



# **Marketing Information System: A Success Factor of Shipping Business in Cyprus**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Dr. Plomaritou designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript.*

*Dr. Patsiouras managed the analyses of the study and the literature searches.*

*Both authors read and approved the final manuscript.*

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## **ABSTRACT**

The marketing information system plays a vital role in marketing planning. Profitable development of a shipping company can only come from a continual commitment to matching the shipping enterprise's capabilities with customers' needs. In order that the shipping company can be certain this matching process is taking place effectively, it is necessary that a two-way information flow exists between the client and the firm. Sound shipping marketing plans rely on sound marketing strategies, and this requires the organization of information into a comprehensible, rational and systematic structure. This paper presents the structure of the Shipping Marketing Information System and examines the commercial, economical and managerial aspects ensued from its operation. No previous research has been conducted on the implementation of the marketing information system in the Cypriot shipping companies. Therefore, the importance of this research lies in the fact that it provides useful and valid data for evaluating the role of the marketing information system as a success factor of shipping business in Cyprus. More specifically, this paper aims to explore the main aspects of the marketing information system by developing knowledge, theories and procedures.

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## 1. INTRODUCTION

The successful operation of a shipping company may be achieved through the appropriate matching of its capabilities with its clients' needs. In order for the company to be certain that this matching process is properly conducted, the existence of a flow of information between the client (charterer/shipper) and the shipowner/carrier is necessary [1]. The correct, sound, and timely provision of information is more imperative to a shipping enterprise than it is to another land enterprise, because the shipping company moves its vessels worldwide, its revenue is realized in foreign currencies (mainly dollars) and the international events (political, economical, social etc.) affect significantly the freight levels and consequently its position in the shipping world. Therefore, much information is necessary to the shipping companies in order to offer appropriate transportation services and satisfy their clients' needs. More specifically, persons occupied with operation of ships exchange a great volume of information, useful for understanding the tendencies of the various charter market segments and necessary for correct decision-making and planning [2]. The information exchanged among shipowners, agents, charterers, shippers, brokers, suppliers etc. concern matters such as the demand and supply of ships, the demand and supply of cargoes, port and canal dues, fuel prices, cargo handling expenses, technological matters, conditions in ports, environmental issues, maritime regulations etc.

This paper is divided into three sections. The first one includes the literature review of the marketing information system which is applied to shipping companies. The second section concerns the presentation of the research methodology. More specifically, the elements of the exploratory, deductive quantitative research are presented thoroughly at this part. Furthermore, the analysis of the findings and the concluding remarks are listed at the last section of this paper.

## 2. LITERATURE REVIEW

According to Turban E. et al. [3] a system is a collection of elements, such as people, resources, concepts and procedures, intended to perform an identifiable function or serve a goal. Kurtz, D. [4] defines the marketing

information system (MIS) as a planned, computer-based system designed to provide decision makers with a continuous flow of information relevant to their areas of responsibility. A component of the organization's overall management information system, a marketing information system deals specifically with marketing data and issues. A well-constructed MIS serves as a company's nerve centre, continually monitoring the market environment—both inside and outside the organization—and providing instantaneous information. Marketers can store data for later use, classify and analyze that data, and retrieve it easily when needed. Marketing information systems (MIS) are defined by Keller and Kotler [5] as computer-based systems that work in combination with other functional information systems in order to support the firm's management in making effective decisions for solving marketing problems. Concern for making proper and acceptable decisions is a primary motivation of business players [6]. According to Nedeva I. [7] there is an objective need for collecting information about the developments of the internal and the external environment of the company before carrying out any marketing activities. Harker et al. [8] argue that all parts of MIS should run simultaneously in order the overall efficiency of the system to be achieved.

The objectives of a firm as well as its marketing process play a significant role in the creation of a suitable marketing information system. According to Hibbs J. [9] marketing must be the spirit and purpose of the firm, and must never be an add-on. Economic policy for transport must recognize this, and ensure that there is maximum freedom for managers to identify their market, to research and understand it, and then to offer the customers a service whose quality and price will satisfy effective demand and promote the efficiency of the economy.

The world has entered a new economic stage. National economies are intimately linked and interdependent. Commerce is conducted with information flows moving at the speed of light over the Internet and mobile phones. Kotler P. and Cazlione J. [10] argue that this new stage confers wonderful benefits in bringing down costs and speeding up the production and delivery of goods and services. But it also comes with a dark side, one that substantially raises the level

of risk and uncertainty facing producers and consumers. In shipping industry, many commercial risks may be arisen to the shipowners from the chartering of their vessels [11]. An event or change in the circumstances of one country—whether a bank failure, a stock market or real estate crash, a political assassination, or a currency default—can spread to many other countries and create massive turbulence, spinning the whole system toward completely unforeseen outcomes [12]. With the assistance of information systems, ship administrators would be able to review marketing strategies in time, so as to face threats, meet new challenges and satisfy the transportation needs of their clients [13].

Cranfield's six 'I's model summarizes the ways in which information technology generally can add value to the customer and hence improve the organization's marketing effectiveness. It comprises [14].

- Integration – of data across time and databases.
- Interactivity – beyond addressability to dialogue.
- Individualization – information-enabled tailoring.
- Independence of location – the death of distance.
- Intelligence – informed strategy.
- Industry restructuring – redrawing the market map.

A well-designed marketing information system (MIS) is comprised of four subsystems:

- The Internal File Subsystem
- The Marketing Information Subsystem
- The Marketing Research Subsystem
- The Marketing Decision Support Subsystem.

### **2.1 Internal File Subsystem**

The internal file subsystem provides information concerning the developments in the internal enterprise's environment, such as vessel's performance, capital cost, running expenses, voyage costs, vessel's chartering policy, daily bunker consumption, voyage estimation, laytime calculation, investment portfolios, commercial risks etc. The internal file constitutes a set of procedures for the regular collection, analysis, and presentation of information concerning the company's environment, for use in making appropriate marketing decisions.

Software facilitates the flow of information, the distribution of the right data to the appropriate persons and the decision-making procedure of executives. There are many maritime applications, specifically designed to assist the technical and operation departments with a reliable and continuous calculation of vessels' performance. The above applications provide complete daily information of voyages, vessels' bunker consumption, ships' positions, vessels' movements etc. The ship's performance must be measured by objective criteria for every voyage leg. Another example of software is the application of voyage estimation. According to this software, the shipowner has the ability to examine all the alternatives of his vessel's employment in order to find out which is the most profitable charter, he calculates the total and daily cost of every alternative charter and foresees which charter will provide him with the greatest daily revenue [15].

### **2.2 Marketing Information Subsystem**

The marketing information subsystem provides daily information relevant to developments in the enterprise's external environment that is necessary for marketing planning. The external marketing environment of a shipping enterprise is divided into the micro and macro environment, and consists of the forces that affect the capacity of the enterprise to develop and maintain successful transactions with its clients.

The micro environment includes all those factors emanating from the shipping market itself and affects the buying behaviour of clients and the supply of sea transport services [16]. Such factors are the regulations instituted by the international maritime organizations, the ports' policies, the banks' policies, the developments in seaborne trade etc. The rationally thinking enterprises should put into practice information systems relating to their competitors. The collection of sound information is more important in the case of the enterprise activated worldwide, as is the shipping enterprise, which receives economic, political, social and other influences. Therefore, the enterprise should have at its disposal accurate information regarding its competitors such as their strategies, their strengths/weaknesses etc [17]. In addition, the enterprise should collect information regarding its invisible competitors, who may offer new methods of transportation needs' satisfaction. This information is necessary in the planning of the shipping marketing strategies.

Among the microenvironment factors, the regulations of the international maritime organizations are distinguished. Regulators affect supply of transportation services through safety or environmental legislation [18]. For example, from the beginning of the '90s special emphasis was given worldwide to the safety and pollution prevention. This brought about the institution and application of new stricter regulations, mainly from International Maritime Organization (IMO) such as the recent IMO 2020 Sulfur Regulation, with the consequence of creating implications in ship construction, operation and management.

Important microenvironment factors are also the ports' and banks' policies. According to Wang, T., Cullinane, K. [19] ports play a vital part in the transport process and supply chain management. Ports have several important functions, which are crucial to the efficiency of the ships that trade among them. Within this framework, the pricing and investment policy of ports plays a decisive role in the speed of the shippers' servicing and therefore in the quality of transport services. In addition, the lending policy of banks and shipyards affects considerably the investment climate in the market and consequently it affects the shipowners' decisions regarding the purchase of second hand vessel or the order of new specialized / automated ships. Burns M. [20] considers that the shipbuilding process is the most demanding in terms of skills, capital, and technology.

Furthermore, the short-term and long-term trends of seaborne commodity trade constitute main factors that affect the chartering policy of charterers-shippers, as well as their buying behavior in the market. According to Sherlock J. and Reuid J. [21] a significant cause of short-term volatility is the seasonality of some trades. Long-term trends in commodity trade are best identified by the industries, which produce and consume the trade commodities.

The macro environment includes all those factors caused by social forces and physical causes, which do not originate from the shipping market but affect the demand of sea transport services, as well as the buying behavior of the clients. Physical causes mainly concern physical catastrophes and weather conditions. A heavy winter in Europe will increase the demand for oil and consequently the demand of tankers. Social forces include political, social, economic and technological events. The shipping companies must be able to adapt their policy to the above

forces, in order to meet the changing requirements of their clients and to satisfy their needs.

The political events constitute the most important factors of the macro environment. The term political events is used to refer to such occurrences as localized wars, revolutions, political nationalizations of foreign assets, revolutions, strikes, canal closures, flag boycotts, embargoes, oil crises, government changes and similar events (e.g. Iran Revolution, Gulf War). The unforeseen political events bring about a sudden and unexpected change in demand for sea transport services and consequently in the shippers' transport policy. Social facts concern cultural, psychological, ethical and anthropological developments (e.g. the COVID-19 pandemic) with social and economic impacts. Economic events concern unexpected events and economic crises, such as the global financial crisis of 2008-2009. Economic crises lead to sudden increase of demand for sea transport services, while the inelastic character of supply in short-term period results in the sudden increase of freight rates. Technological facts are related to the developments in cargo handling and navigational methods such as the Sulphur Scrubber System, the Advanced Rudder and Propeller System etc. The new technological developments lead to an increase of demand for the specific type of vessel and to the decrease of demand for the existing technologically disdained tonnage.

The micro and macro environment factors positively or negatively affect the quality and the quantity of the offered sea transport services, as well as the policy of clients. The shipping enterprise explores the shipping environment (micro and macro) and understands the developments in it, through the collection and elaboration of the suitable and update information provided by the marketing information subsystem.

### **2.3 Marketing Research Subsystem**

The marketing research subsystem provides the official primary data collected by marketing researches regarding a specific marketing problem. During the marketing research, necessary information about the market is collected and analyzed in the context of services.

The American Marketing Association ([www.ama.org](http://www.ama.org)) defines marketing research as the function that links an organization to its market through the gathering of information.

This information facilitates the identification and definition of market-driven opportunities and problems, as well as the development and evaluation of marketing actions. Finally, it enables the monitoring of marketing performance and improved understanding of marketing as a business process. Marketing research is a systematic process. Tasks in this process include designing methods for collecting information, managing the information collection process, analyzing and interpreting results, and communicating findings to decision makers.

According to Hair J. et al. [22] technology is transforming marketing research dramatically. Internet-based tools, including Web-based surveys, interactive and social Web tools like Facebook and Twitter, and smart phones are radically remoulding data collection. Despite the explosion of new marketing research tools and concepts, established tools such as hypothesis testing, construct definition, reliability, validity, sampling, and data analysis remain essential to evaluating the uses and value of new data collection approaches. Companies increasingly are choosing hybrid research techniques involving multiple research methods to overcome the weaknesses inherent in single methodologies.

While the cost of marketing research is more easily calculated, the benefits are not easily evaluated. The benefits can be expressed as the additional profits that can be achieved by recognizing the marketing opportunities and by avoiding failures. According to McDonald M., the benefits of marketing research are the provision of useful and usable information that convert uncertainty into risk. Uncertainty exists when all results are possible. When there is a high possibility for a specific result, then we speak of a risk, which is simply a quantitatively determined uncertainty. Since many risks are arisen from employing the vessels into various geographical areas under various contracts of carriage and types of charter, the conversion of uncertainty into risk and the minimization of this risk are perhaps the most important duties of shipping marketing and, in this process the role of marketing research is of greatest importance.

The distinction of marketing research and market research is necessary. In accordance with the American Marketing Association ([www.ama.org](http://www.ama.org)), marketing research includes all actions concerning

the production, trading and consumption process of products and services, while market research aims to broaden a part of the above process, i.e. of the market. According to the American Marketing Association, market research links the client and the environment with the enterprise through the information required in order to:

- locate and determine the marketing opportunities and threats,
- plan, review and evaluate the marketing programs,
- check the effectiveness of the marketing strategies and,
- understand marketing as a decision making process.

Market research is a well-organized system of market study which collects information concerning clients' needs and constitutes the systemic link of the enterprise with the environment. The shipping enterprise needs to know how to measure and forecast market attractiveness. This requires an evaluation of the size and the efficiency of the market. The above measurements are important when the target-markets are chosen and the company's attention focuses on new services. Market research allows the shipping enterprise to understand the clients' needs in order to plan the marketing in such a manner as to satisfy the above needs [23]. The more the shipping enterprise tries to discover what its clients desire, to offer transport services in order to satisfy their needs, to negotiate the freight with regard to what it offers, to communicate effectively with its target-market the more possibilities there are to achieve an efficient and long-lasting commercial operation of its vessels [24].

Many opportunities exist for both ethical and unethical behaviours to occur in the research process [22,25]. The major sources of ethical issues in marketing research are the interactions among the three key groups: (1) the research information providers; (2) the research information users; and (3) the respondents. Research providers face numerous potential ethical challenges and opportunities to go wrong. Some of those involve general business practices, while others involve conducting research that is below professional standards. Clients may behave unethically or deceptively also, as in all business relationships. Respondents may abuse the research relationship or be abused by it.

## 2.4 Marketing Decision Support Subsystem

Baker M. and Hart S. [26] argue that a critical decision of a company is the selection of the target market segments. If more than one segment is to be addressed, then consideration needs to be given to the order in which each will be targeted. According to Kotler P. and Keller K. [5] all segments have to meet four conditions: measurability; substantiality; accessibility and action ability. Beyond these fundamental requirements, the selection of target market segments requires information that is not always available from market research. Consequently, a decision-support framework is needed to aid managerial decision making.

According to Little J. [27] the marketing decision support subsystem (MDSS) consists of statistical programs and decision models that provide necessary information for businessmen, to help them make the best marketing decisions. Kurtz, D., [4] argues that marketing decision support system (MDSS) consists of software that helps users quickly obtain and apply information in a way that supports marketing decisions. Taking MIS a step further, it allows managers to explore and connect such varying information as the state of the market, consumer behaviour, sales forecasts, competitors' actions, and environmental changes [28].

MDSSs consist of four main characteristics [29]: they are interactive, investigative, flexible, and accessible. An MDSS can create simulations or models to illustrate the likely results of changes in marketing strategies or market conditions. While an MIS provides raw data, an MDSS develops this data into information useful for decision making. Although the other subsystems of the marketing information system aim towards continuous and systematic gathering, classification and analysis of the necessary information towards the staff, the marketing decision support subsystem is regarded as the appropriate system to feed necessary information for the unusual and non-standardized problems as, for example, a charter's evaluation or the transfer of ships from one market to another during periods of a shipping crisis [30].

## 3. RESEARCH METHODOLOGY

The aim of the research was the study of the marketing information system as a success factor of shipping business in Cyprus. For that

reason an exploratory, deductive quantitative research was conducted in order to serve the above-mentioned purpose. To that effect, a mail questionnaire survey was conducted in the merchant shipping industry of Cyprus. This selected method of data collection is an impersonal survey method. It has advantages such as less interviewer bias, low cost of data collection, a high degree of anonymity and wide access to geographically dispersed samples.

In order the produced results to be representative of the whole population, a probability sampling technique was used by the authors. The questionnaire sample consisted of companies geographically located in Cyprus. These companies are involved in the shipowning, ship management, ship agency, freight forwarding, ship brokering etc. More specifically, in order to extend the findings gained from the literature review, a mail questionnaire survey was conducted by the authors to explore the following key issues:

- Do the shipping companies in Cyprus implement marketing information systems?
- Of which subsystems the marketing information systems are constituted?
- Does the marketing information system play a success factor of shipping business?

The shipping industry of Cyprus was selected because of its importance to its national economy. The questionnaire used consisted of two major parts with 20 questions in all. The first part of questions asked about shipping companies' profile. The second part of questions used to explore the implementation of MIS and its subsystems to the companies. The list of companies obtained from the Directory of the Cyprus Chamber of Commerce and Industry. The response rate was 63% of the population size (79 shipping companies), which reflects the validity and reliability of data collected.

## 4. FINDINGS

This section of the paper presents the mail questionnaire survey results. By taking into consideration the main activities of the companies, they have been classified into shipowning companies, ship management companies, freight forwarders/ship agents, providers of logistics/shipping services, chartering brokers and others. The last category

of companies includes a small number of ship suppliers, ship surveyors etc. Furthermore, by taking into consideration the number of employees, the companies have been divided into small, medium and large. The profile of the companies which are located in Cyprus is presented at the Diagrams 1, 2a, 2b, 2c, 2d, 2e and 2f. More analytically, 35% of the sample are freight forwarders and agents, 28% of the sample are providers of logistics/shipping services, 16% of the sample are ship management companies, 4% of the sample are chartering brokers and 3% of the sample are shipowning companies.

The shipowning companies located in Cyprus are large-sized companies while the ship brokering companies are medium-sized companies. The ship management companies are mainly large-sized companies since 67% of these companies are large-sized and 33% are medium-sized companies. The freight forwarding companies and ship agencies are distributed almost equally among large, medium and small sizes. So, 40% of these companies are small-sized companies, 35% are large-sized companies and 25% are medium-sized companies. Moreover, the providers of logistics and shipping services are mainly large-sized companies. More specifically, 50% of these companies are large-sized companies, 31% are medium-sized and 19% are small-sized companies.

After presenting the profile of the companies-participants in the research, the structure of their Marketing Information System is displayed. Diagrams 3, 4, 5, 6, and 7 present the operation of the Marketing Information System at the companies- respondents of the questionnaire.

More specifically, according to Diagram 3, 33% of the shipowning companies use an internal file subsystem, 33% of the companies use a marketing information subsystem, 17% of the companies use a marketing research subsystem and 17% of the companies use a decision support subsystem.

Diagram 4 presents that 43% of the ship management companies apply an internal file subsystem, 43% of the companies apply a marketing information subsystem, 9% of the companies apply a marketing research subsystem and only 5% of the companies apply a decision support subsystem.

In accordance with the Diagram 5, 61% of the freight forwarding companies and ship agencies

use an internal file subsystem and 39% of these companies use a marketing information subsystem. No marketing research subsystem or decision support subsystem is applied in these companies. Similar is the case of ship brokering companies where (see Diagram 7) 73% of these companies use an internal file subsystem and 27% of the companies use a marketing information subsystem.

Finally, Diagram 6 presents that 52% of the providers of logistics/shipping services implement an internal file subsystem, 32% of the companies apply a marketing information subsystem, 10% of the companies implement a marketing research subsystem and 6% of the companies apply a decision support subsystem.

Diagram 8 presents the relation of the companies' size with the types of MIS subsystems. More specifically, the small-sized companies do not use the decision support subsystem and the marketing research subsystem. These subsystems are applied in some large-sized and medium-sized companies. So, 35% of the large-sized companies and 10% of the medium-sized companies use a marketing research support subsystem. In addition, 17% of the large-sized companies and 4% of the medium-sized companies use a decision support subsystem.

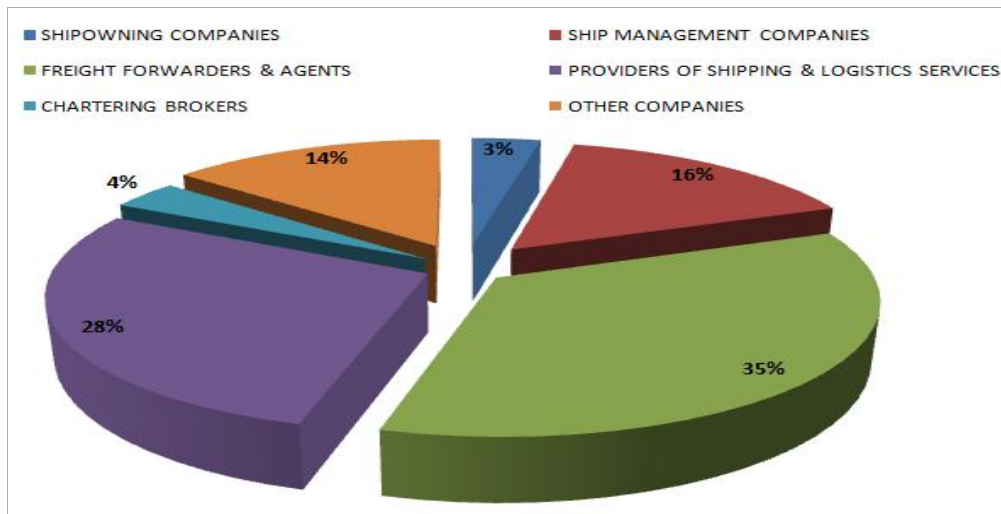
The usual MIS subsystems which are adopted by the shipowning, ship management, ship agency, freight forwarding and ship brokering companies are the internal file subsystems and the marketing information subsystems. Moreover, 96% of the large-sized companies, 75% of the medium-sized companies and 30% of the small-sized companies use an internal file subsystem. Furthermore, 90% of the large-sized companies, 62% of the medium-sized companies and 15% of the small-sized companies use a marketing information subsystem.

The companies have been asked if they recognize the role of the MIS as a success factor of their shipping business (see Diagram 9). 96% of the respondents consider that the internal file subsystem plays a considerable role in their business. 95% of the companies argue that the marketing information subsystem is crucial in shipping business. Furthermore 45% of the respondents admit that the marketing research subsystem is necessary for understanding their target-market. Finally 35%

of the companies state that the decision support subsystem is important in achieving their goals. Obviously, the respondents consider that the internal file subsystem and the marketing information subsystem are more important in shipping business comparing with the marketing research subsystem and the decision support subsystem.

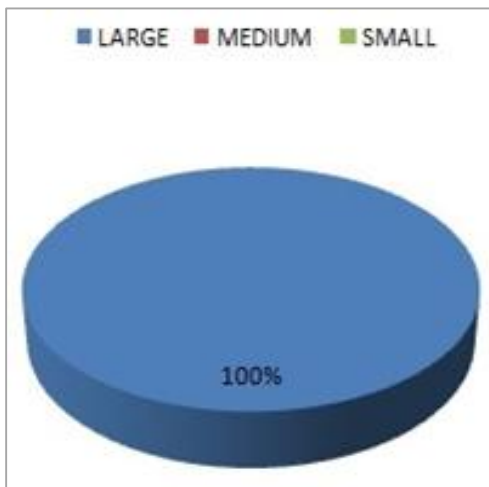
At the question which benefits of MIS are recognised by the companies, 75% of the

companies answered that the proper information is a prerequisite for the proper marketing planning, 68 % of the companies answered that the updated data is a requirement for the proper handling of market threats and opportunities, and 88% of the companies answered that proper information assists the company to understand the clients' needs and as a consequence to satisfy the clients' demands (see Diagram 10). The above benefits constitute key success factors for any shipping company.

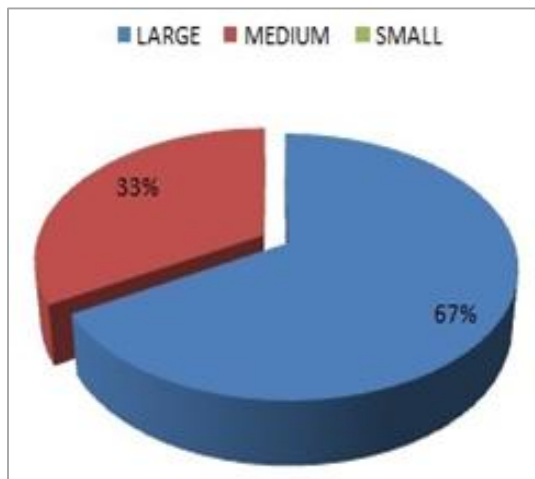


**Diagram 1. Profile of shipping companies in Cyprus**

**Large, medium & small shipping companies in Cyprus**



**Diagram 2a. Shipowning companies**



**Diagram 2b. Ship management companies**



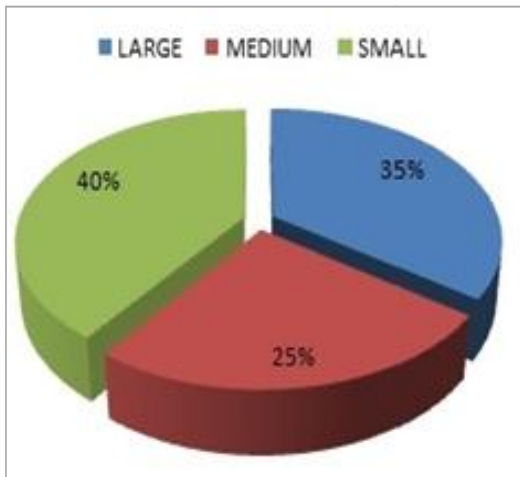


Diagram 2c. Freight forwarders and agents

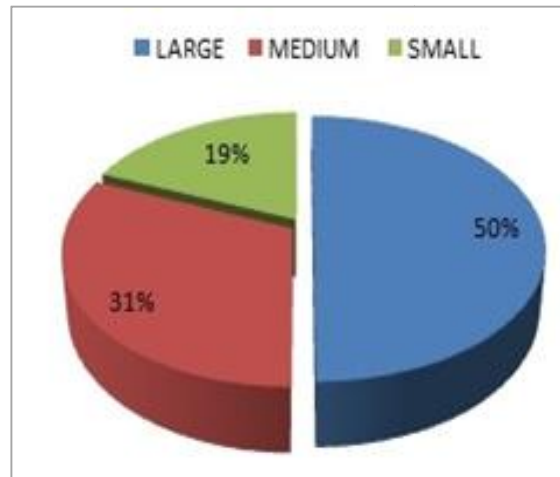


Diagram 2d. Providers of shipping & logistics services

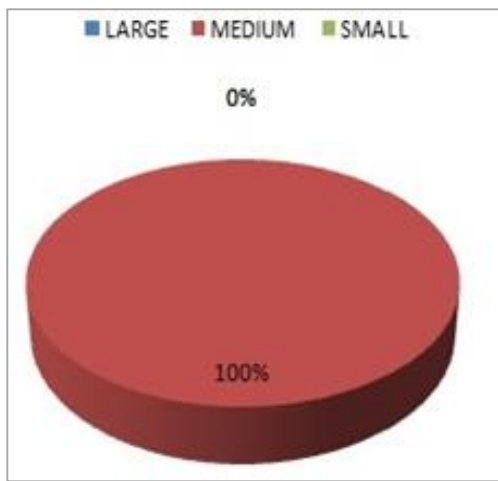


Diagram 2e. Chartering brokers

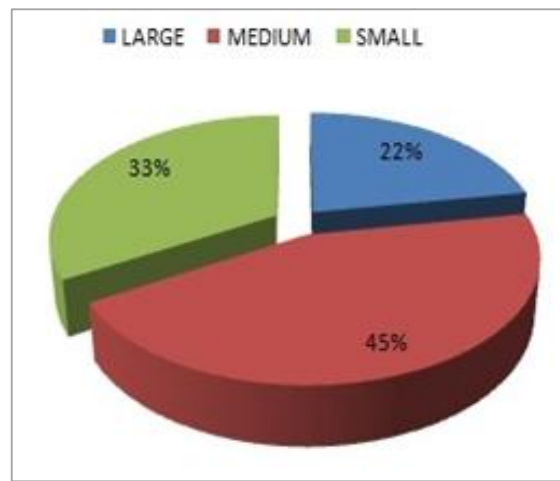


Diagram 2f. Other companies

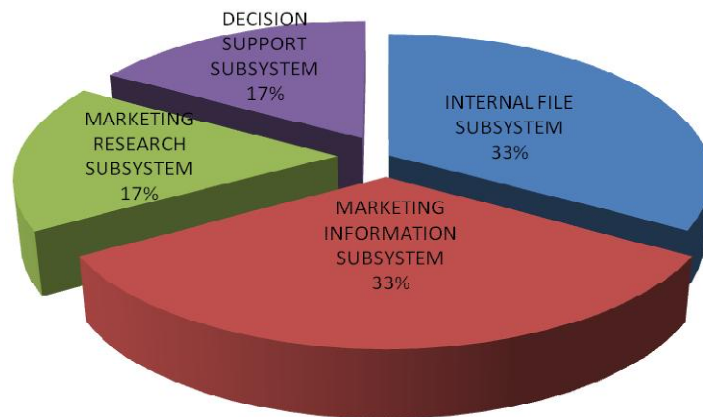
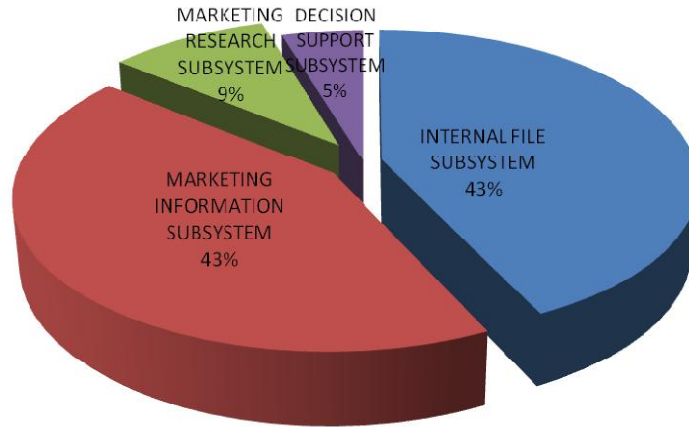
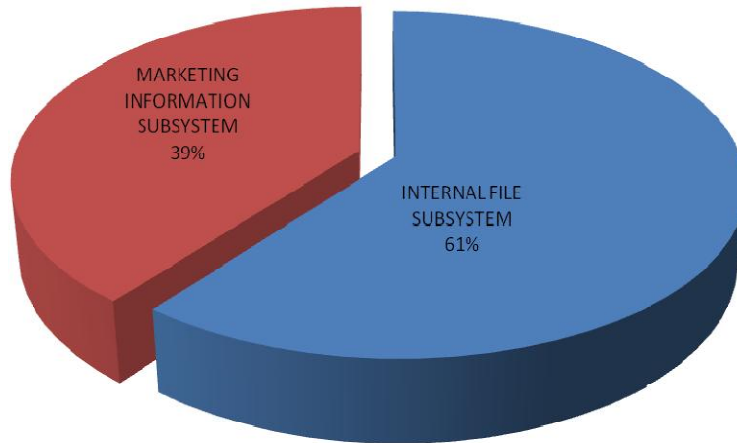


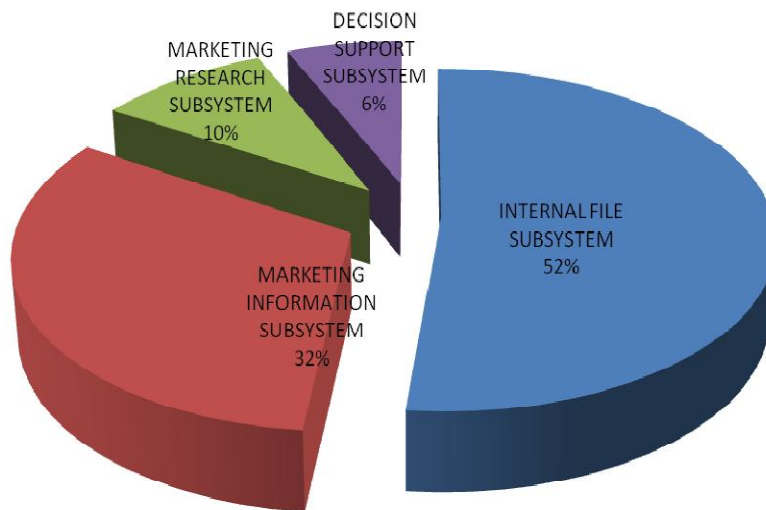
Diagram 3. The MIS of the shipping companies in Cyprus



**Diagram 4. The MIS of the ship management companies in Cyprus**



**Diagram 5. The MIS of the freight forwarding and ship agencies in Cyprus**



**Diagram 6. The MIS of the companies/providers of logistics/shipping services in Cyprus**

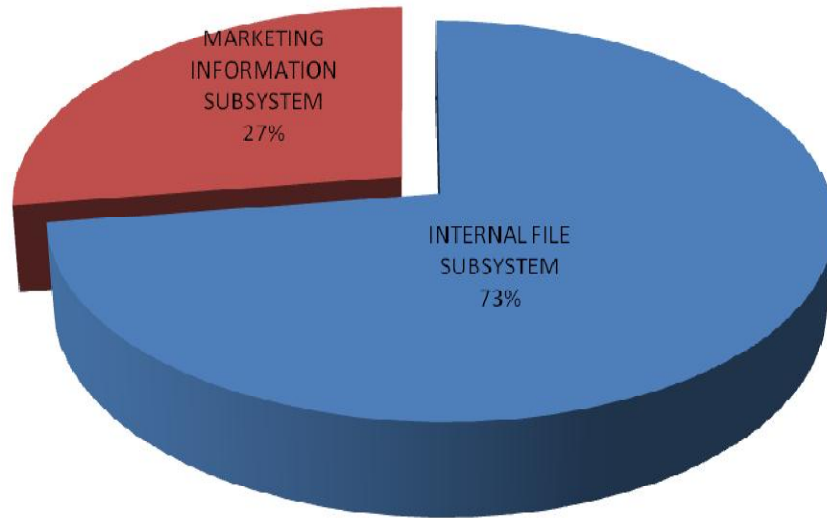


Diagram 7. The MIS of the chartering broking companies in Cyprus

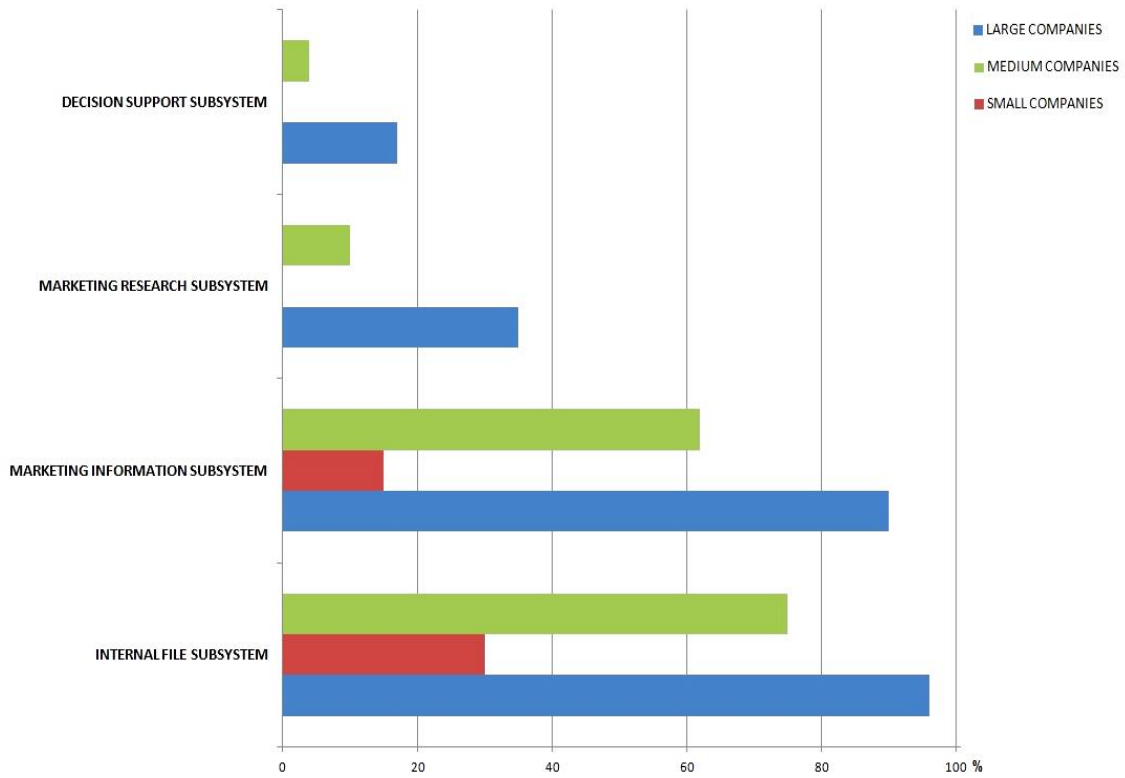
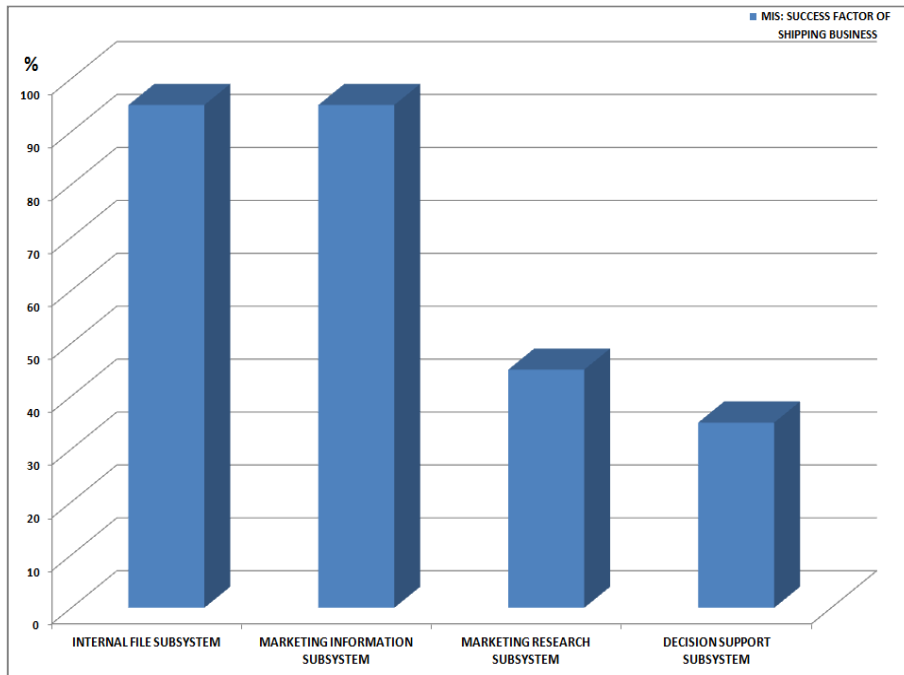
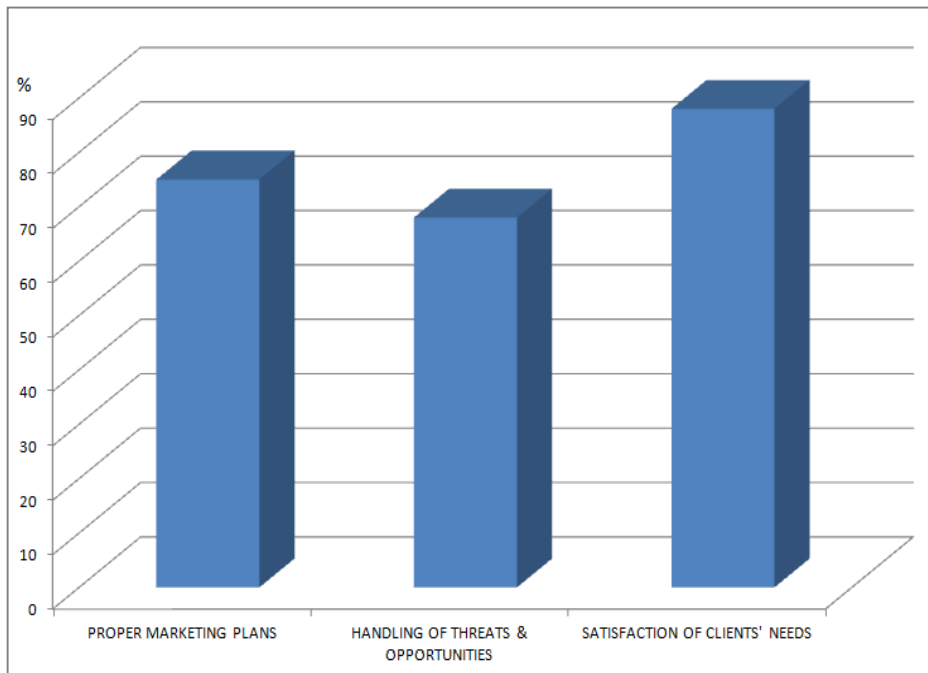


Diagram 8. The subsystems of MIS in large, medium and small companies in Cyprus



**Diagram 9. MIS: A Success factor of shipping and business**



**Diagram 10. Benefits of MIS**

**5. CONCLUSIONS**

The activities of a shipping company must be implemented within the framework of a well-

organised marketing process, which presupposes the understanding of the clients' buying behaviour. The appropriate marketing information system provides to the company the

suitable information regarding the customers' needs and the developments in the shipping business environment. As a consequence, a marketing information system helps the company to understand the customers' needs and to meet their requirements. In addition, a marketing information system contributes to the successful implementation of marketing plans. Furthermore, a marketing information system assists the shipping company to avoid market threats and exploit market opportunities for gaining competitive advantages.

The participants in the survey were freight forwarders and agents (35% of the sample), providers of logistics/shipping services (28% of the sample), ship management companies (16% of the sample), chartering brokers (4% of the sample) and shipowning companies (3% of the sample). Shipping companies in Cyprus comprehend the important role of a marketing information system in shipping business and therefore they use it extensively. More specifically, the respondents recognise that the internal file subsystems (96% of the respondents) and the marketing information subsystems (95% of the respondents) act decisively in their business. Furthermore 45% of the respondents admit that the marketing research subsystem is necessary for understanding their target-market. Finally 35% of the companies state that the decision support subsystem is important in achieving their goals. Obviously, the respondents consider that the internal file subsystem and the marketing information subsystem are more important in shipping business comparing with the marketing research subsystem and the decision support subsystem. The small companies do not use the decision support subsystems and the marketing research subsystems. However, these subsystems are applied in some large-sized and medium-sized companies. Among the benefits of MIS, participants distinguish the proper marketing planning (75% of the respondents), the proper handling of market threats and opportunities (68% of the respondents) and the understanding of the clients' needs (88% of the respondents). The above benefits constitute key success factors for any shipping company.

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no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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