

MECHANICS TO IMPROVE PERFORMANCE INDICATORS FOR SEAPORTS

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ABSTRACT

Maritime transport plays an important role in promoting intra-foreign trade and supporting economic and social integration. Seaports play a key role in the economic development process in most of the world, through which foreign trade is carried out through import and export, their production is discharged to foreign markets. The ports are now profitable economic entities and are no longer as government service agencies burdening the state. It is imperative for us, in light of local, regional and international developments, to consider ways to improve the performance of seaports and to increase growth rates and follow up performance levels and indicators to maintain on the performance rate, personnel and equipment and thus the ability of the port to compete.

KEYWORDS: Indicators- Air Pollution –KPIs-Software- sustainability.

1. DEFINITION OF KEY PERFORMANCE INDICATORS (KPIs)

The aim of this paper is to give an overview on the topic of environmental sustainability in inland ports. First the importance of sustainability in the transport sector in general will be explained and the impact on inland ports. Afterwards, projects and initiatives on how to measure the environmental performance of inland ports are described. In addition, some best practice examples concerning how sustainability is done in some ports is provided. In addition, current measurement methods in Red Sea gate and Dubai World terminal are discussed. At the end of the paper, some best practice examples on how to increase the environmental performance of Saudi ports are described. Basic performance indicators are defined as data based on the core characteristics of an organization's activity and which stand as a benchmark for measuring other relevant data. These are interrelated ratios that are useful in measuring key activities and results in an organization and are expressed through a range of reports, tables and graphs.

The importance of KPIs is that they reflect the current and future performance of the organization, based on predetermined measures. We can consider them as a direct way to compare performance, whether comparable to similar business organizations, or to compare the current performance of the organization itself. Basic performance indicators are complementary to standardization, because the information described through consolidation helps to build accurate estimates of the professional reality, as well as types of activities within the organization as well as performance rates as well as financial data on the state of markets, all together in linkages and relationships Specific. Which gives a clear picture of the course of work, and refers to variables and helps the decision maker to control their effects.

2. INTEGRATION OF INTEGRATED PORT SOLUTIONS AND STRATEGIC MANAGEMENT PRINCIPLES

Key performance indicators in seaports are closely related to the principles of strategic management, which are the first to lay the foundations and tools necessary to support decision-making processes. Which calls on all operators of the software industry in the field of maritime transport to design programs that contribute to raising the levels of human performance and mechanization in ports in order to provide accurate and accurate information necessary for making the right decision. The Smart Port Solution (SPS) software package should include the ability to obtain instantaneous reports of all operations within the port, including:

- Statistical reports on portals (which include truck visits and cashier receipts - for different periods - and goods issued and received)
- Invoices (which include a statement of the state of the yards in the port and the revenues of the squares for the current fiscal year. The system should also indicate the totals of the value of the invoice item for each type of vessel and each container terminal)
- Port management reports (which provide reports on the statistics of vessel visits, berth requests, types of vessels entering the port, and analyzes of the duration of vessels in the port and berth occupancy rates)
- Reports of the movement of general goods, including reports on the volume of goods in the port during a certain period and the volume of goods stored in warehouses during a certain period and the volume of goods transported within the port.
- This type of information is one of the most important tools available to decision makers to know the future trends of performance and thus to know the general tendencies of the performance of the port or container terminal through the exploration of information and analysis to work to improve the actual performance of all levels of the institution.
- One of the most important information that software must die for the duration of ships within the port over a period of six months, for example, we can see the difference of ten hours between the average time of the tracks and the average start time of business, which should call the Department to search for the reasons that led to this difference Between operations and some.
- Moreover, a report on the volume of goods handled at the port during specified periods. The numbers necessary to measure port productivity and performance indicators by comparing the total results of the port's energy and analyzing them over certain periods to determine performance trends and make the right decisions in real time.
- In the field of mechanization of ports and marine stations, there must be:
- Consultancy and studies (evaluation - reengineering of the work cycle - preparation of budgets for projects of mechanization)
- Operating (providing highly experienced engineers - providing technical support specialists in infrastructure, informatics and software)
- Training (application training - advanced technical training)
- Networks (fiber optic networks - wireless networks - wide area networks - local networks)
- Hardware (servers - personal computers - prepaid cards - wireless devices)
- Planning, follow-up and monitoring (ship movement, cargo traffic, container traffic, portals and scales)

Integration with the port society systems (Integration with Customs - Integration with the Export and Import Control Authority - Integration with the Safety Authority). In addition to providing marine ports and terminals with integrated information solutions that help improve the efficiency of operation and port performance through re-engineering of work cycles, implementation of specialized solutions and software, and provision of specialized personnel to operate and manage IT projects. Integrated port solutions are specialized in port automation.

3. PRACTICAL EXAMPLES OF PERFORMANCE AND PRODUCTIVITY INDICATORS FOR SAUDI SEAPORTS

The production indicators are a measure of the development of the production plans for the various seaports and stations and a standard for measuring compliance with the objectives of the interim and final plan and a measure of deviations from the plan. It is also an important factor for the global arrangement of sea ports in terms of the quantity of goods traded, And is therefore used:

1- The ratio of the occupancy rate of the berth:

It is a measure of the utilization of the total area of the berth, which is within the current global report 75%, while the Jeddah Islamic Port (Red Sea Gate) recorded 33.3%, less than half of the world average. 38% and the port in general 40% and still lower than the world average

2 - Productivity movement on the pavement:

a measure of the movement of what is traded, whether the quantities of small or medium or large and amounted to 105 globally while the Red Sea gate was higher than the world average of 136.6 and also used the station with modern techniques

related to productivity and also linked to management to achieve this ratio. It is high because the Quay indicator is low, i.e., the movement of productivity on a small part of the pavement is therefore accomplished at high speed of performance.

The productivity of crane or crane in the hour: which is traded by one crane per hour and the global rate of 35 units equivalent / hour while reaching the Red Sea gate 42.3 / hour is also due to the weakness of the proportion of work on the pavement, that is, the user of the total area of the pier And 75% less than the Red Sea. This is due to the low percentage of pavement works, especially since the berth already allocated to Dubai Ports is less than the Red Sea and the North Terminal. Currently Dubai Ports is contracting with Port Jeddah for the work of another berth is being processed, where the guarantee included. The total number of containers compared to the previous year decreased by (-1.73%) while the number of transshipment containers (transported from ship to vessel to reach the final container) increased. This illustrates the pivotal role of Jeddah Islamic Port in the Arabian Gulf region in general and its role in transporting transit cargo. The report also included a decline in the number of vessels in the (-5.81%), while Jeddah Islamic Port through the Red Sea Container Terminal, the fourth port of the world in the productivity of the berth for the month of August 2017, according to the assessment of global shipping line Maersk.

The Red Sea port terminal at the port itself witnessed the handling of more than 1.6 million containers per year in conjunction with its use of modern technology in operation and management. Jeddah International Airport handled 381 thousand containers during August 2017. The total tonnage handled by goods reached 4.9 million tons during the same month. Transshipment containers reached 1.1 million containers, up 15.2% during the period from 2017 compared to the previous year. A number of international sites through official electronic indicators in the ranks of ports developed globally in achievements in terms of volume and cargo handling.

In the coming period, software will also play an important role in the field of emission measurements and compliance with international standards that should be applied. The following determinants should have a distinct role for software in this regard and not only in the field of productivity measurement and time comparisons. Through marine ports, storage yards, cargo handling houses in this context and environmental determinants can be addressed in the remaining of the current paper.

4. THE IMPORTANCE OF SUSTAINABILITY FOR THE TRANSPORT OF GOODS

Sustainable development can be defined as development that can meet the needs of the current generation without compromising the needs of future generations. Sustainability is about finding long-term beneficial solutions for people and the economy, so that the environment is not overly burdened. Sustainability must include addressing global environmental challenges and achieving sustainable development through the effective integration of environmental principles into sectoral policies, and in this context, coordination of transport and the environment. The impact on and protection of the environment should be taken into account when planning to build and modernize the transport infrastructure. Sustainability can also be identified as an area of particular importance in logistics, and special attention has been paid to sustainable development in the maritime transport sector. Transport can be defined as a single area, which can contribute strongly to a sustainable transportation system (Whiteing 2010). In 2017, the transport sector accounted for 23% of carbon dioxide emissions worldwide and was responsible for 15% of total greenhouse gas emissions (ITF 2017).

With shipments expected to increase in the future. Transport of goods is expected to quadruple by 2050. This also leads to increased GHG emissions (OECD / ITF 2015). In addition to these environmental problems, the increase in energy costs and bottlenecks in transport infrastructure as well as the increasing demand for sustainable transportation solutions by society and politics point to the need for sustainable transport solutions (Britzak and Berkawi 2013). In order to achieve the target level of greenhouse gas emissions identified by the European Union, which requires a 60% reduction in emissions for the transport sector compared to the level of 1990 (EC 2011). One measure aimed at reducing carbon dioxide emissions in the carriage of goods is a conditional shift towards sustainable modes of transport such as railways or inland waterways.

As shown by the statistics of the transport of goods, inland navigation and railways have a relatively low share (i.e. 6% and 17%) in the European media division compared to 77% of land transport (Eurostat 2016). In general, water transport can be considered one of the most useful and important transport methods in terms of environmental, energy and social aspects. Certainly, one vessel on the river - as one of the modes of transportation - could replace several hundred trucks on the road, thus saving transport costs, reducing emissions and easing road congestion. Therefore, water transport has a high capacity and allows transportation of huge goods, which cannot be transported by road or rail because of the limited technicality. The external costs of water transport, accidents, noise, air pollutants or climate-sensitive gases are significantly lower than land transport and rail transport. In addition, the costs of building the infrastructure for each mode of transport, including

maintenance, are up to 4 times lower in inland waterways than roads or railways (Planco Consulting GmbH 2007). However, rivers and aqueducts are not fully utilized in the transport of goods where cargo can be transported by means of a very simple partnership between the vessels and the means of transport available in the country. Shipbuilding companies have always been called upon to innovate in this field for a long time and are geared to make this environmentally friendly transport mode more competitive. For evolution, it is necessary to plan for future shipment, inter alia, in the context of climate adaptation Changes and compliance with applicable international standards. The transfer of inland waterways can contribute significantly to this achievement and to the achievement of environmental protection objectives, including the reduction of greenhouse gas emissions as defined in the Kyoto Protocol.

5. INTERNAL PORTS

Internal ports can play a key role in achieving the desired conditional transition (Dooms et al., 2003). Where inland ports link roads, railways and waterways that facilitate transit through transport. Besides shipping, inland ports are important service providers in logistics services such as warehousing and logistics. In addition, services of a logical value are often provided to customers in the port area: such as packaging Container unloading, sanitary inspection, commissioning, distribution and quality control. As a result, ports have emerged as logistical platforms, regional driving forces and economic development in recent years (Dolinsek 2013). Domestic ports face many challenges such as land scarcity, social and economic constitutions and local political frameworks, which include regulations. This is due to the fact that inland ports are located in densely populated areas and cities in most cases. Inner ports have played and continue to play a major role in urban logistics and the distribution of urban goods. In recent years, inland ports and inland port authorities have been under pressure from a variety of stakeholders, such as the entertainment and environmental industry, to reduce the negative environment of inland port operations (Dooms, 2003). Consequently, inland ports should develop strategies to adopt innovative practices and concepts to improve their overall environmental performance to ensure sustainability through services such as recharging and reducing negative impacts on the environment.

6. ENVIRONMENTAL DIMENSIONS RELATED TO SUSTAINABILITY

Ports and their activities cause negative impacts on the environment (such as air and water pollution). The sources of these environmental impacts can be very diverse. Therefore, there is a need for ways to measure environmental performance in order to measure the level of pollution in terms of monitoring (Gupta, 2005), as ports aim to continuously improve their environmental performance (Puig, 2015). Moreover, it is necessary to establish effective internal links through railways and roads to facilitate conditional transition to inland waterways by integrating sufficient quantities in inland areas Ports (Dooms. 2013).

Ports are considered vital centers of economic activity at the international level, so international organizations support initiatives to promote and improve sustainability, one concept that has recently emerged to improve environmental performance, the so-called "green" concept. Green ports which Aiming at balancing environmental defects and economic interests (Dolinsek 2013). Another measure to assess and improve the environmental performance of the inland port is through the development of a set of key environmental performance indicators (EKPIs), which can be used as a basis for determining measures (Puig, 2014). Thus, the environmental impacts of port activities should be measured and analyzed to ensure safe and sustainable port performance and also to ensure that stakeholders continue their support of port operations and the logistics chain And development (Puig, 2015b). Through a standardized set of EKPIs may result in an advantage for the port And Israel as they demonstrate compliance and demonstrate continued commitment towards improvement through scientific evidence and quantifiable measures. Using and tracking the environmental performance of inland ports and appropriate measures can be specific to meet adverse developments. However, however, there is no uniform set of EKPIs that can be applied to ports. Although various internal ports already measure Its environmental performance in order to reach optimizers of environmental measures and hence highlights the role of software that can play an important role with environmental dimensions and the extent of commitment to them and the development of plans to address deviations.

Here, a method of measuring environmental performance to determine pollution levels, control and predict pollution levels for future and systematic monitoring and assessment of the environment is required (Gupta, 2005), because ports have an ongoing goal of improving their environmental performance (Puig, 2015). With the need to take environmental concerns into account at the seaport, ESPO published the first ESPO in 1994 (ESPO). This first ESPO Environmental Survey was useful for an overview of the most important environmental problems in ports. Includes updates and replacement of practice rules with ESPO Green Guide and periodic environmental surveys to study environment and port performance. With increasing environmental awareness and implications, many research projects have developed. As a result of these research

projects, There are useful methodologies that may be assisting ports in environmental performance management and also for software makers, ESPO has identified the top 10 priorities for environmental issues. A questionnaire, aimed at knowing the position and progress of ports in relation to their environmental performance, can find the results of the first ten priority ports identified. The following areas have been identified as the most important issues in terms of environmental performance of inland ports (ESPO 2017):

1. Air quality
2. Power consumption
3. Noise
4. Water quality
5. Dredging operations
6. Garbage / Waste Port
7. Development of ports (related to land)
8. Relationship with the community
9. Ship waste
10. Climate change

Here you can note that the most important issue for ports is air quality. According to the survey, this is the most important port issues want to improve. The second important energy consumption is the result of the selection of third area optimization noise (ESPO 2017). Where the top ten priority issues change over time and there are some changes in prioritization and a new entry for the first time - energy efficiency, greenhouse gas emissions reduction and adaptation), and air quality remains the top priority for ports. This is in line with maintaining air quality as a top priority in various ongoing political initiatives that include implementation of sulfur, guidance and ongoing political process on the air quality package. Energy consumption becomes the second most important priority issue for ports. Since 2009, the importance of energy consumption rose poll. One reason for this increase is the direct link between energy consumption, port carbon footprint and climate change. Noise is the third priority concern, and its importance has increased smoothly since 2004. The relationship with the community is rising in fourth place where ports are granted licenses to operate and grow from their communities. Another interesting fact is that there are three issues that have consistently appeared in the list of ports sector priorities over the past 20 years, although they are not in the top positions of the nationalities. These issues are the development of ports (land), drilling operations, and dust (Portubia 2017).

7. CONCLUSION

The preparation of indicators and their comparisons for successive periods of the most important methodologies useful in the management of ports and software play an important role in this context and in parallel with the use of software in the preparation of indicators of performance and productivity of the components of the port can also be used in one of the urgent aspects that are arranged in accordance with the port globally, In order to know the position and progress of the ports in terms of their environmental performance, where the software can identify the areas that can be considered the most important issues in terms of the environmental performance of ports such as:. Air Quality - Energy Consumption - Noise, Water Quality, Dredging and Waste Rate. Moreover, the development of ports (related to land) and the extent of the relationship with the community in addition to the rates of ship waste and climate change. Therefore, we recommend that companies responsible for the port software industry take into account these important aspects of the performance of the port, which are no less important than the aspects of measuring the productivity of the squares and the rates of cargo handling to and from the port and the waiting rate of ships at the port and other necessary rates.

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