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THE MEASUREMENT OF OVERALL OPERATIONAL EFFECTIVENESS AS FACTOR OF COMPETITIVE IN SHIPPING INDUSTRY

"Shipscraft", the way to meet the "Owner's Order"

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ABSTRACT:

At every financial period CFOs are requested by shareholders to present the financial results not only just as formal financial statements but also as useful information in relation to their competitors or the market. Despite the best services provided, it is due to the existing trade cycles [1] of the shipping market that shipping companies have trouble delivering strong long-term growth unless their management ensures that all business aspects operate **efficiently** and **effectively**. Efficiency can either be expressed through an operating ratio or through a simple percentage of budgets versus a specific time frame. As much as effectiveness is concerned and according to up today literature, management effectiveness ratios compare the financial statements measures to evaluate management performance. What has been described is industry's standard, however measurement of the management force to vessel's operation should be evaluated also for industry's most feasible **Holistically Operating Cost "HOC"** equivalent to **Overall Operational Effectiveness**. It's a force which can measure how a firm can use the total of its existing capabilities and competencies for the best vessel's operation. In shipping economy it refers to combined actions of both **"Shipscraft"** and vessel's operation. The term "Shipscraft" means "the art in management and leadership in vessel's company". This is the "art" through of which firm's processes, using company's "core competencies", can be readjusted in order to synchronize them and meet the stated **"owner's order"**. These processes are called "Shipscrafting". Reference to the management's effectiveness force to vessel's operation or Overall Operational Effectiveness, it was considered to be a non-quantitative concept and therefore not measurable, until today where through the use of Physics it can be measured as a Project – Work (W). In physics a force does work (W) when it results in movement [2]. The term work was introduced in 1826 by the French mathematician Gaspard - Gustave Coriolis [3] [4].

In this paper, the lowest daily OpEx has been considered and combined with the daily equivalent of the paid D/D expenses plus the Loss of Earnings due to DD idle periods, as the high volume strength for obtaining the best possible effect "work" (W). Setting the Ideal Holistically Operating Cost "HOC" at 0º degrees, the normally worst one is setting at 90º degrees. Where the corresponding cosine can be determined, in turn it can represent the percentage % to the Ideal "HOC". This is resolved through a system of two (2) equations, the outcome of which can be used to determine the degree of the angle

which corresponds to the figure under evaluation. This figure can either be projected as current result or as a forecast item (budget). The gap between current financial results and overall best operational effectiveness narrows with the company's growing ability to capitalize on knowledge and experience gained.

Keywords*: Shipping, Operating Cost, Operational Effectiveness, Benchmarking, Competitiveness*

1. Introduction

As per ex Greek Prime Minister Mr. Antonis Samaras speech of June 2013, the Core Competitive advantage of Hellenic merchant marine, the largest shipowning power worldwide, is due to five (5) main reasons.

1. The identification of seamanship with Hellenism
2. The extroversion of shipping companies
3. Their preoccupation globally in an almost perfectly competitive market
4. Their adaptability to a cyclical market
5. Achieving competitiveness

The need for continuous improvement and the importance of competitiveness are widely recognized; actions which remain top priority in every season of the cycle, at either times of crisis or prosperity.

In shipping industry generally, vessel's fixtures are based on rules and conditions of World Trade. This fact requires from most companies to concentrate their efforts for more efficiency at the "Operating Cost". Greek merchant marine is consisted of various size shipping companies most of which are lacking the ability to record, measure and comprehend the meaning of various quality factors like effectiveness. What cannot be controlled cannot manage and measured [5]. Lack of qualitative documentation does not permit effective management since what is not written can be highly consider as not done, therefore what is not done can't be measured, and if something can't be measure can't be managed [6].

A number of shipping companies are working using budget for their operating and administration expenses but too few create budget for the expected Income. Most retain a simple efficiency ratio system i.e. operating expenses to earnings or a comparison of the details of a benchmarking report to their operating cost.

For most, the level of ships' operating expenses remains the key factor instead of the expected hire of freight. These operating expenses compare either with the benchmarking report or the budget details, provide the opportunity to comprehend the variation and investigate the root causes behind it. Measuring Overall Operational Effectiveness and understanding the gap that is created between the company's efforts in the vessel's operation to retain the budget deviations and improve the outcome, against the Ideal Holistically Operating Cost "HOC" and compared to market's most feasible "HOC" and market's mean level one, is within the scope of this report and the manager's knowledge. Overall Operational Effectiveness measurement however must be ship specific and both shore staff and the sea manpower must be taken into account.

In finance, the term "economic efficiency" refers to the use of resources employed in order to maximize the production of goods and services [7]. In shipping economy there may be a term purpose of mentioning to an "Overall Operational Effectiveness", as result of combined actions of both "Shipscraft" and vessel's operation.

The term "Shipscraft" means "the art in management and leadership in vessel's company". This "art" includes the "Core Competencies" [8] of Principals, Managers and Masters based to the "peopleware" theory [9]. These competen-

cies either as "*a glue that binds"* existing activities or "*an engine for new business development"* [8], create a distinctive group of skills and technologies that enable a shipping company to provide particular benefits to shareholders, to investors, to its employees and to customers (charterers). This is the "art" through of which firm's processes, using company's "core competencies", can be adjusted in order to meet the stated "owner's order". These processes are called "Shipscrafting".

All above are resulting in gaining competitive advantages. These are the "core competencies" which presented to the financial statements either as higher income or as lower operating cost, when compared to the global market figures.

2. Problem Formulation

At every financial period (quarterly, semiannual or annual) in Shipping Industry, CFOs are requested by shareholders and/or investors to present the financial results not only just as formal financial statements but also as useful information in relation to their competitors or the market. The most common and useful information in each financial presentation is the various financial ratios through which the efficiency of their investment and few other quantitative figures can be comprehended.

The scientific community has accepted "shipping cycles" [1] as part of industry culture. These "cycles" are not regular, they appear with high volatility and their characteristics basically do not depend on the company's operation level but on the rules of the world trade. The high volatility of shipping cycles conceals the risk of challenge to "play the cycle". This hidden game for quick profit is the main cause of the problem that shipping companies have trouble delivering strong long-term growth unless their management ensures that all business aspects operate efficiently and effectively. In this paper the term "efficiency" is defined as the extent of an effort in relation to time, while "effectiveness" is defined as the outcome of a project (Work) which however is a relatively fuzzy concept [10] that mainly involves the achievement of objectives.

Efficiency can either be expressed through an operating ratio or as a ratio of budgets versus a specific time frame. Operating ratios typically analyse the effectiveness by which the company uses its assets and liabilities internally like turnover of receivables, repayment of liabilities, quantity and usage of equity and general use of inventories and machinery. Management effectiveness ratios compare the financial statements measures to evaluate management performance. Of all fundamental criteria that investors consider, the most important are the ROE (Return on Equity) and the ROA (Return on Assets). ROE is a basic test of how well a company's management handles its finances. Also it answers to the question "Is management's level increasing the overall value of the business at an acceptable rate?" the ROA illustrates how much profit the company earns for every dollar not only of Investment but also of its assets like cash & banks, receivables, inventories, equipment etc. Without the use of the

What differentiates this paper from industry's standard practice is that the amount which is used for the process of measurement the Overall Operational Effectiveness contains together with vessel's operating and administration expenses, the total of actual spending expenses during the last one or two consecutive D/D periods plus the loss of earnings which are calculated as the balance of the loss of hire less the operating costs for these D/D periods. This net amount is called Holistically Operating Cost "HOC" and in a daily basis it represents the differentiating detail which is introduced in this paper, which can also be used as a break-even operating point, equivalent to expectancy income of EBID factor (Earnings before Interest & Depreciation).

mentioned ratios, high-debt companies may be presented as more attractive than low-debt firms with the same earnings and assets.

All above makes it even more important to find a formula for evaluation of company's "current operation status", regardless of the current position of the market in the chart of a shipping cycle. These mentioned findings can be used for the measure of management force to vessel's operation or otherwise "the quantitative display of the art in management and leadership in vessel's company" towards best effectiveness. This force can be compared not only to a reported market's mean level but also to a force equal to Ideal Holistically Operating Cost "HOC" and to market's most feasible one.

With this force, measurements of how a firm can use its existing capabilities and competencies for the best vessel's operation can be achieved. This is a fact as there are many companies which although they have financial and technological capabilities, they lack core competencies, like human skills, and conversely.

This management's effectiveness force or Overall Operational Effectiveness is a non-quantitative concept, which can now be approached / measured through the use of Physics as Project - Work (W) (Figure 2). In shipping markets the operating results depends at each voyage (project) performance.

According to the Physics theory of the "work" (W) [2] any result must be measured in relation to the time (t). Therefore either as a voyage or as a time charter both must be measured and compared on the basis of a daily (t) rate.

The purpose of each project (voyage) must be the creation of a positive effect. It's the company's Overall Operational Effectiveness (W) (Figure 2), which lies behind any number and/or financial result, but this is also the company's real strength or weakness, in relation to competitors and/or market. This kind of effectiveness includes the partnership, leadership, the management of projects, the internal management, and the status of clients' quality together with company's relationship to all. Finally the most important for any firm is the understanding of all above mentioned findings together with any ratio and result or otherwise "creation of knowledge - experience" [11]. The Overall Operational Effectiveness of each organization is presented as a force, through which a positive effect can be achieved.

These forces are presented in a quadrant. The ideal Holistically Operating Cost "HOC" is projected at 0° degrees and the normally worst one at 90° degrees. Considering the lowest cost as the high-volume strength for best effect, then all remaining results can be placed as forces ranging between 0° to 90° degrees accordingly. Alternatively to this hypothesis, we can take into account to put at 0º degrees the Most Feasible HOC instead of Ideal one.

The cosine of the resulting angles equals to the effectiveness (%) over the Ideal Holistically Operating Cost "HOC" defined as follows:

a. In case that 0º is considered equal to Ideal "HOC"
   - 100,00% @ 0° degrees (for Ideal "HOC")
   - 96,59% @ 15° degrees (for Most feasible "HOC")
   - 86,60% @ 30° degrees
   - 70,71% @ 45° degrees (for Mean Level "HOC")
   - 50,00% @ 60° degrees.
   - 25,88% @ 75° degrees
   - 0.0% @ 90° degrees (for the normally worst one)
b. In case that 0º is considered equal to Most feasible "HOC"
   - 100,00% @ 0º degrees (for Most feasible "HOC")

- 96,59% @ 15º degrees
- 86,60% @ 30º degrees (for Mean Level "HOC")
- 70,71% @ 45º degrees
- 50,00% @ 60º degrees.
- 25,88% @ 75º degrees
- 0.0% @ 90º degrees (for the normally worst one)

"Overall Operational Effectiveness" is proportional to percentage. The understanding of the resulting percentages can be used as a tool and a motive towards better outcomes, since the difference a) between actual to the ideal "HOC" or b) between actual to Most feasible "HOC", could be expressed as the gap that exists towards achieving the best results.

3. Research Sources

One of the most significant handicaps of the shipping industry is the lack of organizational information based on which accurate measurements, models, theories and practices can be developed and executed. The lack of such information restricts significantly the level or research and therefore the impact of the contribution of any work (scientific or industry based) attempted on the industry.

The Moore Stephens Benchmarking report [12] is considered as one of the most reliable sources of information that can support empirical and scientific research activities in the shipping industry. This paper employs the Moore Stephens Benchmarking report and their specific details in Annex I samples, which are representative of the market.

Nevertheless it must be noted that the information provided by the Moore Stephens Benchmarking report is primarily vessel oriented and not organizational oriented. Therefore and according to the stated "owner's order", significant factors that contribute to the scope of this paper, towards the definition of the term "Shipscraft", such as the utilization of the human recourses expertise, knowledge, leadership, management and innovation have been integrated to what is defined as vessel operations management and effectiveness indexes.

This paper also attempts to highlight the need of human oriented management factor metrics that can be generated within each organization vertically, and integrated through the measure of ship's effectiveness to general terms of efficiency, for both vessels and shipping organizations.

Once the concept that shipping organizations do not measure their effectiveness by the vessels' response to "owner's order" only gets accepted, and a chance of mind is achieved to include the human capacity, intelligence, knowledge and expertise in the efficiency definitions and models, then vessel and organizations management methods in the shipping industry will enter a new era.

4. Methodology

Based on the available date, the operating costs and dry docking expenses for 25 ship categories are all presented in the Moore Stephens benchmarking report while the specifics of each category is based on following six (6) figures:

- The lowest value,
- The lower (1st) quartile,
- The Average (mean level),

- The middle (2nd) quartile,
- The upper (3) quartile and
- The highest value.

Most of the above figures are available for both operating & dry-dock expenses with idle dry-dock days being included. The Moore Stephens study also reports the number of vessels for each sample compare to the global fleet and makes use of three (3) age factors which are necessary for a fair comparison.

- 1 to 7 years old
- 8-15 &
- 16-25

In descriptive statistics there are:

- The "mean" which is the average value of all the data in the sample.
- The "median" which is the middle value in a data set that has been arranged in numerical order so that exactly half the data is above the median and half is below it.

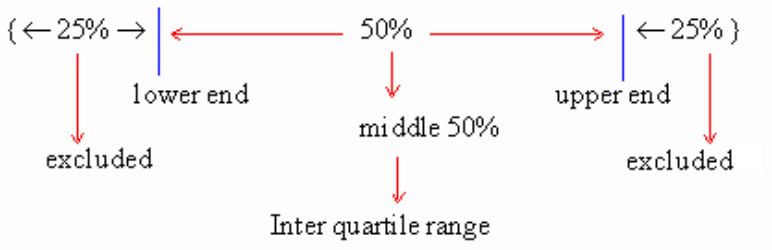

Figure 1. Quartile and Interquartile Range

Moore Stephens methodology is based on the Quartile's method of statistics which is similar to the median. In the median's method data are measured in order to find the central tendency of them. As this is a figure which says nothing about the distribution of data on either side of the median, data are divided into 4 equal groups. Out of existing two extreme figures, the first 25th percentile is the first quartile which recognized as the lower figure. Similarly the 75th percentile is the 3rd quartile which recognized as the upper one. This is needed in order to decide if the figures of 4 quartiles can be used as a normal distribution or to use only the three figures of the interquartile range. In this methodology used the Quartile method (Figure 1). This was screened as the more functional, as both extreme figures are far away from the figures of 1st & 3rd quartiles. Therefore the interquartile range is that which can be used with the more useful informative figures.

Above mentioned expenses and their management, depends solely upon the individual manager's or shipowners' strategies and policies. There are cases where shipowner's managers decide on a day to day vessel operating cost with high maintenance and low dry dock specification, whereas others decide on an expensive dry-dock scheme with lower maintenance or day to day cost.

It is for that reason the composing of data between Operating & Dry Dock cost are used conversely i.e. in this paper. On table 1, the data of the values of Operating and Administrations expenses (OpCost) are presented from min to max values and the Dry Dock expenses from max to min. In case of new building and/or new acquisitions where the dry-docking expenses are not applicable, the paper can only be used for operating costs comparison purposes.

In order to process and study all operating expenses, these expenses are projected into daily costs which include dry-dock (D/D) cost and the net loss of earnings from the D/D idle periods. More specific, the paper equally divides the annual operating and administration expenses for the days of the year or specific peri-

od and the average of paid amount for Intermediate and Special Surveys and D/D together with the average operating cost of their idle periods with 913. Reference to the calculation of the daily cost of D/D expenses it depends on how many D/D periods the vessel underwent under our management. For comparison purposes, the corresponding data from the Moore Stephens benchmarking is also be projected on a daily basis (913 days projection) as it presents only period of D/D either as a Special Survey or as an intermediate survey.

Table 1. Operating and Dry Dock Expenses

	Min	Lower (1st) Quartile	Middle (2nd) Quartile	Average (mean)	Upper (3rd) Quartile	Max
OpCost (Running + Admin.) / 365 days developed (min to max)	A					
D/D Cost / 913 days Developed (max to min)	B					
Aver. days of D/D	C					
(a) OpCost of D/D Idle period	D = C @ A					
Loss of Earnings (b) The average T/C daily hire @ the days of D/D	E =T/C @ C					
Net Daily loss of earnings due to D/D idle period (b-a)/913 days	F=(E-D)/913					
Total Daily Holistically Operating Cost or Break Even Operating point eq. to EBID	G = A+B+F					
All above adjusted to Vessel's Age Factor (X)	G @ X					

In order to be compatible with the Moore Stephens Benchmarking figures, all expenses to be examined must be adjusted to the age corrective factor (X). Conversion of D/D ex-penses in NPV is a matter of choosing the depth of analysis.

Reference to EBID factor, in Shipping Industry (listed companies excluded) it must be preferable to EBITD (Earnings before Interest, Tax & Depreciation) and / or EBITDA, since the majority of shipowning companies are taxed according to vessel's tonnage and not according to their results. This amount of tonnage tax presented at Moore Stephens tables of Operating Cost as "registration cost".

The range between the lower & upper quartiles is a reliable one the lower 1st quartile of which presents the most truly low cost "HOC" which the next level after the ideal cost, and correspondingly the upper 3rd quartile the most truly higher cost.

Reference to the Overall Operational Effectiveness and in order to convert it to a quantitative / measureable figure, the use of "Work producing Force" theory [2] is employed. As the purpose of each project (Work) must be the creation of an effect (positive result), the Overall

Operational Effectiveness of each organization can be presented as the force through which a positive effect can be achieved. This force is projected in a quadrant either as the optimum force of the **i**deal Holistically Operating Cost "HOC" at the zero (0°) degrees or at ninety (90°) degrees the force for the normally worst one.

As the "Work" (W) is closely related to "Energy", in shipping market this term (figure 2), can be expressed as:

A) The ship's ability to convert energy into movement. This energy is the resultant force of the forces and efforts of both humans and machines.

B) The conversion of energy (thermal, kinetic, etc.) to positive economic effects; an essential element for a further development of any organization.

The project - work (W) of the above mentioned resultant force (F) is equal to the product of this force (F) for the movement of (***r***) and the cosine of angle (θ) - Displacement. Actually this presents either the profit per calendar day or the daily Holistically Operating Cost "HOC" alternatively.

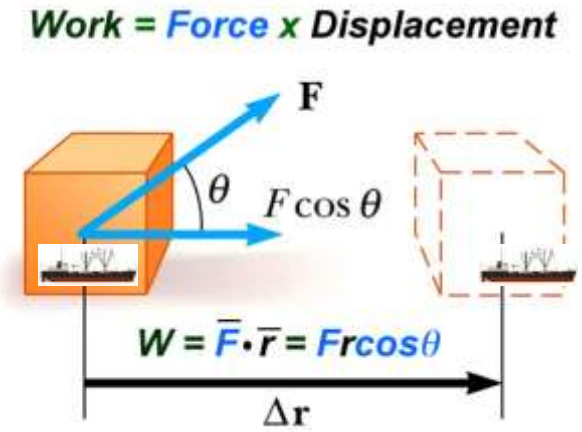

Figure 2. Definition of Work (W)

In Shipping Market, an almost perfectly competitive market, in most cases, vessels' revenue comes either from freight or from a daily hire. One of the basic that vessel's revenue depends is the type of ship. Assuming that there are two sister vessels which are fixed for the same voyage at the same period, owners and operators should not expect the same economic effect (Δr) before interest & depreciation cost. In practice any two sister vessels, even if fixed at the same amount as income (Hire or Freight), at the end of the (W) "work" (Voyage) the financial result will be different. This is the diversity that is examined at the basis of Overall Operational Effectiveness.

5. Deepening

According to literature [13], the financial performance of these two sister ships which supposed that are chartered under a daily hire, are depend to:

1. The revenue from chartering
2. The cost of running the vessel
3. The method of financing the business.

As these two sister vessels have fixed with the same T/C daily rate and the method of financing is a hypothesis of capital investment, the

cost of running the vessel remains the unique critical sector.

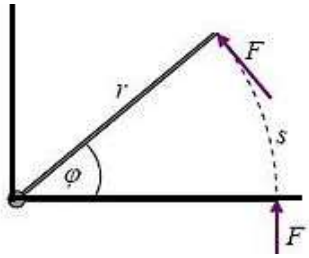

Figure 3. Lack of Response – Lack of Performance (negative force F)

According to the operational managements for shipping companies [14], the reason that the results of these two sister vessels with the same type of time charter are differentiated, is the existence negative forces *(F)* or firm's gap of Response from Ideal Holistically Operating Cost and compared to most feasible "HOC" and market's Mean level one. (Figure 3) This negative fact is either due to Master's actions or Managers' orders or Owners' decisions. Generally it is due to their lack of response to vessel's mission and requirement level of vessel's holistically operating expenses.

For any kind of shipping company the main points in the 1st step of the operational management are the decision of Owners and the orders of Managers for:

- Vessel's Acquisition
- Flag and vessel's registration
- Vessel's chartering
- Firm's Marketing
- Process on decision making

The analysis in depth of the above mentioned matters and the ability of a researcher to create comparison of results imply firms' internal information as the publication of periodically and annual financial statements are not mandatory and very difficult to be found.

Most of organizations in shipping industry are failed either due to their misfortune to invest at the right time or due to their inability to identify their problems. In shipping practice is accepted that the most well-known, the most probably applicable.

Even an organization has identified its problems; it remains risky if it can't be able to accept & to measure them. This is a step that needs to go down either throughout the manager's maturity and structure's capability or using outsourcing by a consultant. These actions are included in the processes of Change Management.

The reason that a firm cannot implement change management with internal processes is based mainly to the law of conservation of corporate angular momentum. It states that when no external torque (consultant) acts on an object or a closed system of objects, no change of corporate angular momentum can occur. Hence, the corporate angular momentum before an event involving only internal torques (internal processes) or no torques (no action) is equal to the corporate angular momentum after the event. The other hidden reason is the fear of the external evaluation and the risk of job loss. In fact the role of an external consultant is; using the existing staff - manpower to proceed to necessary actions that they will help organization either to restart from its existing operational inertia or to avoid its shrinkage.

The 2nd step of operational management contains the Operational Results which are depending to:

- Net Vessel's Voyage Income
- Vessel's running cost
- Administration expenses
- Amortisation expenses
- Depreciation expenses

The balance of above mentioned results accounts presents the vessel's net Profit or Loss from Shipping Operation. From these results accounts the net vessel's voyage income is depending to the status of market and generally more or less it is independent to the ship management type and Principles of Organization. For any type of management the functions of it mainly are four. All of them are addressed to firm's Managers [15]:

- **Planning**, though of which managers are setting goals and deciding how best to achieve them.
- **Controlling,** through of which managers are regulating activities to reach goals
- **Organizing**, through of which managers are allocating and arranging resources
- **Leading**, through of which managers are influencing others to work toward goals.

The last one of the above results accounts, the depreciation cost, is depending to company's strategy on capital investment. Therefore the other remaining results accounts have advantages a) to be equivalent to breakeven operating point of Earning before Interest & Depreciation (EBID) and b) to be known annually from MS research department as report of Benchmarking vessels running cost.

As a 3rd Step on the operational management, is the separation of the human capital as the equilibrium factor towards identifying the actual performance and efficiency variables but also towards defining the actions towards achieving the "Shipscraft" concept.

The human capital, the "Main Engine" of "Shipscraft" in a shipping entity, either it is a vessel or an organization, and on any type of operation derives significantly, from, at least, the following factors:

- Management and operations expertise
- Innovation and Competiveness
- Competition and Cooperation
- Knowledge acquisition, management and utilization
- Leadership and reliability

In order to understand the reasons of which the two sister vessels have different running cost each one of the main categories is briefly analyzed. The cost of running a cargo vessel [16] includes the manning (crew) costs, the cost of stores and lubricants, the cost of repairs and maintenance, the cost of insurance and the administrations cost. Also as individual sector there is the periodic (D/D) cost of repairs and maintenance, included the bunkers consumption and port expenses for D/D period. Any other cost like bunkers, port expenses and capital cost is out of the operating cost as they are depend to voyage type of vessel's trading and the capital structure.

It is very important that although the Management of a Shipowning Co takes into consideration the loss of earnings due to expected D/D, almost nobody from finance division presents this loss in a depth financial analysis of vessel's operation, unless this vessel is under a T/C Charter party agreement.

The mentioned analysis in this paper is based on a T/C daily rate out of any other the costs which are for charterers account.

Reference to the periodic (D/D) cost of repairs and maintenance, the cost of any kind of these surveys are depending to the position of the vessel at the time which each one is due. If for example the one of the sister vessels is due for a S/S where vessel sails in Europe area and the other one in Chinese South Sea, the cost of the first one will be higher than the second sister vessel. At the other side the needed days for the S/S in Europe are less than the needed days in China. Finally and reference to the loss of earnings, it depends on the hire which vessel loses due to mentioned D/D idle period.

Last but not least, the human factor must be considered as a critical and an independent element in the overall operating cost. Questions must be answered on how officers met the thought that "preventive short term maintenance policies mean better long term results".
All above referred lead to the conclusion that: **"different people, different results". The higher crew performance, the lower vessel running cost. The highest managers' perception, the lowest probability for accidently losses.** These are in brief the main reasons at the end of the day the two sister ships will have different results.

6. Faced with the Challenge – Solution

Reference on how all these expenses are treated is based according to the International Financial Reporting Standards [17] the periodical (D/D) maintenance recognized as deferred expenses, presented at the statement of comprehensive income as Amortisation and not as part of vessel's running expenses. These may be led managers to non-accurate financial information and wrong decisions. All papers measure the vessel's performance either as a P&L result or a ratio of expenses to the vessel's operating profit or to the gross earning or to the net profit or loss. Up today there is no method to compare the effectiveness of both machinery & human forces for two or more vessels. There is no method to predict the expecting effectiveness of the vessel. Most of them are planned just according to experience of shipowner or the firm's Managing Director.
The purpose of this paper is not to find and count how human-power is affected on holistically effectiveness. Its aim is to specify the percentage, as gap from the industry's most feasible one. It is based on holistically operating cost, combinatorial result of human activity and machinery's operations. This percentage presents the Overall Operational Effectiveness as a force, in relation to other ones.
"Shipping is an exciting business, surrounded by many false beliefs, misconceptions and even taboos…" [18] In the depth of consciousness everyone knows the reason of our status. The only that this paper wants is to present us the figures simple and specific.
This paper presents simple and specific the real running cost of the vessel, the administration cost and the actual periodic cost of maintenance (D/D) together with the net loss of earnings from the D/D idle periods, in order to find the cost of firm's holistically force to operate a vessel. This action is part of Holistic Management. Using these results the force of overall efforts are presented as a vector. The lowest cost is considered as the high-volume strength for the best effect "work" (W). Therefore all results can be placed as forces ranging between 0º-90º degrees.

The ideal cost lies placed at zero 0º degrees (100%) while market's most feasibly "HOC" placed at 15º degrees (96.59%) and market's mean level at 45º degrees (70.7%). (Figure 4)

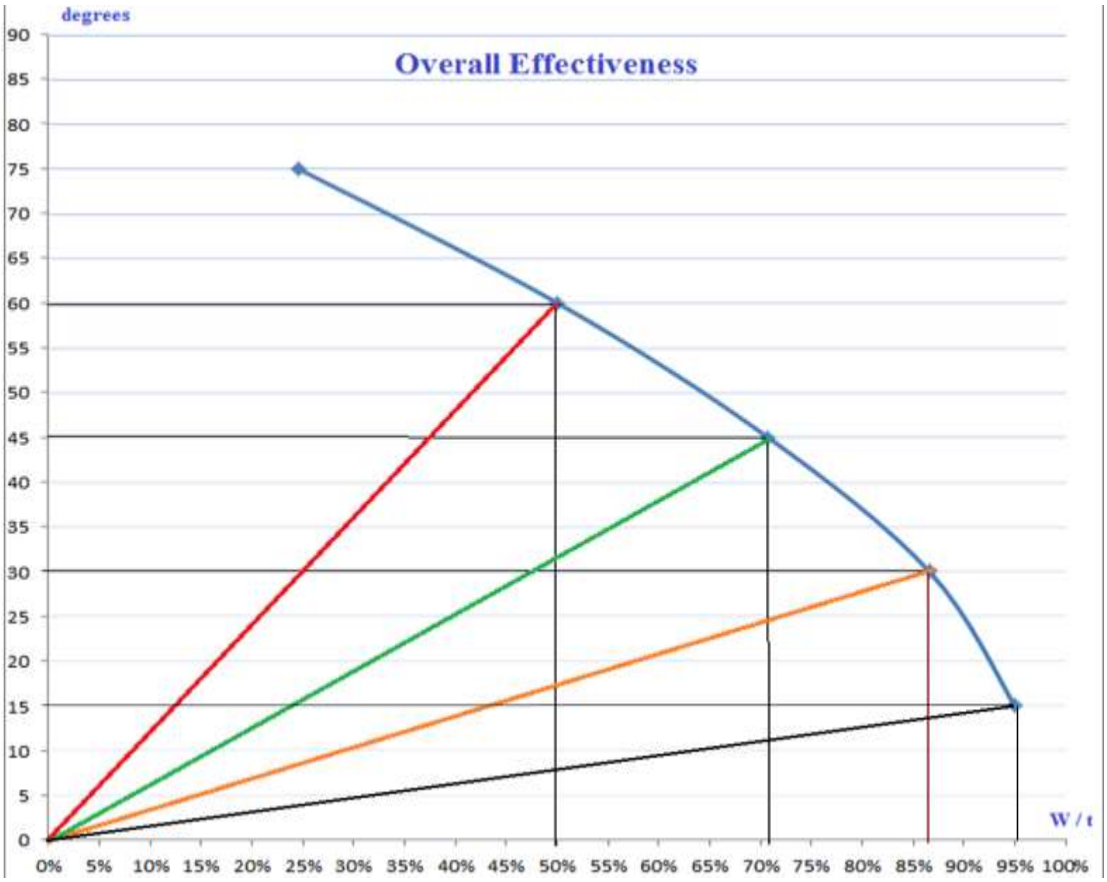

Figure 4. Diagram of Overall Operational Effectiveness

The corresponding angle cosine, represent the Overall Operational Effectiveness (%) versus to the ideal one i.e. The 30º degrees results to 86.6% effectiveness versus to ideal “HOC”; the 45º degrees to 70.7% and the 60º degrees to 50% gap of response.

From this hypothesis the company’s Overall Operational Effectiveness is presented versus both to Ideal “HOC” and to most feasible acceptable recorded lower Holistically Operating Cost “HOC”. Using the heavy term "Holistically" achieved to include the whole system of human beliefs which as result of human decisions, are presented as a number of currency under the finance term: "operating expenses".

The really cause i.e. the human element, is result of expertise and knowledge of people. It is also a factor to the determination of the increase or decrease of vessel’s operational expenses, in relation to the machinery's efficiency. This can be measured and counted individually for each firm as a closed management system in a future research paper.

Towards resolving these issues noted that both hypotheses must be solved as a system with the following two equations (a) (a1):

Hypothesis: Examination of the figures to the Ideal Holistically Operating Cost

$$\left.\begin{aligned} a^2 x_1 + a x_2 &= 15 \\ b^2 x_1 + b x_2 &= 45 \end{aligned}\right\} \quad \text{a)}$$

By solving for X1 & X2, the resulti n of formulas is listed in (b):

(b)
$$\begin{cases} x_1 = \dfrac{15\,b - 45\,a}{a\,(a\,b - b^2)} \\ x_2 = \dfrac{-\dfrac{15\,b^2}{a} + 45\,a}{a\,b - b^2} \end{cases}, a \neq 0 \text{ and } b - \frac{b^2}{a} \neq 0$$

7. Results

Substituting (a) and (b) with Moore Stephens lower 1st and mean level figures, the corresponding X1 and X2 values are obtained. In order to find the position of one of the actual examined figures as a degree at the quadrant, the following formula of is used:

In (c) the 'a' is replaced with the actual figure of the examinee Holistically Operating Cost "HOC" and the (X1), (X2) variables with the above mentioned numbers of resulting system. The outcome of 'ψ' is the degree of the angle which corresponds to the examinee figure. The corresponding cosine can be then determined which in turn represents the percentage % to the ideal "HOC" and to use for comparison with industry's most feasible "HOC" (15º) and Mean level one (45º).

$$\text{solve}(\{a^2 x_1 + a x_2 = \psi\}, \{\psi\})$$

Additionally, knowing the individual forces of company's ships and industry's figures on low, mean and high quartiles, the resultants of both company's forces and industry ones can be found. Transferring the finding data into quadrant, an opportunity is given to view and to understand the position of the company relative to the market and the firm's divergence from the industry's most feasible holistically operating cost (HOC).

As "market" can be considered either an area per ship classification e.g. individual resultant of Panamax figures or Capesize etc. or another one according to the BDI Index [19] of dry cargo i.e resultant of Capesize, Panamax, Supramax & Handysize figures.

8. Socioeconomic Impact

As currently in force in medicine that early diagnosis and the prevention are prerequisite for the successful cure of a disease, under the same view, it would be challenge if there is also this possibility in the Shipping Industry. In this market there is a competitive advantage that is not mandatory the publication of financial reports, case which parallel is disadvantage, as no picture or details of the market and competition are available public.

Many times CFOs use creative accounting to generate financial results which are showing

either better or worse than the existent real ones. Also through the presentation of formal financial statements, CFOs can achieve to "keep under the carpet" chronic problems and generally "not clear information". In order to understand the variation between similar vessels' expenses, according to MS report (edition 2014) there is vessel (PANAMAX type) for which owners have spent $ 22,847 per day for operating cost and another similar vessel for which other owners have spent just $1,705! per day. In another case and reference to the cost of the periodically Maintenance (D/D), there is vessel (PANAMAX type) for which owners have spent for D/D $ 1,173,111 and another similar vessel for which other owners have spent just $ 446,621.

Questions that arises is which is the true figure, and in the case that there are wrong figures how can be found in order not to be taken into account, and how a representative sample per vessel's type, with as possible as certainly real figures, can be generated. These figures are separable in two types of expenses. The annual operating and administration cost and the long term periodically maintenance cost (D/D). Especially on the long term expenses there are two different types of D/D and Surveys: The most expensive Special Survey (S/S), every 5 years, and the intermediate survey at the middle of two consecutive S/S. Also a hidden cost must take in consideration, as during these surveys the vessel is out of the market like in an Idle Period.

The question placed here is how they can be allocated and incorporated in order to take comparable data. Seeing and comparing individually each one of the vessel expenses, the only certain is that it may take wrong results. The holistic approach of the vessel's Operating cost can give to the observer the opportunity for a more objective viewpoint. It must be noted that the information for how much is needed for paints or spare parts or stores or how much is the cost of "x" Filipino seaman or Romanian or Chinese one, is not enough to decide about the future and the level of vessel's operating cost.

All above are also applying to budget preparation. The question is how CEO or BOD can view the level of vessels operation at the time of budget approval. It is obvious that an expensive budget, higher than market one, may not have positive competitive and financial results. With the method which is presented through this paper the CFO, CEO or the BOD can compare the holistic operating cost of all similar or dissimilar vessels at the same graphic, simply and notoriously.

As mentioned above, the challenge is the level of anticipation in order to diagnose the problem before it occurs or even to diagnose it from the first months of the next year. With this method there is no need to find out exactly what is happening and why such kinds of results have been created. The aim is the cure of the disease. In most of the firms in shipping market, every CFO knows exactly and very well her/his own matters. It is certain that where she/he view the vessel's position in relation to the market she/he will make all necessary corrective actions in order to change the details of the next budget, otherwise he / she must be replaced..

This method is basically a tool of internal control and self-determination on the basis of early general diagnosis and avoidance of unpleasant impressions for Shipowners and Directors.

At the same time it is offered to the market for a clearer view of where firm or each vessel is, in respect of previous periods, as part of Holistic Management. It is compared at the same graphic not only to Mean level figures of the individual elements of sample but also to Ideal Holistically Operating Cost and to industry's Most feasible Holistically Operating Cost "HOC".

9. CONCLUSION:

The company's Overall Operational Effectiveness is directly related to the percentage of industry's Most Feasible "HOC" or Ideal "HOC" or Mean level one. The understanding of the resulting percentages can be used as a tool and a motive towards better outcomes, since the difference between actual to the ideal, expresses the gap of effort that exists towards achieving the best results within the organization's capabilities.

The use of this method expects from the companies, instead of to be one of the many mediocrities, to find their scope through of which they would become better and more competitive. Therefore according to this method the higher resulting percentage can drive the company to have better overall operating effectiveness, better performance and better financial results.

10. Areas of Further Research

In daily operating cost the crew cost covers average about the 40% of vessels running cost. Shipowners trust in a group of multinational seamen under the command of the ship's Master the navigation and the operation of their assets (vessels) [20]. These two facts prove the value of having human resources and seamen recruitment in ship's operation and management. Also another serious cost is the labor cost on the shore based office which as part of the management fee presents the 75% of the administration cost. Generally a holistically management must address the labor cost not only as expenses but also as an asset which can provide to firm additional corporate value and better financial results.

On the introduction there is a term namely **"Shipscraft"**. This term as the "craft" that can lead processes to meet the "owners order", is referred to "the art in management and leadership in Vessel's Company". This "art" includes the "core competencies" of Principals, Managers and Masters based to the "peopleware" theory [8]. In addition to the previously existing in the shipping industries, based on shipping practice, in both management and leadership processes, the greater disadvantage is the existing conflict of competence between the organization chart and management & decision making processes. This disadvantage presented on the figure (3) as **Lack of response or lack of performance**. It's a negative fact which is due either to Master's actions or Managers' instructions or Owners' decisions or lack on their two ways communication, orders and feedback.

The labeling and determination of possible errors, demonstrates the need for a clear distinction of actions among the three levels of the ship management and decision making processes. These three levels of the organization are:

- The upper level of BOD and/or Shareholders - Shipowners
- The middle level of "shore based ship management & operating office"
- The lower level of "ship's navigation"

The actions and responsibilities of the upper level of BOD and/or Shareholders – Shipowners should be restricted only into the decision making and planning of the corporate strategy. In few words **THEY SHOULD DECIDE.**

According to the firm's upper level decisions, the Managing Director together with the shore based office managers must be develop all needed analytical methods and ways in order to achieve the implementation of upper level decisions. In few words **THEY SHOULD INSTRUCT**

Both decision making and orders have as final recipient the ship's Master, officers and the

crew. This is the 3rd and lower level of the organization. The upper levels want for them to execute all necessary actions in order to navigate the vessel with safe and health, according to definitions of the international regulations and organizations and according to the articles which defined in the charter parties. In few words **THEY SHOULD PERFORM.**

In addition to the above mentioned main levels there are also two other sub networks from which to the first one the Managing Director or CEO decides and plan the way in which the office managers will create "good and correct instructions" to the vessel. To the second sub network vessel's Master decides, plans and instructs vessel's officers all necessary actions and the way with which the crew will implement the ordered decisions and to achieve high level performance [15].

If Shipowner wants to involve to a day to day ship's operation or an office manager to order the low level ship's officer and crew for navigation matters and ship maintenance, the future of the company may not be positive and conducive. The Shipowner should think and act as OWNER and not just as a manager. The shore based officers should think and act as MANAGERS and not just as an employee. The vessel's master should think and act as vessel's CAPTAIN and not just as vessel's crew.

In addition to the above necessary elements to achieve effectiveness there is another critical point, the level of communication way. Detail at the process of communication is the "type of language" which an upper level communicates with a lower one and vice versa the "type of language" which a lower level informs an upper level. The most common lack to communication is the "type of language". This type exists according to the understanding language and the level of perception of the recipient and not of the sender. At the other side the feedback information to the upper levels must be formulated according to the instructions, the form and the type equivalent to the needed time which the upper level has noticed as acceptable.

All these thoughts together with the execution of the overall feasibility study and the operational effect, holistically, are the substance in the creation of the above mentioned "art" which the "Shipscraft" through "Shipscrafting" processes, needs in order to achieve a successful meeting with the stated "owner's order".

In practice, considering workers and employees (labor cost) as a firms fixed assets, instead of an operation cost, if the uses of firm's labor can be planed, fixed and secured the at least for a time, with three months' notice for recruitment, then the strengthening links of the operation value chain [21] can be achieved, taking positive margin either as a value add or competitive advantage.

After trying technology, hardware, software, economics, models, metrics, theories, investments, macro and micro approaches, etc., it will be found out that all of this is great but managers got to go back to the drawing board and involve more the people (seamen and office staff) on what they try to achieve. Either as a human action or as a part of human communication, people can be the success recipe on any modern or practical theory or approach integrated with other disciplines in any industry. People can amazingly contribute if and only if they sense the truth on their involvement. Truth on the other hand is not a skill but a charisma only the true leaders have it. Recognized that in Shipping Industry the most feasible goal is the "owner's order goal". In different shipping entities are different goals and different "owner's orders". Learning through history, the miracle of the Greek Shipping was built not only to the shipowners' entrepreneurial capacity or market's opportunities but also to a common strategy: Office employees and ships' crew members were called by Shipowners "my people". The fact that they recognized as true leaders is

based to hypothesis that they developed true strategies which people follow only people because they are true. Only with this common strategy new Shipowners can achieve to build people, members of their "Shipscraft" and followers of their "owner's order".

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REFERENCES

[1] Hampton, M. J. (1991) Long and Short Shipping Cycles. The Rhythms and Psychology of Shipping Markets (Little Shelford: Cambridge Academy of Transport).

[2] J. W. Conroy, Elementary Mechanics: prepared by the department of mathematics of the U. S. Naval Academy, 2nd Ed., The Lord Baltimore Press, Baltimore, 1922.

[3] Jammer, Max (1957). Concepts of Force. Dover Publications, Inc. p. 167; footnote 14. ISBN 0-486-40689-X.

[4] Coriolis, Gustave. (1829). Calculation of the Effect of Machines, or Considerations on the Use of Engines and their Evaluation (Du Calcul de l'effet des Machines, ou Considérations sur l'emploi des Moteurs et sur Leur Evaluation). Paris: Carilian-Goeury, Libraire.

[5] De Marco, Tom. 'Controlling Software Projects', Prentice Hall, 1982

[6] Deming W., Edwards, 'Out of the Crisis', Massachusetts Institute of Technology Press, 1986.

[7] Pfeffer, Jeffrey. 'Competitive Advantage through People', Harvard Business School Press, 1994.

[8] Prahalad C. K. and Hamel, G. "The Core Competence of the Corporation", Harvard Business Review, May/June, 1990

[9] Noordin, M.F.; Othman, R. ; Zakaria, N.A. 'Peopleware & heartware - The philosophy of knowledge management'. Proceeding of the International Conference on Research and Innovation in Information Systems (ICRIIS), Pages 1-6, Kuala Lumpur, 2011

[10] Zadeh, Lotfi. "Commonsense Knowledge Representation Based on Fuzzy Logic." Computer, Issue 16 (October): pages 61–65., 1983

[11] Nonaka, Ikujiro and Takeuchi, Hirotaka. 'The Knowledge-Creating Company. How Japanese Companies Create the Dynamics of Innovation'. Oxford University Press, New York, (1995)

[12] Moore Stephens Benchmarking Reports http://www.moorestephens.co.uk/Shippingopcost.aspx Sited [2014]

[13] Martin Stopford – Maritime Economics – 2nd edition 2000 year – Routledge – page 153

[14]A.M. Goulielmos "Operational Management of Shipping Companies" –J & J Hellas-1996

[15] Kathrynm, Bartol & David C.Martin – Management – McGrawHill – NY -1994

[16] Martin Stopford – Maritime Economics – 2nd edition 2000 year – Routledge – page 160

[17] International Financial Reporting System http://www.ifrs.org

[18] Helmut Sohmen – Representatives Association, Hong Kong 27 June 1985, reprinted in Fairplay, London, 1 August 1986

[19] The Baltic Exchange http://www.balticexchange.com/

[20] Costas Th. Grammenos – The Handbook of Maritime Economics and Business – Chapter 20

– Heather Leggate and James McConville - The Economics of the Seafaring Labor Market – LLP – London – 2002

[21] Richard Lynch – Corporate Strategy – Pitman Publishing –London 1997

APPENDICES

Case study on a fleet of two dry vessels: One Panamax Bulker 17 years old & one Capesize Bulker 11 years old.

Panamax Bulker (US$)

Table 2 – Panamax analysis

2013 Year (Finance year 2014)	Min	Lower (1st) Quartile	Average (Mean)	Middle (2nd) Quartile	Upper (3rd) Quartile	Max	**Actual Exps** of a vsl 17 y. old adjusted with **Age factor** 1.06
Daily OpCost (Note: min to max)	$1.705	**$4.633**	**$6.118**	**$5.346**	**$6.177**	$22.847	$6.369 adj. to **$6.008**
D/D Cost (divided to 913 days) (Note: max to min)	$1.173.111 $1.285	$879.311 **$963**	$717.803 **$786**	$647.213 **$709**	$491.103 **$538**	$446.621 $489	$1.178.000 eq $1.290 adj. to **$ 1.217**
Days for D/D idle period	33 days	28 days	23 days	22 days	18 days	11 days	23 days
Loss of Earrings during the idle period (Days of D/D): ({Av daily T/C $10.099) less OpCost)} / 913 days	33 days X ($10.099 Less $1.705) = $277.002 / 913 = $303	28 days X ($10.099 Less $4.633) = $153.048 / 913= **$168**	23 days X ($10.099 - $6.118) = $91.563/ 913 =**$100**	22 days X ($10.099 Less $5.346) = $104.566 / 913= **$115**	18 days X ($10.099 Less $6.177) = $70.596 / 913= **$77**	11 d. X ($10.099 - 22.847) = - 140.228 / 913 = $154	23 days X ($9.366 Less $6.369) = 68.931 / 913= - $75 adj. to **$71**
Daily "HOC" Holistically Operating Cost. **Equiv. to Break Even Operating Point EBID**	$ 3.293 N/A	**$5.764**	**$7.004**	**$6.170**	**$6.792**	$23.181 N/A	$7.734 adjusted to **$7.296**
(Based to Ideal daily OpCost Expressed as degrees (º)	N/A	15º	45º	27.9º	46.4º	N/A	42.4º
Overall Operational Effectiveness – Cosine of angle – degrees - Expressed as **% to Ideal OpCost** Gap(%) to Ideal OpCost	N/A	96.6% (3.4%)	70.7% (29.3%)	88.4% (11.6%)	68.9% (31.1%)	N/A	73.9% (26.1%)
(Based to Ideal daily Holistically Operating Cost "HOC") Expressed as degrees (º)	N/A	15º	45º	23.8º	39.2º	N/A	53.4º
Overall Operational Effectiveness - Cosine of angle – degrees-Expressed as % **to Ideal daily "HOC"** - Gap (%) to industry's Ideal "HOC"	N/A	96.6% (3.4%)	70.7% (29.3%)	91.5% (8.5%)	77.5% (22.5%)	N/A	59.6% (40.4%)
Efficiency % to the Lower Quartile Industry's most feasible "HOC" and Gap - Lack of performance (%)	N/A	100% 0%	78.49% (21.51)%	92.96% (7.04)%	82.17% (17.83)%	N/A	73.4% (26.6)%

Capesize Bulker (US$)

Table 3 – Cape size analysis

2013 Year (Finance 2014)	Min	Lower (1st) Quartile	Average (Mean)	Middle (2nd) Quartile	Upper (3rd) Quartile	Max	**Actual Exps** of a vessel 11 years old adjusted with Age factor 1.00
Daily OpCost (Note: min to max)	$692	**$5.446**	**$7.302**	**$6.210**	**$7.015**	$9.177	$7.403 adj. to **$7.403**
D/D Cost (divided to 913 days) (Note: max to min)	$1.826.452 $2.000	$1054.060**$1.155**	$959.792 **$1.051**	$909.012 **$996**	$806.806 **$884**	$526.623 $577	$785.191 $860 adj. to **$ 860**
Days for D/D idle period	44 days	26 days	24 days	24 days	16 days	13 days	17 days
Loss of Earrings during the idle period (Days of D/D): ({Av daily T/C $15.760) less Op-Cost)} / 913 days	44 days X ($15.760 Less $692) = $662.992/ 913 = $726	(26 days X ($15.760 Less $5.446) = $268.164/ 913 = **$294**	(24 days X ($15.760 Less $7.302) = $202.992/ 913 = **$222**	(24 days X ($15.760 Less $6.210) = $229.200/ 913 = **$251**	(16 days X ($15.760 Less $7.015) = $139.920/ 913 = **$153**	(13 days X ($15.760 Less $9.177) = $85.579/ 913 = $94	(17 days X ($13.345 Less $7.403) = $101.014/ 913 = $111 adj. to **$111**
Daily "HOC" Holistically Operating Cost. **Equiv. to Break Even Operating Point-EBID**	$ 3.418 N/A	**$6.895**	**$8.575**	**$7.457**	**$8.052**	$9.848 N/A	$8.374 Adj. to **$8.374**
(Based to Ideal daily OpCost Expressed as degrees (º)	N/A	15º	45º	25.8º	39.5º	N/A	47º
Overall Operational Effectiveness – Cosine of angle – degrees - Expressed as **% to Ideal OpCost** Gap(%) to Ideal Op-Cost	N/A	96.6% (3.4%)	70.7% (29.3%)	90.0% (10.0%)	77.1% (22.9%)	N/A	68.2% (31.8%)
(Based to Ideal daily Holistically Operating Cost "HOC") Expressed as degrees (º)	N/A	15º	45º	23.9º	34.6º	N/A	40.9º
Overall Operational Effectiveness - Cosine of angle – degrees- Expressed as % **to Ideal daily "HOC"** - Gap (%) to industry's Ideal "HOC"	N/A	96.6% (3.4%)	70.7% (29.3%)	91.4% (8.6%)	82.4% (17.6%)	N/A	75.6% (24.4%)
Efficiency % to the Lower Quartile Industry's most feasible "HOC" and Gap - Lack of performance (%)	N/A	100% 0%	75.6% (24.4)%	93.2% (6.8)%	83.2% (16.8)%	N/A	78.5% (21.5)%

Remarks on case study:

This study is regardless to type and age of fleet vessels. In above mentioned cases and in addition to usual used **"mean level"** figures, which are based to MS Benchmarking research, we can use the **"lower quartile"** figures of MS Benchmarking as Industry's "**Most Feasible Operating Figures"** either as Most Feasible Operating Cost **(OPEX)** or as Most Feasible Break Even Operating Point **(EBID)** which also can be called **"Holistically Operating Cost" (HOC).** These Most Feasible Operating Figures for any type of vessel have by default 3.4% lack of performance to ideal Operating Figures or 96.6% effectiveness, while the Mean Level figures have by default 29.3% lack of performance to ideal Operating Figures or 70.7% effectiveness

Remarks on Panamax Bulker:

Using the usually standards of market i.e. the mean level of MS OpEx Benchmarking, compared to actual expenses of a 17 years old Panamax Vessel, we find a positive performance result 1.79% ($6.118 -$6.008= $110).

If we compare the vessel's actual OpEx to Most Feasible Operating Cost (OPEX) of MS Benchmarking, we find a negative performance result 29.68% ($4.633 -$6.008= - $1.375).

Compare to ideal OpCost we have 26.1% lack of performance or 73.9% effectiveness and compare to ideal Holistically Operating Cost we have 40.4% lack of performance or 59.6% effectiveness.

Regarding to the efficiency, we have a 26.6% lack of performance

Which is of above mentioned figures can be used by a shipowner in order to take a decision?

According to this paper:

a) it should be used the **Overall Operational Effectiveness (HOC) i.e 40.4% lack of performance to Ideal HOC.**

b) If we want a most reasonable comparison of vessel's actual HOC to Most Feasible HOC, we should be recalculate the system of equations in the sense that Most Feasible HOC presented at zero (0) degrees and the Mean Level at (30) degrees

$$5764^2 \text{ X } x1+5764 \text{ X } x2= 0$$
$$7004^2 \text{ X } x1+7004 \text{ X } x2= 30$$

$$\begin{cases} x_1 = \dfrac{3}{868496} \approx 3.45424734253 24 \cdot 10^{-6} \\ x_2 = -\dfrac{4323}{217124} \approx -0.0199102816824 \end{cases}$$

Replacing the X1 & X2 @ 7.296 (actual vessel's cost), we can find the cosine of angle expressed in percentage "lack of performance" and the percentage of "effectiveness".

=POWER(7296;2)*3/868496+7296*(-4323/217124)=**38.61º**

i.e [COS(RADIANS(38.61))]-1 =

21.9% lack of performance to Most Feasible HOC and 78.10% effectiveness

Remarks on Capesize Bulker:

Using the usually standards of market i.e. the mean level of MS OpEx Benchmarking compared to actual expenses of an 11 years old Capesize Dry Vessel, we find a negative performance result 1.38% ($7.302 - $7.403 = $101).

If we compare the vessel's actual OpEx to Most Feasible Operating Cost (OPEX) of MS Bench-

marking, we find a negative performance result 35.93% ($5.446 -$7.403= - $1.957).
Compare to ideal OpCost we have 31.8% lack of performance or 68.2% effectiveness and compare to ideal Holistically Operating Cost we have 24.4% lack of performance or 75.6% effectiveness.
Regarding to the efficiency, we have a 21.5% lack of performance

Which is of above mentioned figures can be used by a shipowner in order to take a decision?
According to this paper:
a) It should be used the **Overall Operational Effectiveness (HOC) i.e 24.4% lack of performance to ideal HOC.**

b) If we want a most reasonable comparison of vessel's actual HOC to Most Feasible HOC, we should be recalculate the system of equations in the sense that Most Feasible HOC presented at zero (0) degrees and the Mean Level at (30) degrees

$$6895^2 \text{ X } x1+6895 \text{ X } x2= 0$$
$$8575^2 \text{ X } x1+8575 \text{ X } x2= 30$$

$$\begin{cases} x_1 = \frac{1}{480200} \approx 2.082465639317 \cdot 10^{-6} \\ x_2 = -\frac{197}{13720} \approx -0.0143586005831 \end{cases}$$

Replacing the X1 & X2 @ 8.374 (actual vessel's cost), we can find the cosine of angle expressed in percentage "lack of performance" and the percentage of "effectiveness".
=POWER(8374;2)*1/480200 + 8374 * (-197/13720) = **25.79º** or [COS(RADIANS(25.79))]-1 =

10% lack of performance to Most Feasible HOC and 90% effectiveness

Examination of elements:
According to an **Ideal Holistically Operating Expenses**:

Table 4 – elements on Ideal HOC

a)

	Ideal Cost	MS -Most Feasible	MS - Mean Level	Actual Expenses
Panamax (angle)	0º	15º	45º	53.4º
Gap (%) to Ideal		3.4%	29.3%	40.4%
Capesize (angle)	0º	15º	45º	40.9º
Gap (%) to Ideal		3.4%	29.3%	24.4%

According to Most Feasible Holistically Operating Expenses

Table 5 – Elements of Most Feasible HOC

	MS -Most Feasible	MS - Mean Level	Actual Expenses
Panamax (angle)	0º	30º	38.61º
Gap (%) to Ideal		13.4%	21.9%
Capesize (angle)	0º	30º	25.79º
Gap (%) to Ideal		13.4%	10%

Presenting above in two separate diagrams we can conclude:

"The lower angle to 0º, the better effectiveness".

Scanning in depth the details of Holistically Operating Exps compare to mean level one

Panamax Bulkers:

Table 6 – Comparison MS- Panamax Vessel's Actual HOC

	MS results		Vessel's result
Crew Cost	41.7%		38.8%
Lubs & Stores	11.5%		11.4%
Spares-Repairs	11.2%		9.2%
Insurance	8.1%		4.9%
Administration	14.9%		18.0%
D/D cost	11.2%		16.7%
Loss of Earnings	1.4%		1.0%
Total of "HOC"	**100 %**		**100 %**

From the above table the items with the greatest differential to MS figure are the Administration & the Dry Dock cost. Reference to the D/D cost, the main point is the vessel's age and may be the effort of owners to keep their vessel "marketable". For the Administration cost it is a very difficult and sensitive issue as it is purely depends on the company's terms and conditions of management agreement i.e. the Management Fee.

Capesize Bulker (US$)

Table 7 – Comparison MS- Cape size Vessel's Actual HOC

	MS results		Vessel's result
Crew Cost	37.7%		44.4%
Lubs & Stores	12.5%		10.8%
Spares-Repairs	11.1%		7.0%
Insurance	8.3%		7.6%
Administration	15.6%		18.6%
D/D cost	12.3%		10.3%
Loss of Earnings	2.5%		1.3%
Total of "HOC"	**100 %**		**100 %**

Additional Remarks on Capesize Bulker: The observation of the above mention table can indicate to the researcher that the figures which need a further in-depth examination is mainly the "crew Cost" and secondary the Administration cost.

Table 8 – Comparison MS– Cape size Vessel's Actual Crew Cost

	MS results		Vessel's result
Crew Wages	83.6%		90.5%
Provisions	6.2%		4.5%
Crew other	10.2%		5.1%
Crew Cost Total	**100 %**		**100 %**

Keeping in mind that the sample vessel's manning is not known exactly, concentration must be given on the known figures and to compare them with the market's known ones.
Therefore and according to the existing experience for this matter the following issues can to be examined:

- Crew cost, the composition of vessel's manning, compared to vessel's safe manning, the nationality of seamen and the wages' scale plus any additional bonus, compared to the current market.
- Administration, the management fee in relation to the current market and the communication cost.

The operational manager of this vessel certainly recognizes the problem and how it will be resolved, except of the case that this "negative figure" is part of company's policy in context to the corporate strategy or a marketing tool, part of a voyage agreement.

Comprehensive view for further research

Having these two vessels with so different results, how can the weaknesses in fleet's level and in company's one can be found? Why the same people to have different results on their effort to become a "work"?
The answer is very simple. These two vessels, as two different types of vessels, are operated by two different teams of people usually. In practice this expressed as division and specialization of labor.
Port captains and port engineers are divided according to their experience as ex seamen. Although this is a good option for a large company, it is not followed by the small size and the most of the middle size companies. This decision is catastrophic as they haven't clear distinction of actions among the three levels of ship's management and decision making process.

- How vessel's seamen are recruited?
- How the office managers and directors are chosen?
- How serious can be taken in consideration the fact of differentiation of personality for a seaman when he is on board and when he isn't?
- How vessel's operation can be affected by the coexistence on board of a master and chief engineer with conflicting personalities.
- What actions can be taken to solve these problems? Can we find like vessels the employee Gap to response on Company's order?

Every problem cannot have a solution as long as people refuse to convert their experience into knowledge, as long as they afraid for their position, have professional insecurities, or have own benefit from the continued existence of the problem. Once such unperceivable matters get to be acknowledged then **"the game will turn in your favor".**