equal number of ties in the network as compared to vessel master which signifies his importance in the network. The charterer pays a fix hire to the shipowners and wishing a maximum output. Shipowners emphasize the charterer to take care of safety matters in performing the commercial operations. On the hand, the charterer is in favor of a plan which saves time, expense and fuel to increase the profitability. The charterer only concern for efficiency found to result in the negative effect on the safety.

**External stakeholders influence network for voyage planning.** The figure 9-2 shows a relational system of external stakeholders interactions between each other and finally with the principal node, the master. The external node has no direct ties with the principal node. All of the external stakeholders belong to the legislative, regulatory and other informational bodies. These stakeholders are not in direct interaction with the master nor influence the safety and efficiency issue directly. However, in a voyage planning stage they have an external stake, as the plan should incorporate all the rules regulations, recommendations and guidelines to make a perfect



**Figure 9-2** External stakeholders influence network for voyage planning

plan by giving consideration to the interests of each part stakeholders.

IMO has a very central role to play in the whole maritime sector and its gives recommendations, guidelines and prepare framework for the different actors in the maritime industry. IMO ties with master exist due to its specific guide line for the voyage planning stage and it advises that a proper plan should have four parts (appraisal, planning, execution, monitoring). IMO requires a plan should ensure safety of life, safety and efficiency of navigation and safety of marine environment. A voyage plan should take into consideration all the related factors and gather all the information related to a voyage (appraisal). A detailed plan covers all voyage factors from berth to berth (planning). Carry out the voyage according to the devise plan and make changes if necessary (execution). A plan should be monitored all the time to compare

the progress (monitoring). The plan ensure all the safety factors including safe speed, safe route, vessel crew safety, proper equipment and documentation, navigational equipment and weather considerations incorporating all these factors conflicts the interest of the charterer and impacts negatively on financial efficiency.

IMO's role is to provide the regulatory framework and provide procedure for proper implementation. However, real implementations responsibility lies on the flag state, port state and other authorities. The countries signatory to the IMO conventions has the responsibility to implement the rules. The flag state ensures that whether the vessel is seaworthy for the voyage and inspects all the documentations and provide certificate of safety and pollution prevention before a vessel set for any voyage. Further, master has to obey all the rules set by the state where the vessel is register. The requirement and rules vary country to country which also effect on the well plane voyage plan.

Port authorizes provide guides lines which should be considered while making the plan and may be put restriction on the speed, geographical area, navigational rules and traffic schemes to enhance the safety of the vessel in the port.

In preparing the voyage plan, master requires charts, guideline and publications which are published by different authority. IMO also recommend the review of publications by these authorities. These authorizes provide guideline in devising a safe and efficient plan under the regulatory framework provided by IMO. Many educational institutes are also doing research on the voyage planning issues and publish material which will enhance the safety measures as well as advices on the issues related to economic efficiency which makes a plan more efficient in time, speed, distance and other factors.

Classification societies also play an important role in enhancing the overall safety of the vessel, it equipment and to increase the efficiency. Classification societies assist flag sates in the inspections of the vessel as required by the flag state. Moreover, to keep into the safety consideration and operational, navigational and technical capacity of the vessel classification society can place restriction on maximum distance from the harbor for safe voyage, navigational area restriction where it is not suitable for a vessel type to navigate and other operational restriction in which vessel can perform operations. Classification society does not impose the rules but it the duty of specifically of the master and generally of the owner to take into consideration these issues while doing any operations including the voyage plan. A master must

consider on what speed a vessel can go or in what navigational area a vessel can navigate while making the voyage plan.

IMO require to give due consideration to every aspect which can come across in the voyage at the voyage planning stage. The vessel may be required to pass through a water canal or have to navigate through the coastal waters are straits. These authorities follow the guidelines from IMO and may have their own rules as required for the safe passage which required considering in planning stage. Further, restrictions on speed, geographical area or traffic scheme, found to force a master to draw an influenced plan which otherwise bring more economic efficiency.

**Entire voyage planning system.** The figure 9-3 depicts and maps all the stakeholders involved at the voyage planning stage by combing all the sub-systems. These are the stakeholders who directly or indirectly affect the safety or efficiency of the voyage planning stage. The network structure depicts voyage planning stage to influence more by stakeholders on safety matters. The structure shows the E+, S- ratio to E-, S+ as 1:13.

Pirates and navy have been also identified to have some external influence in the voyage planning stage. Voyage plan should be made by looking at these possibilities as well. Moreover, prohibited navigational area and documentation required by the Navy of port states have impact on the voyage plan. Even though, they do not have any concern with the vessel operational safety or efficiency.

There is numerous numbers of stakeholders which represent regulatory, legislative or other authorities. They are the external stakeholders who have no direct stake but relation tie exist between all the nodes and master due to their concerns for safety issues. The IMO is the main regulatory body which provides guide line to all other legislative authorities to implement the rules to enhance the safety.



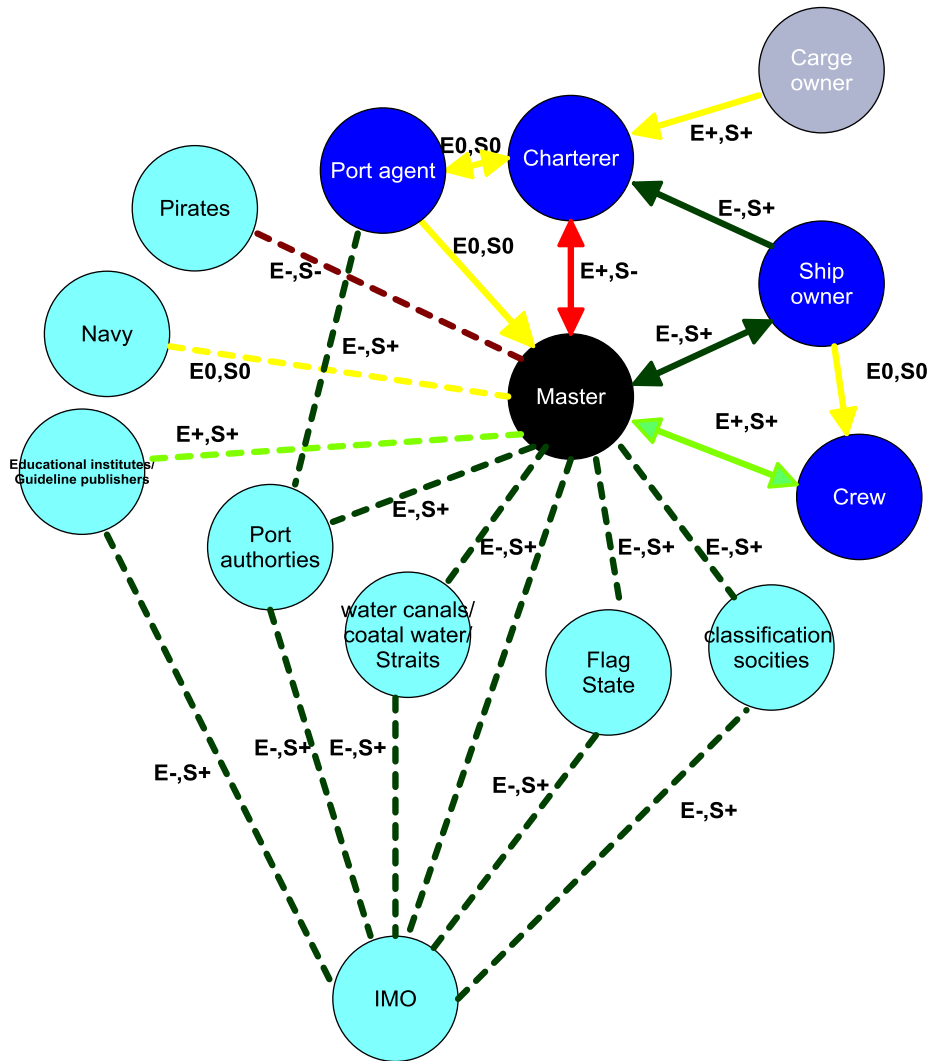


Figure 9-3 Entire system (voyage planning)

However, the ship owner and charterer on the other hand may have different interest as discussed above and shown in figure 9-1 which influences the master to trade off safety measure set by the authorities and make a plan which suits their interest.

### 9.3. Navigation

Vessel starts navigating as soon as the voyage plan is ready and it's on way to transport the cargo. Navigational stage of the vessel operations requires actual follow up of the voyage plan. This stage has several identical stakeholders with the voyage planning stage because of

same nature of stake. However, in the actual performance of voyage, master is more under pressure to meet the interest of the stakeholders by actual performance.

**Shipowners and charterer influence network for navigation.** The network shown in figure 9-4 of the navigational stage of vessel operations resembles with network structure of voyage plan stage (see figure 9-1). The structural pattern and influence pathways also show the similarities. The owners and charterer have the same type and level of influence; however their focus is more on the actual performance according to their desired objectives.

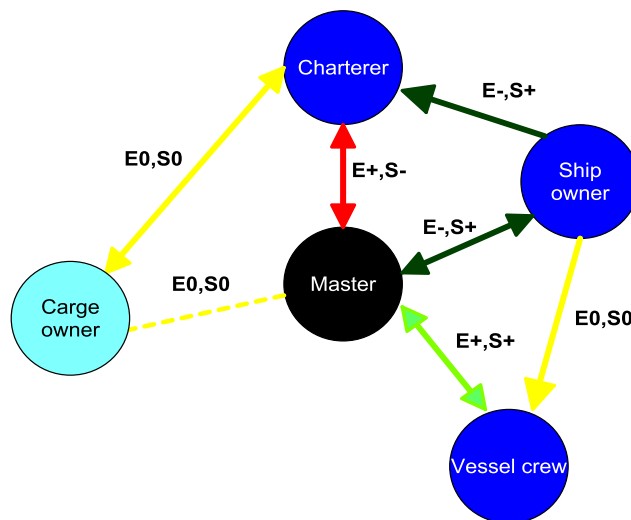


Figure 9-4 Shipowners and charterer influence network for navigation

When the vessel is in the sea each party is found to be interested in knowing the position, condition, safety and efficiency of the vessel by having the daily report. Research reveals that charterer influences master for the timely transportations of the cargo despite of the dangerous situations regarding weather or problems on board. On the other hand, vessel owner desires the safety of vessel, vessel crew, environment and cargo during the navigation of the vessel. Cargo owner interact with the charterer for the completion of contract between them. Cargo owner indirectly influence master through the charterer on any matter related to the voyage. Cargo owner's external ties in the structure illustrate the informational relationship. The cargo owner wants to know the position of the valuable cargo to ensure the timely transportation along with the safety of cargo.

**External stakeholders influence network for voyage planning.** The figure 9-5 represents the structural arrangement and influence pathways of nodes in navigational stage

which depict the relational system of the network. This sub-system has a like relation ties, resource dependencies and influence type as explained for the external network of the voyage planning stage. But the actual navigation through sea required implementation of the factors which impact in the voyage planning stage.

Moreover, water canal/coastal water/straits are identified as the primary stakeholders in the navigational stage due to direct interaction while the passage through the territorial water of the countries. A vessel has to obey the rules and regulation on navigational safety, traffic scheme and environmental protection set by authorities in those waters which identified these authorities as direct safety influencer.

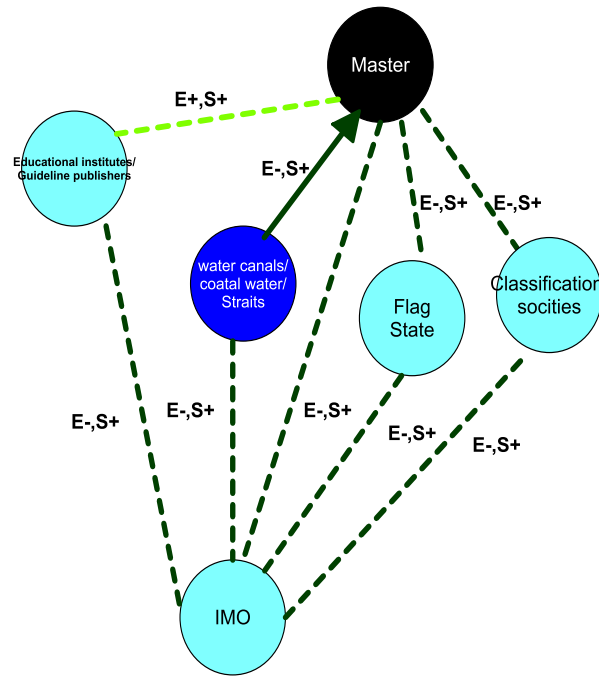


Figure 9-5 External stakeholders influence network for voyage planning

**Entire navigation system.** The figure 9-6 shows all the ties between the nodes, structural patterns and influence pathways of the stakeholders involved in the navigational stage. The E+, S- ratio to E-, S+ is 1:10.

Pirates indicated as external stakeholder, due to the fact that if the vessel is navigating through the sea confined by the pirates they can affect the safety and if master avoid the passage through that area he will be compromising the voyage efficiency. A deep sea voyage has higher

risk of attack by pirates which makes pirates as an external party effecting both safety and efficiency.

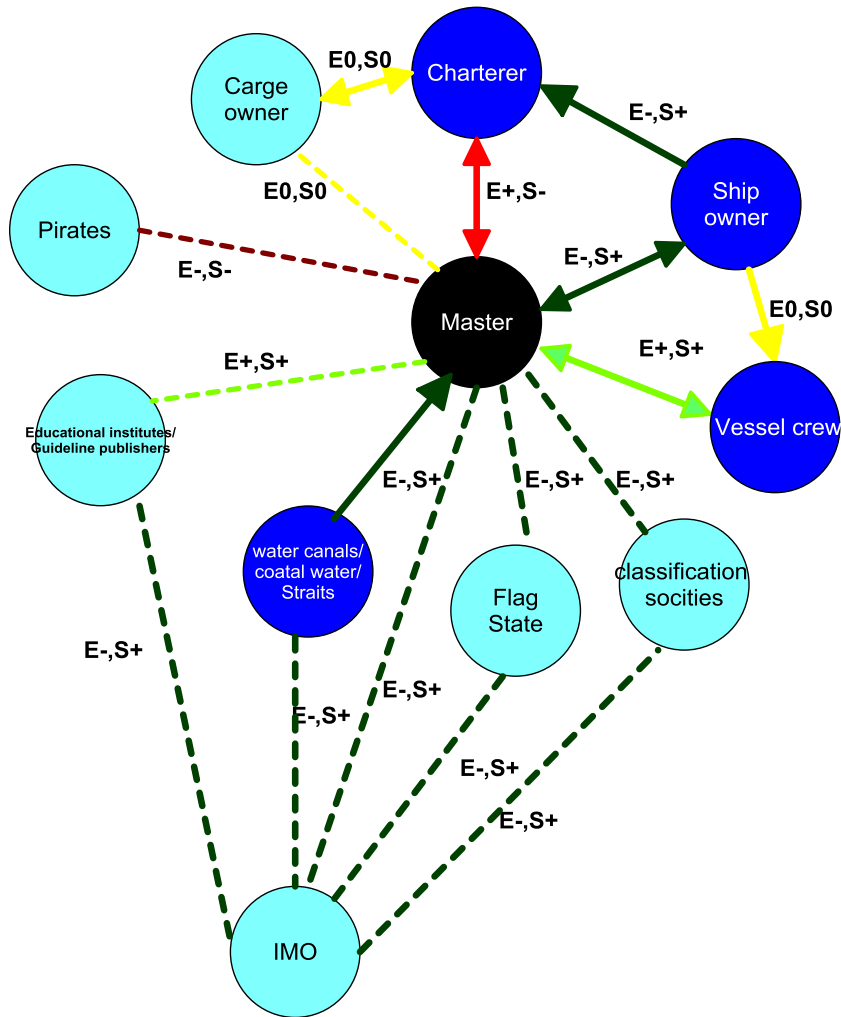


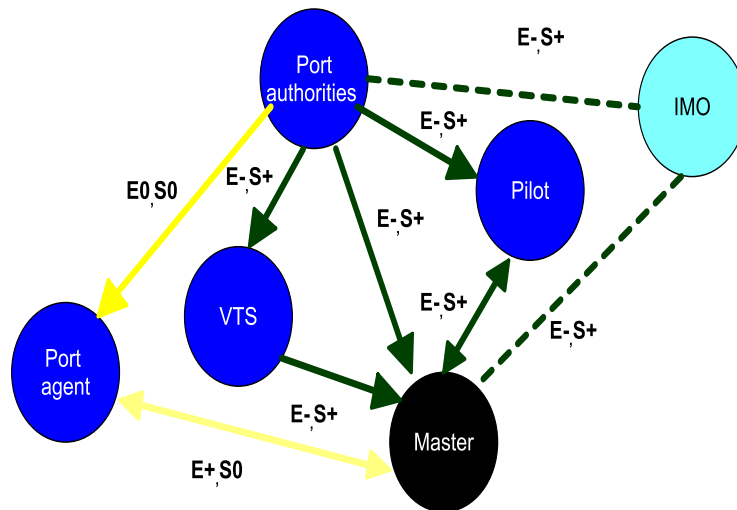
Figure 9-6 Entire system (Navigation)

#### 9.4. Port Entry/Leaving

Port entry or leaving both processes involves the same stakeholders. When the vessel is entering a port it or leaving a port, it is on the territorial water of the foreign country and obliged by the rules of the port state. In the port entry or leaving stage the master is under the influence of the port authorities.

**Port state influence network for port entry/leaving.** The figure 9-7 of the port entry stage recognizes the port authority influence on the vessel master. Port authorities, VTS and pilot have the direct ties with the principal node, with IMO as the regulator of the port state authority.

IMO provider guidelines for the safe navigation of the vessel passage in the port area. IMO as an external stakeholder did not directly impose the rules and regulations. In fact, port authorities have the role to enforce its own specific rules as well as ensuring the compliance with IMO regulations.



**Figure 9-7** Port state influence network for port entry/leaving

Port state authorities inspect the vessel through the officials of port state control to ensure that safety standards are met according to international regulations. Non-compliance result in the detention of vessel or delay which recognize as decreasing the efficiency of the port entry stage and of the whole voyage. VTS and pilot are the services provided by the port authority to ensure the safety of port facilities and infrastructure, other vessel and safe navigation of the vessel. VTS assist and monitor the passage of vessel to avoid any miss happening in the port area. VTS enhance the safe navigation through the port by assisting and providing information. VTS is identified as a factor of safety but it seems to lower the efficiency. The efficiency decrease due to miscommunication and such information which leads to undue wait which result in time and fuel consumption. Safety measures are further enhanced by the pilot on board who has the expert knowledge of the area and guide the vessel to safely berth. Port state as a regulatory and law enforcing authority, exercise the formal influence to enhance the safety and provide information

and guidelines to meet the standards. However, in quest for following the rules and standards set by the port state leads to lower efficiency in terms mostly delay.

Port agent interaction with the port state is of legislative and administrative nature, where a port agent meets all the documentation and legal requirement necessary for the entry or leaving of vessel in the port. Port agent also coordinates with master and physically present on the arrival of vessel. These all pre-done arrangements, before the vessel arrival in port, save time fuel and cost which ensure the scheduled operations of loading/unloading.

**Entire system port entry/leaving.** The entire port entry or leaving operational environment is illustrated by the figure 9-8. The port authorities has most central role to play to ensure the safe navigation and the relation system depicts port authorities as safety conscious. The port authorities rules and regulations are not made to decrease the efficiency but research

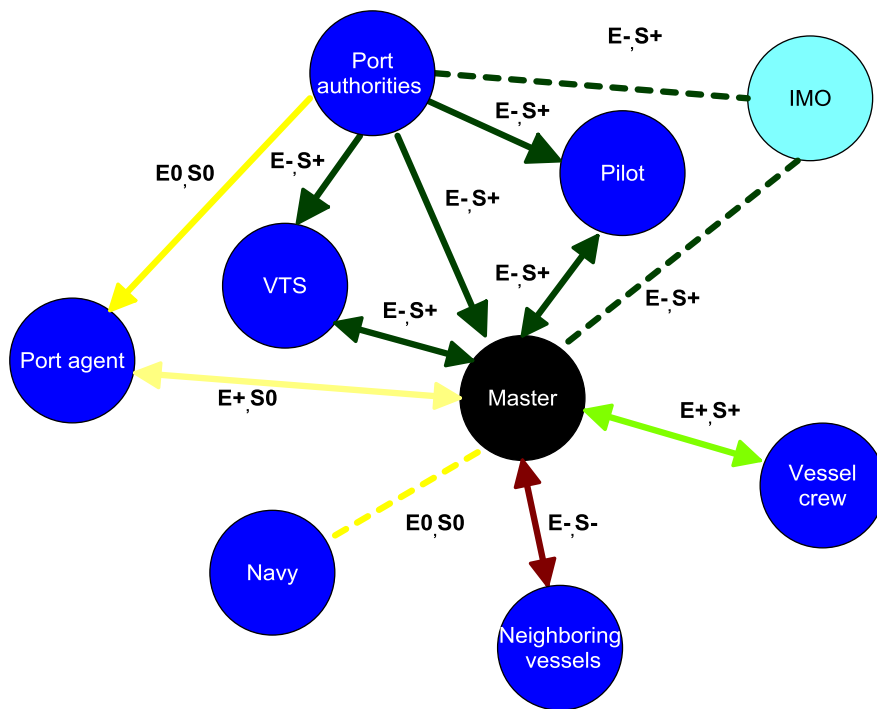


Figure 9-8 Entire system (Port Entry/leaving)

indicate the influence induce by these regulations cause the efficiency to go down. This stage is also safety focus with E+, S- ratio to E-, S+ as 0:7.

Navy is an external stakeholder, which needs to be informed before entry in the port in some territorial waters. Navy monitors the movements of vessels in territorial waters without interfering until or unless a vessel is engaged in any unlawful activity.

Neighboring vessels are recognized to have negative influence on safety and efficiency. In the port area, neighboring vessel found to hinder the passage which can cause delays or cause damage due to collision which is not rare in port areas. Finally, the vessel crew has an important role to play to safely navigate the vessel through the port area safely and efficiently.

### 9.5. Cargo Handling

The cargo loading and unloading systems environment recognize the impact of third parties which are otherwise not present at any other stage of the vessel operations. Loading and unloading differ from vessel to vessel and from cargo to cargo. However, the parties involved are always the almost same. The network systems of cargo handling system interact and overlap with each other to define the whole cargo handling operational environment. In this operational stage focus of stakeholders is safe and efficient cargo handling and the timely loading and unloading.

**Port agent influence network system for cargo handling.** Cargo handling stage identifies the importance and influence of the port agents. He plays a key role in performing all the administrative, legal, and communicational tasks. The port agent hires stevedores and makes arrangements with terminal operators to perform the loading or unloading task. Stevedores and terminal operators are third parties and works according to the interests of the hired party.

All the preparations and equipment are arranged as ordered by the port agent on behalf of the charterer. The charterer is interested in meeting the time lines and to secure the further business. The port agent as charterer representative ensures the performance of terminal operator and stevedores according to chartered interests. The structural arrangement and influence pathways in figure 9-9 is indicative of the interests of charterer as being efficient to save time to reduce stay in port.

The master is under influence of the terminal operators who are performing the cargo handling. The terminal operators will work according to the induced influence of port agent. They are paid by the charterer and take care of his interest. Further, the terminal operators are privately owned bodies with the objective of getting more and more business which also have decreasing effect on safety standards.

The stevedores and master represent an important relationship which affects the overall cargo handling. Stevedores are the actual persons who perform the loading and unloading of the

cargo. They are professional worker and have the ability to perform the work quickly and efficiently. In fact, master is responsible for the safety of stevedores, safe cargo handling and safety of vessel and overall cargo operations. However, stevedore can affect the safety of cargo or vessel if not manage properly.

Master vessel crew relationship is present in all vessel operational stage and throughout the entire vessel operations. In the cargo handling stage chief officer is responsible for cargo operations to master. He may appoint second or third officer for the proper stowage of the cargo. However, master and chief officer should all the time supervise the cargo handling to ensure safety.

Lastly, the structural arrangement change if a terminal has all the needed equipment and usually private terminal provide all the associated service which reduce to contact with the stevedore company.

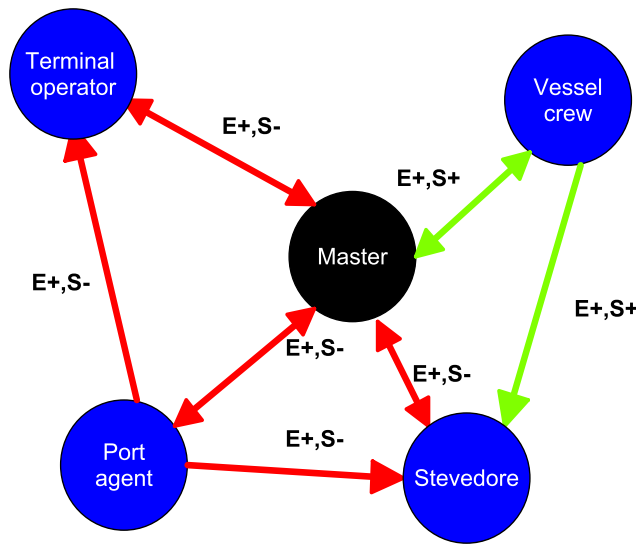
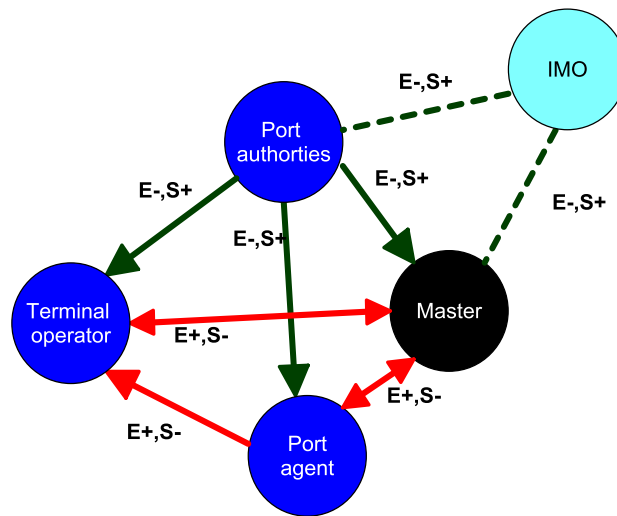


Figure 9-9 Port agent influence network system for cargo handling



**Port state influence network for port cargo handling.** The figure 9-10 illustrates the influence of port authorities as safety conscious. Port states work under the guidelines of IMO which give recommendation for cargo handling and safety. The IMO provide guidelines to port authorities and terminal operators for the handling of cargo. In case of private terminal operator as considered in this model. It is the responsibility of the port authorities to implement the regulations. The safety standards requirement has decreasing effect on the efficiency as depicted by the influence pathways shown in figure 9-10. This network sub-system also identifies the common nodes (port agent and terminal operator) with the sub-system network of port agent (figure 9-9) and have the same interaction and influence as explained earlier.



**Figure 9-10** Port state influence network for port cargo handling

**Entire system cargo handling.** The figure 9-11 maps the entire environment of the cargo

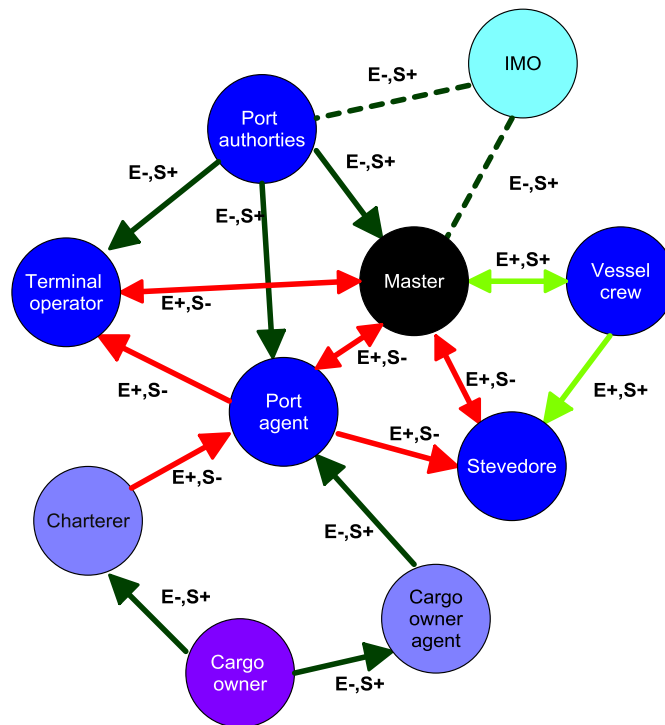


Figure 9-11 Entire system cargo handling

handling network systems. The cargo handling network system has E+, S- ratio to E-, S+ as 6:8.

Port agent is dependent on the charter for all the necessary information to make all the arrangement. Agent is acting as an intermediary node between master and charterer and communicates the orders from the charter to the master. Port agent is also responsible for contacting the cargo owner agent when the vessel is on the port and ready for loading or unloading.

In a situation when the charterer is responsible for cargo handling operations, cargo owner agent as representative of cargo owner and his interests, make sure that cargo handling is done in a proper way and cause no damage to cargo. However, the commercial interest of charterer made the network efficiency focus.

## 9.6. Entire Voyage Network System

The entire voyage environment consists of four network systems i.e. voyage planning, navigation, port entry/leaving and cargo handling. These systems are not independent system in fact they interact with each other and form a network of whole voyage.

The system is recognized as an open system which has interaction with each other and with the environment and have tendency to change with the environment. These four systems can be considered as the four sub-systems of the entire voyage environment. However, these four systems are further characterized with many sub-systems which interact with each other to create the entire working system of the network. The figure 9-12 maps, all stakeholders involved in network system of a voyage. It depicts the relational ties and interactions between the nodes which creates the influence pathways where each node having its own interests and influence.

The principal node, master of vessel, has the most centrality with maximum numbers of connection. The network of stakeholders in vessel operational environment recognize as highly dense structure with showing all possible interaction between the stakeholders.

The network model is a generic model based on the assumptions mention in the start of section. Many stakeholders differ from their behavior and interaction which are shown in individual vessel operation. This model assumes the general interactions in the entire voyage environment rather than specific to particular environment which were shown in the proceedings parts.

The whole network recognizes a safety influencing environment where E+, S- ratio to E-, S+ is 7:20. The legislative, administrative and legal authorities are mostly external stakeholders and safety focus where as the most of the operations related to port requires both safety and efficiency.

Ship owner and cargo owner are identified as being safety focus and charterer with efficiency focus. This conflict of interest has varied effect on the whole network which are shown in figure 9-12.

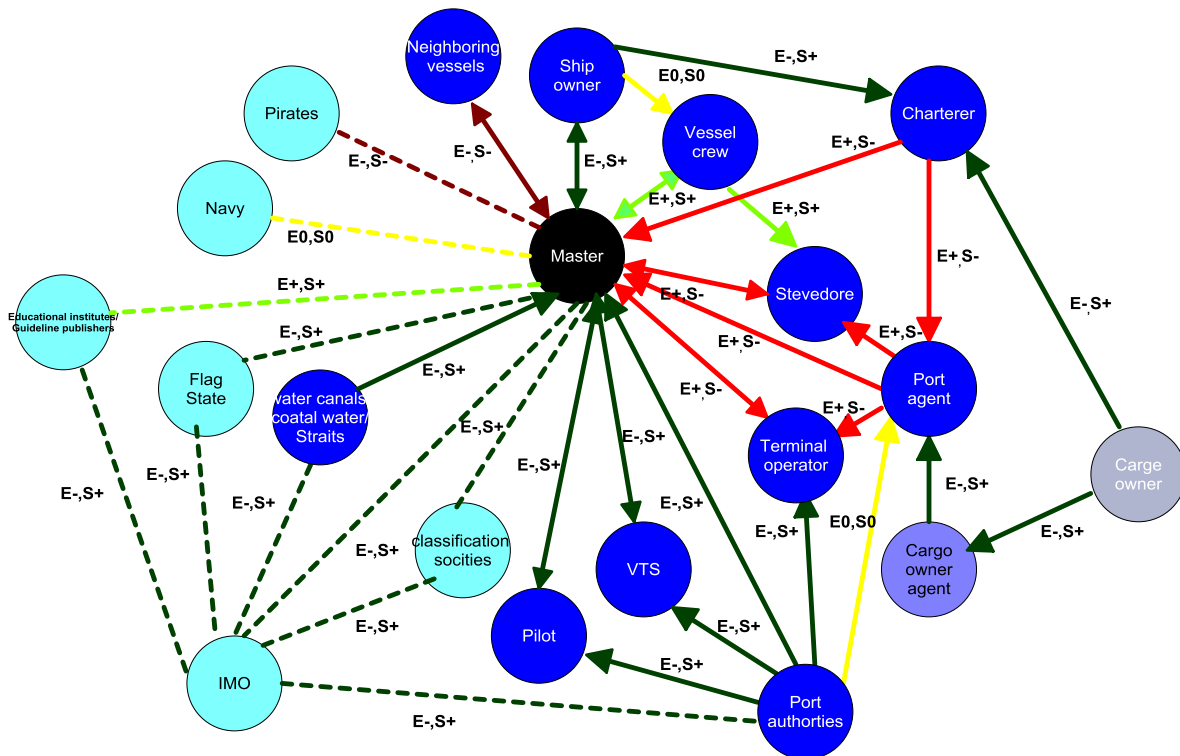


Figure 9-12 Entire voyage network system

## 10. Contractual Relationship and Network Structures

Tramp trade is a contractual trade. It is driven by three major type of contractual relationship i.e. voyage charter party, time charter party and bare boat charter party. The research undertaken indicates that the interaction among the nodes and structural arrangement changes when the contractual environment changes. Moreover, influence pathways and relationship is also affected by the type of contract governing the relationship. This part illustrates the change in vessel operational environments due to change in contractual relationship.

This section only takes into account the stakeholders which change their position in the system as a consequence of new contractual environment. All the other stakeholders remain unchanged regardless of the nature of the contract and are not presented in this part. Moreover, only those influence pathways has been explained which are different from previous part. Further, it is assumed for this section that all other relational ties which are not explained here have same implications as explained in the previous section.

This section is divided into three parts which are based on the type of contract. The structural arrangement for voyage charter party, time charter party and bare boat charter party are illustrated respectively. Finally, this sections conclude with the visualize comparison of the three contracts which indicates the impact of contractual relationship on stakeholders interactions, influence and structure of network.

### 10.1. Voyage Charter Party

This contractual environment found to affects the nodes in the system and the relational ties due to the terms of the contract. Nature of the contract makes shipowner as the focal stakeholder who influences the master in vessel operations and responsible for commercial as well as technical management of the vessel. Voyage charter party is the most commonly used charter party in tramp trade.

**Voyage planning.** In the Voyage planning stage for the voyage charter party, shipowners influence the master to draw a plan which completes the voyage on schedule. The shipowners desire full year deployment of the vessel and want to catch other opportunities after finishing this voyage.

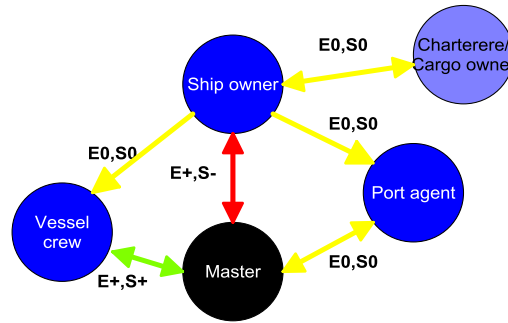


Figure 10-1 Voyage planning (Voyage charterer party)

The structural arrangement in figure 10-1 shows the interactions between the nodes which the owner as the focal actor. The shipowners have formal relationship as the employer of the vessel crew and port agent but without any influence in the voyage planning stage. In the voyage planning port agent is acting as a source of information whiteout influencing the outcome of the voyage plan. The cargo owner has no concerns in the voyage planning stage only a relational tie exist as the material and financial resource are involved for the cargo owner. The cargo owner can directly contact with the shipowners for a particular voyage or in case of charterer who wants a shipment of cargo which requires the hire of full capacity of the vessel. Considering the voyage charter party, shipowners desire a plan which take less time with shortest possible distance which save fuel and increase profitability.

**Navigation.** In the navigational stage (figure 10-2) cargo owner /charterer acts as external stakeholder with no direct interaction or influence with only concern for timely delivery and safe cargo. The shipowners require the master to complete the voyage as soon as possible and reach to next loading port with in laydays i.e. the days in which vessel must be presented to

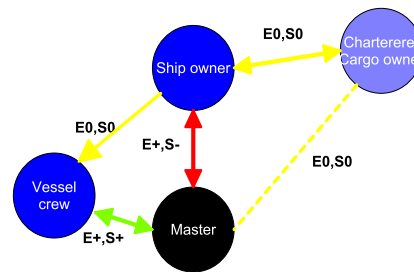


Figure 10-2 Navigation (Voyage charter party)

charterer/cargo owner .The tramp trade is mostly characterized with voyage charter party in which business is generated by single voyage, so shipowners found to be more efficiency conscious.

**Port entry/leaving.** The figure 10-3 illustrates the interaction among the nodes in port operational environment. When the vessel enters the port shipowners want to reach to the berth as soon as possible without any wait and pushes the port agent to make all early arrangements for safe navigations and reduce any undue wastage of time. In the port entry stage shipowners require from the master and agent to highly efficient by which master can tender the notice of readiness i.e. vessel is ready for loading or unloading.

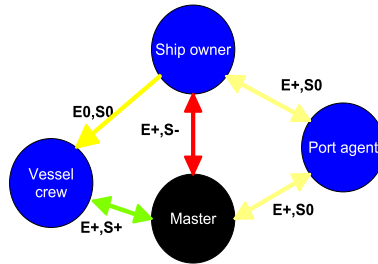


Figure 10-3 Port entry/leaving (Voyage charter party)

**Cargo handling.** The shipowner requires the port agent to make arrangement for faster loading and unloading without any damage to cargo, vessel or other damage. The figure 10-4 recognizes the influence of shipowners with more focus on time without effecting safety. Moreover, he does not want higher safety standers which increase the cost and time. On the other hand, in the voyage charter party the charterer/cargo owner is responsible for loading and unloading with pressure of lay time i.e. the time allowed for loading/unloading. To complete the cargo loading/unloading operations on time he desires high efficiency which can affect the safety issues.

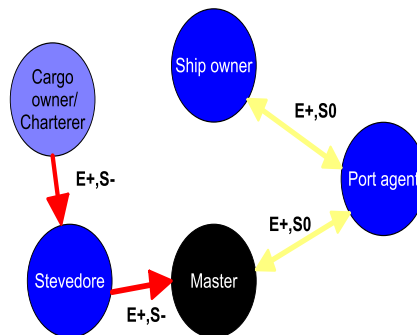


Figure 10-4 Cargo handling (Voyage charter party)

10.2. Time Charter Party

In this contract type, the charterer hires the vessel for a specific period of the time. This empowers the charter to give commercial orders to the master. And the vessel owner still has the obligation to providing the technical management and vessel crew for the vessel.

**Voyage planning.** Charterer demands a voyage plan which is more financially efficient and allows the charter to fully utilize the hire time. His concerns for safety are not high due to the same fact (figure 10-5). However, vessel owner having formal influence and technical manager

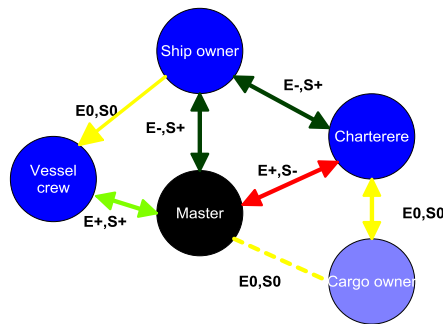


Figure 10-5 Voyage planning (Time charter party)

ensure that the plan should be quality plan ensuring the safety of vessel, cargo and marine environment.

**Navigation.** With respect to time charter, when the vessel is navigating through the sea the charter is influencing the master to have finish the voyage within specified time. Many times during the voyage the master receive the orders for new voyage which further enhance the pressure on master to complete the voyage despite of any problems. The figure 10-6 emphasizes the safety conscious role of the shipowners but in time charterer it’s the responsibility of the shipowners to make available the ship to charterer for commercial operations.

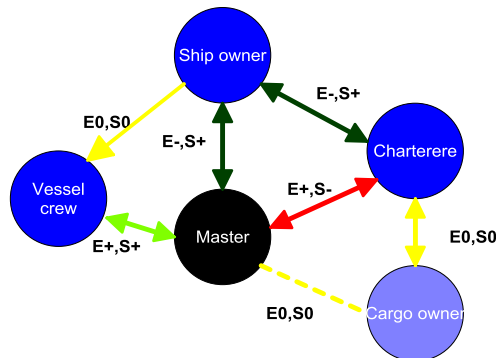


Figure 10-6 Navigation (Time charter party)



**Port entry/leaving.** The figure 10-7, illustrate the charterer influence on the master as highly efficient by compromising the safety standards. When the vessel is in the port, charterers want the timely access to the berth to start loading or unloading on time. The port agent acts according to the desires of the charterer with objective of short stay of vessel in the port .the port entry requires a lot of clerical work which does not seems to have effect on vessel operational safety issues.

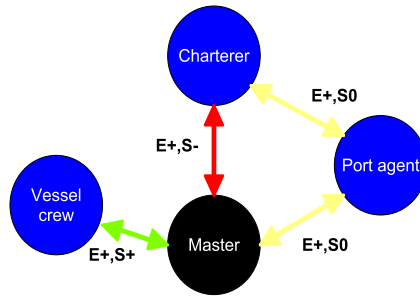


Figure 10-7 Port entry/leaving (Time charterer)

**Cargo handling.** The relational ties in figure 10-8 the loading/unloading characterize both efficient and safety focus. The charterer want the timely loading if better than the loading should be done in way that it takes less time.

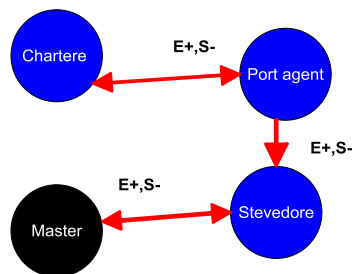


Figure 10-8 Cargo handling (Time charter party)

### 10.3. Bareboat Charter Party

Bareboat charter party place the charterer in the position of shipowners. The charter holds the authority and full control over vessel by having both technical and commercial management but its objective differ from the shipowners. In the bareboat charterer the shipowners have very less power to influence the vessel operations. Moreover, bareboat charterer can also take the form of hire-purchase i.e. the charterer become owner of the vessel after the chartering term ,this

provision further reduce the role of shipowners. Bareboat charter party gives the full control of vessel to charterer except the legal ownership which makes him more powerful to induce his influence according to his desires.

**Voyage planning.** The contractual terms of bare boat charter make the vessel owner an external party as depicted in the figure 10-9. He has no concerns on what voyage the vessel is

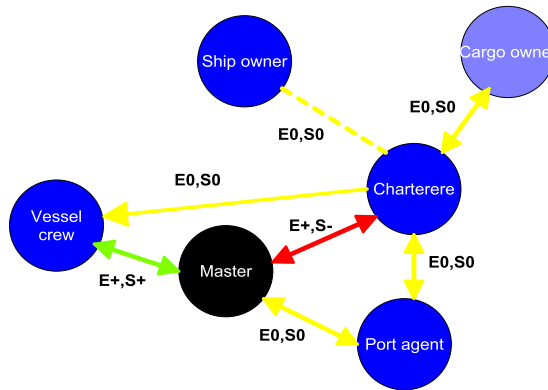


Figure 10-9 voyage planning (Bare boat charter party)

going but he has the stake in vessel as the owner and wishes to have the safety of its assets in each stage of vessel operation. The charterer has the vessel for a long period of the time but still he is not owner of the vessel and wants to utilize the vessel time as efficient as possible. He is also responsible for the hiring of the crew. But regarding the voyage planning he did not have any influence on the vessel crew except having a formal authority as the employer of the crew.

**Navigation.** The structural pattern illustrated in figure 10-10 is similar to voyage planning stage because of the same stakeholders with same interests. When the vessel is navigating through the high sea shipowners have very limited role or influence in the navigational operation or any other operation. He has the safety stake though out the term of the

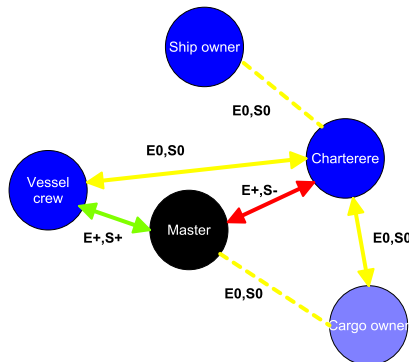


Figure 10-10 Navigation (bare boat charter party)

contract. The navigational network environment and contractual terms depicts the charterer interests are same as in voyage charterer party except he has full control over the vessel.

**Port entry/leaving.** In bare boat contract, the charter needs the efficient navigation of the vessel while meeting the standards of safety. Charterer orders port agent to make the

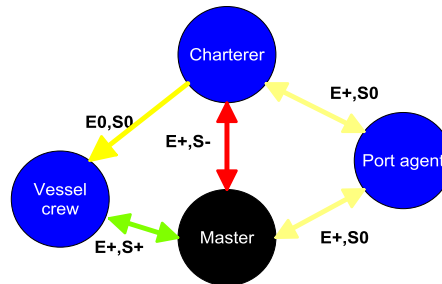


Figure 10-11 Port entry/leaving (Bare boat charter party)

arrangements which make the stay of vessel as efficient as possible to reduce the port stay. The figure 10-11 identifies the clerical role of port agent in enhancing the efficiency of port operations.

**Cargo handling.** The figure 10-12 shows the loading and unloading under the bare boat charter party contract. The charterer desires the rate of cargo loading or unloading to be at maximum to save time. The charterer influences the port agent for the efficient

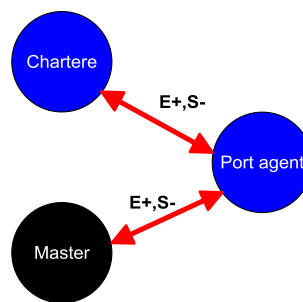


Figure 10-12 Cargo handling (Bare boat charter party)

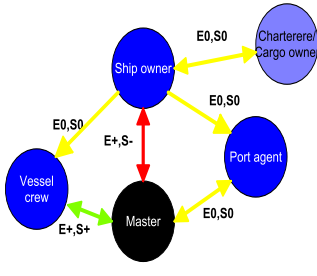
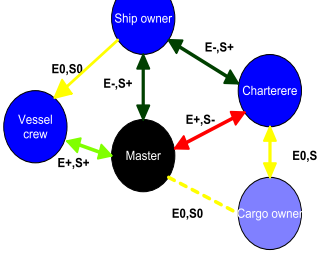
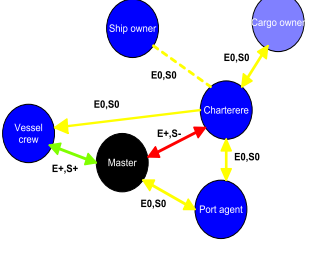
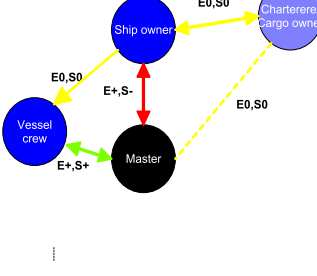
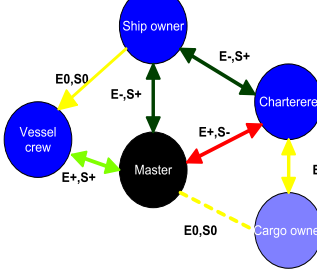
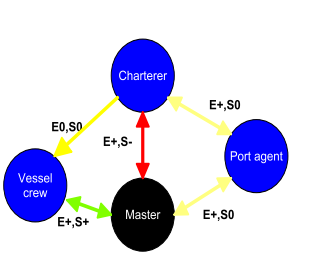
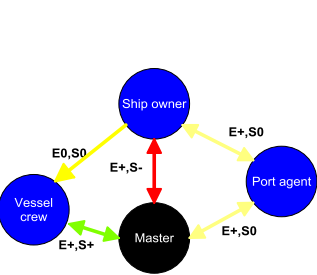
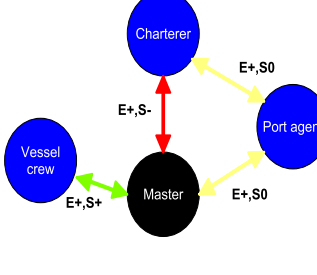
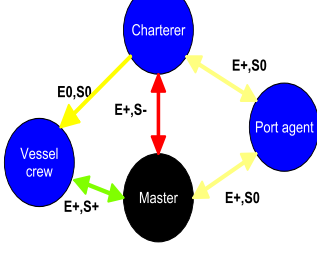
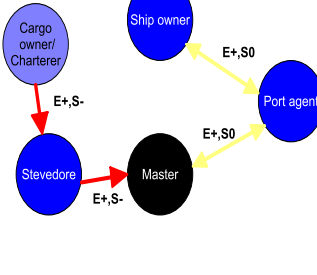
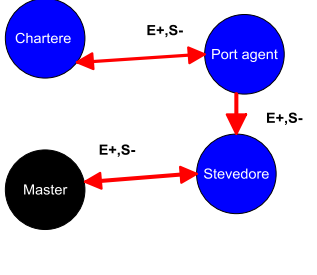
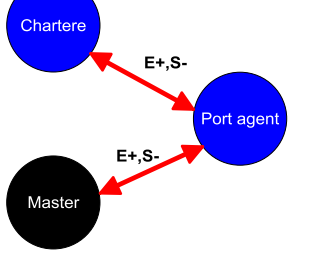
loading/unloading operations to make sure that vessel leave the port and navigate towards destined port in timely manner.

#### 10.4. Contractual Structural Comparison

The table 10-1 summaries and recognizes the change in the structural pattern, relationship and influence pathways by comparing with different contractual types. Further, it also visualizes the change in systems environment and stakeholders across the vessel operational stages with regards to each contract type. The charterer has the same degree of influence in time and bareboat charter party however, his influential power to induce his interest is more in bareboat charter party. Moreover, the shipowners behave as the more efficiency influencer because of he is responsible for commercial management of vessel and he desire more and more business.

**Table 10-1**

*Structural comparison of contract types*

Vessel operations	Voyage Charter party	Time Charter party	Bareboat charter party
Voyage planning			
Navigation			
Port entry/leaving			
Cargo handling			

## 11. Discussion

The concept of stakeholder analysis is almost universally used in every business sector irrespective of private or public sector. The analysis trend has been growing since the last decade because it has proven successful for the businesses to know the actors in internal and external environment. However, maritime sector which is one of the most important sectors of the world remained unanalyzed in terms of stakeholder analysis. Vessel operations are at the heart of performing a voyage but the vessel's operational stages characterize different stakeholders who affect the vessel activities according to their interest. Among the numbers of different stakeholder's interests in vessel operations, "safety and efficiency" are of significant importance. Increase in global trade, commercial pressure and regulations are affecting safety and efficiency of the shipping. The research is conducted to focus on these issues of safety and efficiency. The stakeholder analysis is performed to identify how different stakeholders influence the vessel operations; as safety influencer or more oriented towards economic efficiency. This research set forth the question as:

*What is the influence of stakeholders on vessel operations related to the issues of safety and efficiency?*

Interviews and secondary data are reviewed to answer this question which leads to build up a conceptual model representing the influence patterns of the involved stakeholders at each vessel operational stage.

In answer to this question it is found that the influence of stakeholders and their relationship depends on the type of charter party and vessel operational stage. The stakeholders also found to have change in degree of influence in different contractual relationships (Table 10-1). It is also found that number of stakeholders, their relationship and influence also changes with the change in the vessel operational stage (See figure 9-3, 9-6, 9-8 and 9-11).

The research indicates that vessel operational stakeholders have three kinds of relationships with master based on direct or indirect influence and interaction i.e. primary, secondary and external. The relationship exists due to transfer of resources and stake in the vessel activities. The most important resource transferred in every stage of vessel operation is information. Moreover, nature of stake and positional power also illustrate the formation of relationship in network, besides resource transfer. However, the whole voyage relationship is more informational.

Voyage planning stage (figure 9-3) illustrates the presence of most number of stakeholders where E+, S- ratio to E-, S+ is found to be 1:13 which shows that stakeholders in voyage planning stage are more focused on safety. Further, more numbers of stakeholders in voyage planning are having informational influence than formal influence.

Navigational stage (figure 9-6) represents the same structure, relationships and influence of stakeholders as voyage planning but the focus of influence is shifted to actual performance of the voyage based on the desired interests of stakeholders. The stage recognizes more informational influence than formal influence and E+, S- ratio to E-, S+ is 1:10.

Port entry/leaving stage (figure 9-8) is characterized with new stakeholders i.e. VTS and Pilot and relationship of port authorities changes from external to primary stakeholders. This stage is also safety focus with E+, S- ratio to E-, S+ is 0:7 and represent the informational influence in most of the relationships.

Cargo handling stage (figure 9-11) also shows two new stakeholders specific to the particular stage i.e. terminal operators and stevedores. The cargo handling network system is also safety focus and depicts E+, S- ratio to E-, S+ as 6:8 and this network environment is also more informational influenced.

In the border view, considering the whole voyage, it represents eleven primary, one secondary and six external stakeholders where E+, S- ratio to E-, S+ is 7:20. This shows that the most stakeholders in a voyage have safety oriented approach than efficiency oriented with information as major relational and influential type.

Some relationships found to deviate from the safety-efficiency trade-off criteria and depict the existence of both extremes together. These include vessel crew and educational institute/guideline publisher with E+, S+ influence and pirate and neighboring vessels having E-, S- influence.

In voyage charterer party, shipowners have negative safety influence on vessel operations whereas in time and bareboat charter party, charterers have negative safety influence and positive efficiency influence. Further, different contracts also change the position of stakeholders in the network structure.

Finally, the model presented has a dense structure with all possible relationships and interactions. The systems of the network model i.e. vessel operational stages are not independent; they work together and have multiple ties with each other which construct entire network

environment. Moreover, the model depicts master as having most centrality with maximum number of ties in each stage of vessel operations besides that charterer has more interactions after master in voyage planning and navigation stage. However, centrality also seems to differ in other voyage stage i.e. port agent has equal number of ties in cargo handling as master, whereas port state authority has more ties in port entry/leaving besides master.

Many research studies were conducted with the aim of defining the stakeholder theory and performing a stakeholder analysis but none of them have their field of study from the maritime sector perspective. However, these works provided bases for the concept of stakeholder and how to perform the analysis. This research is based on the concept of existing stakeholder theories and presents the application of those studies in relevance to vessel operational environment. This study has extended the scope of stakeholder concept to include maritime sector in the light of existing theories.

The argument that stakeholder theory is based on the moral content i.e. the organizations should work for the benefit and in the interest of all the involved parties (Robert Phillips et al., 2003). This opinion seems to conflict when the charterers are responsible for commercial deployment of vessel i.e. time charterer party and bareboat charter party. In these situations, charterers are self-interest focused to enhance the profitability by increasing efficiency and decreasing safety. They go against their moral obligations towards shipowners, crew, vessel and environment. It is not a rare situation where charterers order to take short route despite of dangers, or go through bad weather to meet the schedule or continue vessel operations even with damaged equipment. Charterers are efficiency focused they not only affect the safety but also work against the interests of other stakeholders e.g. shipowners who want safety of vessel and crew. IMO and other legislative bodies interest in the safety of life, vessel and environment.

The views of Jawahar and McLaughlin (2001) that the stakeholders influence changes throughout the life cycle of the firm are found to be consistent with this research. Their opinion seems true if considered from the vessel operational cycle perspective. Not only stakeholders influence but network structural positions, appearance of new stakeholders and nature of interest found to change according to the stage of vessel operations and type of contract. Port agents exemplify the change of influence situation when in voyage planning stage they act only as information provider without influencing the voyage plan and having influence E0, S0 (see figure 9-3) whereas their influence changes in cargo handling to E+, S-. In port operations they



act on the behalf of the charterers and representative of their interests and influence master and stakeholders with E+, S-. The charterers want to finish loading/unloading as soon as possible to finish and to catch more business opportunities (Figure 9-11).

Port authorities act as external stakeholders in voyage planning (figure 9-3) whereas primary in port entry and cargo handling stage because of the direct influence while the vessel is in the port. Stevedores and terminal operators are only present in cargo handling stage (figure 9-11).

In terms of contractual relationships, influence of charterers change from E0, S0 in voyage charter party to E+, S- in time and bareboat charter party (table 10-1). Charterers also act as secondary stakeholder in voyage charter party and primary in time and bareboat charter party (table 9-1). Because charterers have no hold over vessel either in commercial or technical management terms in voyage charter party which decreases their influential power. On the other hand, they have commercial management in time charter and both commercial and technical management in bareboat charterer which gives them power to influence the operations in their interests.

Literature also identifies that stakeholders have conflicting interests (Harrison & Freeman, 1999) and the stakeholders influence the results in the direction of their interests (Karim et al., 2007). This research agrees with these views and found conflict of interests and interest driven influence among the stakeholders. The shipowners chartered the vessel to the charterers while agreeing with them on the contractual terms but still conflicting interests exist when it comes to safety and efficiency related issues. The shipowners want the safety of vessel, crew and environment not only because they are owners but they are also liable for the ultimate damages even caused under the charterer's authority. Contrary to that, charterers compromise on the safety issue over efficiency without any liability and trying to cut costs, forces to follow shorten distance and slow steaming for less fuel with the ultimate aim of increasing efficiency which increases overall profitability.

IMO's interest is to enhance the safety through the governing legislative authorities i.e. flag state and port state authorities. All the IMO conventions, policies, recommendations, advices are based on enhancing the safety of maritime sector. However, charterer's interests are to be economically productive by utilizing the resources in the best way. Their desire for increasing efficiency has negative effect on the safety which is also in conflict with the IMO interests.

Under the terms of time and bareboat charter party the charterers use their former authority which is due to their position to drive the results according to their wishes.

A trend has been found that when efficiency increases it has negative effect on safety and vice versa. The trade-off models expressed in figure 4-2 and ETTO principle also describes that increase in one parameter comes at compromise on the other parameter. In practice, it is also found that safety comes at cost, if charterers want to follow the highest or increased standards of safety they lose time, incur extra expense which will reduce the profitability. For example IMO, flag states and port authorities' objective is safety and they have no concern whether there concern for safety will decrease the efficiency. It is not their aim to decrease efficiency but their concern for safety standards ultimately decrease the efficiency i.e. IMO requires a procedure to be followed for voyage planning to draw a plan however interviews revealed that following all those procedures will take much time and charterers build pressure on master to start journey only by following important steps, this will have negative impact on safety.

Contrary to E+, S- trend, some deviations also occur in case of vessel crew and educational institutes/guides line publishers which represent their influence as E+, S+. In case of vessel crew, to recognize them as a stakeholder, requires to view them as a separate entity from master and assess individual influence. In practice, they work under the command of master but they are trained to work safely and efficiently. For example, chief engineers allow the master to reduce or increase the speed of vessel but within safety limits and while considering the efficiency when master asks navigational officer to draw a shorter distance voyage plan the officer is increasing efficiency but at the same time he is taking care of safety in the plan i.e. the plan will be having shorter distance but meeting the safety standards. Thus, in terms of individual influence upon master it is E+, S+. This is also accurate for educational institutes/guide line publishers, these institutes provide materials on enhancing both efficiency and safety which positions the net effect of this entire cluster as E+ and S+ regardless of that some institutes are only working for safety and others for efficiency.

On the other hand, pirates are not as such having a stake in vessel operations but their effect on making voyage plan and to consider them in navigation make them relevant. Neighboring vessels also effect negatively to safety by collision and congestions in ports due to high traffic and also put negative effect on efficiency.

In the vessel operations the master is the center of influence of all the stakeholders. He has the ultimate responsibility of safety of crew, vessel, cargo, compliance with regulations and environment. Master is not only responsible in fact he has also the authority to turn down any order or request which can compromise over standards but in the era of commercialization, he is under pressure to obey the orders and many times safety is at stake. He is bound to obey the instruction from shipowners and follows the orders from charterers too. Shipowners do not want to lose the contact and charterers do not want a decrease in profit. Moreover, charterers are the single most influential stakeholder emphasizing on increasing efficiency which ultimately decrease safety. Charterers have the commercial command over the vessel, in time and bareboat chartering, and have single, strong influence which even minimize the influence of other stakeholders. As a source of generation of business, they are strong enough to influence master to give preference to their interests. Their positional authority gives them formal influence which found to be stronger than of the other stakeholders beside shipowners.

The time charter and bareboat charter represent the same degree of influence in terms of E+, S- but in fact the influence of charterer is more powerful in bareboat charter party. Where they are having full control of the vessel as compared to the time charter party, where technical management is in the hands of the shipowners which have conflicting interests with charterer.

When shipowners earning are not secured in the case of voyage charter party their influence found to have negative effect on safety because they want maximum utilization of their vessel and have negative influence on safety. On the other hand, when in time or bareboat charter party their future income is secured, and their focus is more on the safety of the vessel.

Economic changes also have a number of implications on vessel operations. Commercial pressure on vessel operators increases due to economic ups and downs. Economic crisis decreases trade volume as well as freight and chartering rates and characterizes a market condition having over tonnage with many vessels being laid up. To remain profitable and competitive in the market place the only option available for the vessel operators, is to cut costs to remain in the market. Besides many other costs, ship operators try to reduce the operating cost of the vessel up to the minimum level. The ship operator reduces vessel crew or hires cheap and unskilled crew; reduces maintenance, spare and stores; change the class of vessel and adopt other such policies to be profitable. This kind of drastic operating cost reduction will likely have

devastating impact on the safety of the vessel and different operations; and probably change the stakeholders towards a more E+, S- oriented approach.

Different contractual relationship and vessel operations have different stakeholders. The degree of influence and relationship also found to vary. Further, the responsibility of commercial management plays an important role in deciding who will give the voyage orders. The master is responsible and under the influence of the party who give the voyage order. The charterers having the commercial management in time and bareboat are in a position to influence the vessel operations to enhance the economic efficiency and achieve their objectives.

### 11.1. **Research Limitations and Challenges**

This research was intended to study the influence of stakeholders on vessel operations in the natural settings which makes it difficult to replicate in other settings. The research is performed on specific vessel operations that limit its scope to these particular vessel operations.

Time constraints for the research; limit the researcher's ability to understand the reality i.e. the behavior of the stakeholders. Within the allowed time it was impossible to interview each stakeholder to assess their influence. Time limitation in the research work allows only few interviews with stakeholders, which makes researcher unable to construct the network solely based on the interview findings. Henceforth, the qualitative research approach have been supported by conceptual modeling in order to create a network model of different ship operations. The contents of future operations would be oriented towards evaluating the efficiency-safety balance.

The model presented is in particular focused on tramp trade. This research provides a conceptual model which can be applied to different situations and can be re-modified. However, this model may have limited applicability in other shipping segments i.e. liner shipping.

Further, access to interviewees was a challenge, firstly, due to the non-availability of the resource persons and secondly, the researcher having no or less industry connection in the foreign country. Lastly, it was difficult to reach every stakeholder especially high up in the hierarchy which have the real information i.e. shipowners.

Language was also a barrier to some extent, neither of the party interviewer and interviewees had English as their mother language.

However, researcher overcame these problems up to certain extent with the help of native colleagues and interviewed some industry people. Further, interviews were recorded with the permission of the interviewee which helped the researcher to get better understanding and to prevent any ambiguity.

To overcome these limitations in the future researches the data collection should be started as early as possible and the researcher should try to establish connection in the industry prior to the research work.

## 12. Conclusion

This research found that stakeholders of the vessel operations have varied level of influence and relationships related to safety and efficiency which are dependent on the vessel operational stage and contract type. More the control the stakeholder has, more he is influential and more the importance a stakeholder has i.e. positional power, more he is able to induce the influence. External stakeholders and legislative authorities are found to be safety influencer whereas charterers as efficiency influencer. The shipowners are safety focused with the exception of voyage charter party, where the focus is efficiency. Commercial pressure i.e. the deployment of the vessel is found to be a critical factor affecting safety and efficiency. Both shipowners and charterers, when having the responsibility of commercial management of vessel, have negative influence on the vessel operational safety.

### **Future Research**

The network model presented in this research is a generic model and is a starting point; it is not a definite model to study the vessel operations. Future research can be conducted by applying new parameters within this model and can be studied through a new model.

This research conducted and presented the result by using the social network model, which is a structural model. The research can be conducted by using agent-based modeling which allows in-depth study at individual level and gives an overview on how the individual actors within the network interacts with each other in the model. This will allow the researcher to assess the model characteristics at micro level. Moreover, the network model behavior can be studied through social cognition perspective to research how the involvement and interactions of stakeholders infect other stakeholders by their attitudes and behaviors.

Further, a case study can also be performed to test the model. A real voyage in tramp trade which has the mentioned vessel operations can help in rectifying the model presented, practical assessment of the influence and identification of new stakeholders. Moreover, sector specific study will be more beneficial in assessing the application of this model and to find new influential patterns in that sector i.e. passenger, bulk and oil and gas.

Lastly, this research presents a qualitative analysis; a statistical analysis can be performed to test the network characteristics to measure salience of stakeholders' degree, density, closeness, clique, centralization and other related parameters.

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## Appendices

### Appendix A

Interview Guide:

### Information Sheet for the Participant

#### Introduction

My name is Faisal Fiaz. I am last year Master Degree student at University College of Buskerud and Vestfold (HBV). The purpose of my mail is to inquire about any possibility to conduct an interview with you regarding my Master Thesis (Research Work).

#### The Topic of my thesis is:

Stakeholders Influence on Vessels' Operational Safety and Efficiency.

#### Brief Description of research work:

The ship master is in direct control of the manoeuvring, direction and speed of the ship.

However, he/she takes advice and directions from a number of stakeholders, and is under the influence of various expectations.

The aim of this research is to see what are the interests of different stakeholders? And how they influence the operations of a vessel especially on the matters of safety and efficiency? I want to conduct a semi-structured interview to discuss how the stakeholders influence the various vessel operations.

Some of the discussion areas are as follows. The influence stakeholders on:

- Voyage planning
- Port entry/leaving
- Vessel operations e.g. speed/bunkering/cargo handling/compulsory pilot etc
- Loading/discharging
- Navigation

- The role and influence of port authorities/VTS/charterers/other legal authorities' e.g. IMO

The valuable experience and information will be very useful for my research work and enhancing my knowledge. In order to facilitate my note-taking, I would like to audio tape our conversation, if you allow. I assure that all data gathered will be treated with utmost confidentiality and de-identified in the thesis and will be used by me only for my research work.

I am requesting an informational interview and would only take about 1 hour. I can be very flexible with my schedule to match the availability. I look forward to hear from you and to meeting in person soon.

I am attaching a detailed description of my thesis for further details. If you have any further query about the research you can contact to me (the researcher) or my supervisor on the following addresses.

### **1. Supervisor**

Kjell Ivar Øvergård, PhD

Professor of Maritime Human Factors

Head of Research, Department of Maritime Technology and Innovation,

E-mail: [Kjell.Oevergaard@hbv.no](mailto:Kjell.Oevergaard@hbv.no)

Phone: (+47) 33 03 77 44

Buskerud and Vestfold University College

Postboks 235, 3603 Kongsberg

Norway

## **2. Researcher**

Faisal Fiaz

M.Sc. in Maritime Management

E-mail: [faisal\\_fiazz@yahoo.com](mailto:faisal_fiazz@yahoo.com)

Phone: (+47) 400 44 398

University College of Buskerud and Vestfold (HBV)

Thanks.

Regards,

Faisal Fiaz.

## Appendix B

This is the detailed description of the research study which the researcher attached to the interviewees for more detail on the research work.

### Thesis description

The concept of stakeholder has been deeply embedded in the management literature. Although the concept is widely used but maritime sector lacks on the literature of stakeholder analysis.

Maritime sector is characterized by a number of different stakeholders in vessel operation area. The ship master has the direct control of the maneuvering, direction and speed of the ship. However, he takes advice and directions from a number of stakeholders, and is under the influence of various expectations. Among a number of different stakeholder's interests in vessel operations "safety and efficiency" are of significant importance. The purpose of any commercial voyage is to earn profit through an efficient but at the same time safe voyage. However, objective pressure of various stakeholders may make it viable to compromise on the standards of safety or efficiency.

The aim of this research work is to identify different stakeholders, particularly in tramp trade shipping segment, which influence at different vessel operational stages (voyage planning, port entry/leaving, navigation, loading/discharging). Moreover, this research seeks to answer the question of what are the interests of different stakeholders. And how they influence the operations of a vessel especially on the matters of safety and efficiency?

The proposed result of this research is an influence network chart showing pathways of stakeholders influence. Furthermore, it aims to describe change in influence pathways under different contractual relationship, economic situations or legal changes.

I will be interested in conducting semi-structured interviews which help me to uncover the network of stakeholders and the way they influence.

Regards,  
Faisal Fiaz.

## Appendix C

To obtain the permission of the interviewees following consent form has been used.

### Consent Form

**Thesis Title:**

Stakeholders Influence on Vessels' Operational Safety and Efficiency.

**Name of the Researcher:**

Faisal Fiaz

Please mark the relevant box and sign the form.

- My participation in this interview is voluntary.
- I agree to be interviewed by the researcher.
- I understand the intent and purpose of this research.
- I give permission to record the interview.
- I am aware that my participation is voluntary and I can withdraw at any time.
- I agree that I will be available for any further interview, if required.
- I understand that my response will be treated confidentially.
- I have read and understand the explanation provided to me and I voluntarily agree to participate in this interview.

\_\_\_\_\_  
Participant's signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Interviewer's signature