Athens University of economic and business | Delphic thoughts and events
European Conference Centre of Delphi, 14-17 May 2004
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Maritime Management Information Systems in the Twilight Zone

The beginning of business activities, transporting goods through waterborne transportation is lost in the depth of time. After a centuries-long journey, marked by Greek shipyard and machinery business, the modern management of vessel fleet illustrates the efficiency, identifies self-knowledge and adapts dynamically, holistically and systematically to the rapidly changing flowing landscape, which is characterized by a generous degree of ambiguity and complexity.

Indicatively, the specific business framework differs from its action boundaries, which does not have limits, from the multicultural character of the human resource it uses, from the necessity to comply to national and local rules and standards, and harmonization with international maritime law. The customer-centric, human-centred and ecological approach qualitatively defines its objective: the safe, timely transport of goods by protecting human life and the environment.

Production units (ships) with significant operating costs and large capital investments must have the greatest possible economic exploitation, their projects (voyages) require a flexible, resource efficient planning. The continuous integrated interactive design of parallel multiphase projects with relatively unclear time horizons (multi- multi-phase- projects management) and the flexible implementation plan (implementation plan: voyage plan) drastically determining the degree of the system's economic performance.

The type-3 wrong decision.

Businesses today face challenges, requiring solutions and take decisions overseeing many times the rapid changes and incompleteness of linear thinking. Complexity overrides the aspiration of full and centralized control. The variables, their interrelationships and values in problems constantly change and the mechanistic solution is inadequate. Homo complexus is called to face the problem holistically with analytical thinking, identify the complexity and with a combining ability to complete multiple one-dimensional formulations in one. In this way only will he avoid the usual nowadays mistake known as type-3: **Asking to solve a problem formulating in a wrong manner!** The importance of correct problem formulation is now recognizable. The <<know how>> moto of the post-industrial period gives its place to «know what and why». Therefore, before attempting to solve our problem we will have to reformulate it with questions: « What is it that forces us to revise our system and why? The second question has a very easy answer if we remember the basic principle of the destruction theory. All open systems in a dynamically changing environment are likely to have one certain point of disaster. The method of time shifting the point is to review them! But what is the type of system we are seeking to revise? Simple or complex?

****Simple system:** The systematic way of organization currently used today by conventional shipping companies is classified as simple. Its behaviour is predictable and does not contain

surprises! The feedback loops are short. The control is central. The system can be decomposed and re-assembled (reversible) without particular issues. It is characterized by order and thus has a small degree of entropy. However, viable systems follow the second law of thermodynamics and tend to be mischievous.

Complex-adaptive system: The system we are looking for must retain its form while simultaneously re-adjusting to the demands of the changing environment with the aid of complex feedback loops. Negative feedback will have an adjusting role, while a positive one will reinforce. The system will have an automated structure, that is, it will have its own history interwoven with the history of the environment and other self-sufficient structures. None of them is delimited by clearly predetermined borders so as to be an organizationally closed entity but at the same time it will be informally open to the environment (Osmosis: See cell with semipermeable membrane). The system thus allows the symbiotic convolution. **Organizations that did not learn the art of co-operation were led to extinction!**

Cosmos –Lykofos – Chaos. Is complexity the attractor for a system that has a high degree of organization (cosmos) in a chaotic structure with a great degree of entropy. The meteor system balances in the twilight zone. Metaphorically pushing one leg in the order can work efficiently and pushing with the other in the chaos is ready for change every moment. The twilight zone illuminates the complex adaptive systems. According to the theory of information, systems must have a scattering structure, being informally open and at the same time organizationally open. So there is our subject. How do we organize information in maritime systems in the twilight zone? A single answer: by scatter!

Maritime Governance Information System: Conventional MIS harmonize with the pyramidal decision model. Operative decisions in the basic user level are information receivers (sensors), tactical decisions in a departmental level and strategic decisions in management level.

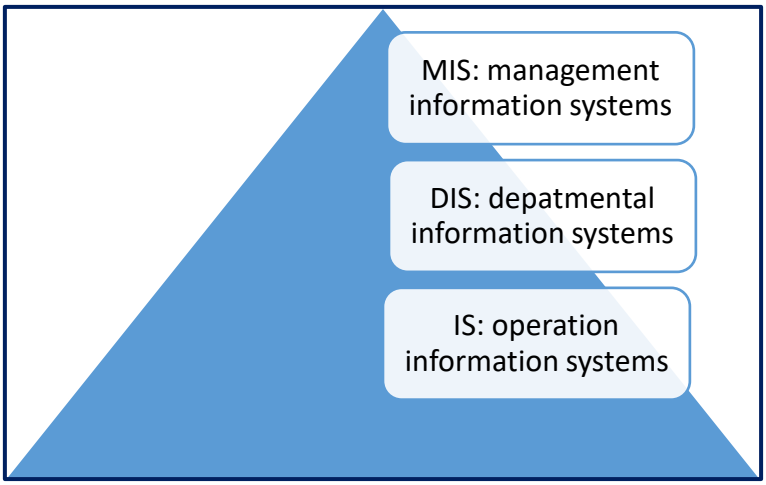

Figure 1 MIS topology

Simple Information Systems (IS) support operative decisions and create a dense Management Information System (MIS) in tactical and strategic level. The information volume is concentrated upwards while the energy content of information increases. MIS with model integration are evolved into DSS (Decision Support System and by decoding the decision-making mechanism of the products are transformed occasionally into expert systems. The efficiency of these systems has been satisfactory for many years. Nowadays, the multi-complexity indicates weak points, which are inherent and structural and cannot be repaired in the existing structure form. Specifically:

- The hierarchical MIS does not allow the diffusion of information into the two-dimensional or multi-dimensional managerial grid. An information that contains the availability of an engineer for recruiting is trapped in the crew section and does not become the companion of the technical operator who is searching for an engineer with experience in turbo generators for manning of Sea harmony.
- The deterministic MIS does not consider forecasting and does not consider it in the administration's information.
- In conventional MIS, the activation of the interface between the information and the receiver is one-way and user-driven. Information from the outside world, for example the estimated arrival of a vessel to a port will be requested by the operator when he required the information. The desired outcome is essentially this information (including estimations) to trigger those who have to be notified or alerted. It is important to point out the dynamic character of triggers, which in their lifespan can change the receivers of notifications and alerts. In the vessel arrival example, the responsible operator has to get an alert, while the chief engineer, purchasing operator, crew operator have to receive a notification. If the IT need to be notified to send a printer, it should be in the list of its recipients alert. If during the trigger the operator is replaced, a new alert for his replacement should be activated.
- Let last of all be the most important. Conventional MIS aims in creating a unified summary information of the administration classified into the resource-management structures. They can present a concise picture of the ship's technical inspection surveys (fleet survey status), the concentrating economic image of the ships (profit & loss report), to date purchases from a specific supplier. They cannot however illustrate the planning of available funds for the realization of a trip because there is no approach below the point of view of the horizontal interconnection of functional nodes per project (trip).

MIS in the maritime industry adjusted in the Twilight zone must be scatter, with a closed organizational structure (cosmos) and informationally open (chaos diffusion). An interactive infrastructure that supports the best use of resources. To be in other words, an ERP (Enterprise Resources Planning) homeostatic system that used feedback for its auto-adjustment. This seems to be the answer for today. Every time we have to describe the problem correctly and its solution might change because the data changes too.