

Information technology in shipping industry

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The use of marine software to assist ship owning and ship management operations today is extremely fragmented. There are myriad of marine applications that provide piece meal solutions. A large number of decisions are taken at functional manager levels where the organizational goals are not understood or misinterpreted. This paper takes the reader through a journey of successful need analysis for integrated IT solutions in shipping. It then introduces the essential elements of the next generation maritime software solution. Competitive gains with information technology in shipping and the leverage with IT in the economic slow down have also been addressed in the conclusion.

KEY WORDS

Enterprise IT, Information Technology, Maritime Business Intelligence, Decision Support, What-if scenario, ERM(Enterprise Resource Management), System Software(Operating systems, databases et al.),Fragmented Enterprise(ships at sea), Reporting, Analysis, Monitoring, Predictive Analysis, Performance Monitoring, Self Check Dashboards, ROI (return on investment)

INTRODUCTION

This paper challenges the conventional wisdom in the management of ships and argues that the old school of thought will allow the investment in IT only if it is driven by regulations and not organizational efficiencies.

It navigates the reader through a careful business need analysis that must be done by shipping companies before IT investments are made. The compartments of research here are management needs, technology framework, organizational needs, the information system and hence the most optimum business solution for offices and ships in the fleet.

The writer makes an effort to conduct a successful need analysis and shares real life experiences with the readers from the realm of maritime IT consulting. This merits a discussion on IT and ROI where a metric has been established to explain the relationship.

What evolves is a result that elaborates the fundamental elements of a next generation maritime enterprise software application. The author finally touches on IT and the competitive edge and the use of IT in an economic slowdown.

OLD SCHOOL OF THOUGHT?

The conventional wisdom thought process has prevailed in shipping industry more than anywhere else.

In the absence of a regulatory paradigm to embrace IT in shipping, the use of technology to manage business processes has largely taken a back-seat. Most organizations have historically taken a generic approach to IT and stuck to the use of conventional wisdom in running the process with – careful thinking, discipline, hard work and patience.

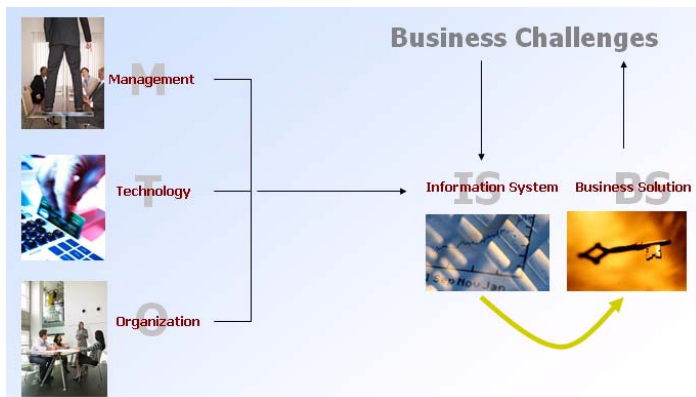
Is this all that is required to deliver an integrated IT solution to a business of “management of ships”?

The presence of myriad standalone applications that do not give decision support and increase paperwork, and the absence of identifications of IT needs at strategic, operational and tactical layers of the shipping organizations are prevailing endorsement to an “Old school of thought”.

This paper makes a conscious approach in addressing the huge gap that exists in embracing IT in shipping companies. A large number of analogies are drawn from mainstream corporate world to identify and address IT needs in such organizations.

The next logical step in this study is to identify the business needs of the shipping organization in order to further align IT to gain operational efficiency.

BUSINESS NEED ANALYSIS – MANAGEMENT OF SHIPS



Maritime industry at large has never executed a complete need analysis under the logical study heads of management, technology, organization, information systems and business solution.

Management

Some of the challenges in the absence of integrated systems that a management faces are -

- Centralized storing and purchasing in order to achieve economies of scale
- Centralized crewing for HR to gain efficiency in seafarer management in order to ensure that the right person joins the right ship at the right time.
- Real time results on expenses from all applications
- Drilling down on budgets and expenses to the last level of detail such as an invoice or a purchase order
- Intelligent management of emails
- Real time ship vetting status
- Instant status report on deficiencies and non conformities
- Large number of queried reports
- Large number of “what-if” scenarios
- Scalable IT infrastructure to absorb vessel acquisition and expansion
- TMSA KPI monitoring or any kind of organizational benchmarking
- Fleet monitoring
- Business intelligence

Technology

Companies need to explore the technology infrastructure and evaluate on the following –

- shipping enterprise software resource management
- web centric solutions
- relational databases
- data warehousing and mining for larger companies
- system software for ERM requirements
- business intelligence infrastructure
- disaster recovery

Organization

Organizational needs are required to be mapped to –

- the enterprise type. This typically means the corporate and geographical structure of the organization where global headquarters, branch offices, regional offices and the fragmented enterprise (ships at sea) are collectively and individually addressed.
- Empowering ship’s crew with information at home for motivation and retention

Information Systems

The requirements for an adequate information systems platform in the shipping enterprise should include –

- structured data reporting from ships
- complete elimination of email attachments for operational needs
- facilitations of global operations for offices and managers on the move
- centralized repository of documents for use on ships and in offices
- Standardization of information flow across business functions – Purchasing, Maintenance, Crewing, Safety and more
- reduction in operating costs
- adequate reporting
- management and executive information systems for strategic, operational and tactical layers

Business Solution

All shipping and maritime organizations eventually seek for a business solution that is efficient, robust, capable of information discovery, integrated and cost effective.

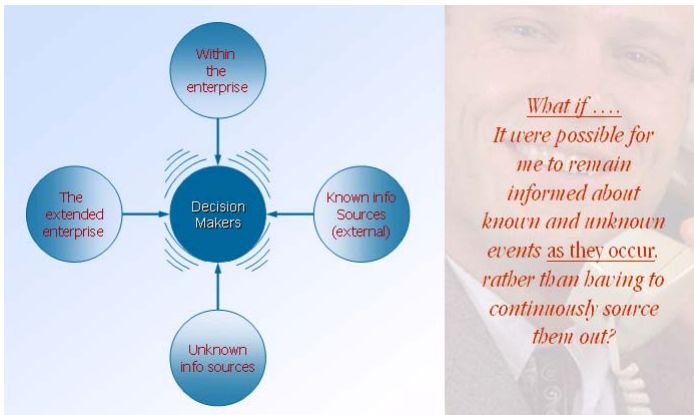
SUCCESSFUL NEED ANALYSIS - HOW?

Conducting a successful need analysis has never been easy. This approach by far has not been adopted in the shipping industry.

The parameters in this study in identifying IT needs run across several verticals of internal assessment. These range from identification of “what if “ scenarios to addressing ethical and social impact to addressing custom specific business needs.

Each is described in detail here.

An assessment of “what-if” scenarios”



What if....It were possible for me to increase profitability by 10% in the fleet. The results will generate a series of scenarios that range from vendor selection process, purchase optimizations, crew training and time on board, so on and so forth.

These scenarios keep the users alerted with known and unknown events as they occur, rather than having to source them.

What if....It were possible for me to reduce near miss occurrences in the fleet.

Senior and functional managers in the fleet need to continuously ask these questions to the information systems, which in turn are required to reciprocate this mission critical result.

Adequate technology framework

The technology infrastructure required to house enterprise software needs to be adequate. Shipping companies need to work closely with software application provider to work on

- Operating systems
- Databases
- enterprise application infrastructure
- Master data management, especially where the companies need to integrate to the legacy applications such as financial software.
- Web services
- Choice of communication technology between ships and shore
- On board hardware and system software capabilities

Resource commitment

Shipping companies historically have allocated wafer thin budgets to training. This is further poor for training on technology investments. Most companies resort to piece meal software training after the purchase of software. This is detrimental to the successful running of functions in the companies. 70% of the software projects including marine projects fail due to lack of training. Most companies today invest in software to satisfy regulatory paradigms such as TMSA requirements, computerized planned maintenance systems et al. Even large companies today do not use software applications to monitor safety records and statistics pertaining to injuries, damages, accidents, near-misses and so on. This work, how much ever vast is a number crunching exercise in the office and is mostly done to comply with audits and inspections. The crew on board does not use a structured application and enters all data into the mandatory ISM forms. There is double work in office because the shore based system does not allow the ISM forms to import into the rudimentary excel spreadsheets in use. Quite simply, there is no regulation that requires integrated ship-shore systems for safety management and companies continue to spend pennies until they are faced with severe expenses after a series of incidents that could have been avoided, simply by analysis and monitoring of data from ships.

Training is required on IT infrastructure of hardware and system software, for database administration, for administrators who set rights and privileges under instructions from management and the software application training to managers in technical, purchase, safety, crewing and more.

In order to ensure seamless execution of ship shore operations, most companies need to invest in skilled IT professionals to assist with database building(if not outsourced), hardware and technical, training managers for continuous on board training across the fleet.

In the absence of any such resource commitment, the IT initiative is bound to fail.

Commitment to change and embrace technology

Managing change for shipping companies from paper based systems or standalone system to integrated software applications have been an uphill task.

A set of bigger threats in the minds of most shipping managers comprises of fear and anxiety, resistance, changes in job functions and career paths, training time against operational time and more.

However, what seem rather peaceful and simple are business process re-engineering, design, development and implementation.

Shipping has lagged behind a few years as compared to other industries in the use of IT.

McKinsey Quarterly says “As companies improve the productivity of workers it will be necessary to couple investments in technologies with the right combination of incentives and organizational values to drive their adoption and use by employees. Creating a business for investing in such interactions will be challenging, but critical for managers. (Manyika, Roberts, Sprague, 2007)

Addressing customization

Most applications in use now answer the generic needs of the end user in shipping. The underlying architecture of the integrated IT solutions needs to take care of client centric customized environment.

The software application should be flexible to be configured to provide specificity to –

- Particular ship and cargo type
- Different operating environments, such as loading, discharging, cargo heating, in port, on voyage, idling et al.
- Equipment and machinery. This is relevant to reusability with respect to maintenance
- company specific policies and procedures
- customized IT infrastructure

More on change management

The outcome of the software implementation needs to be assessed for design, costs, operations and data integrity. This can only be achieved by user involvement and influence, management commitment and support, the level and risk of complexity in people management and the ease of implementation of the new application.

While the management of change is tricky in every industry, in the marine business it remains a daunting task where patience shown by managers as change agents will bear long term fruits.

TECHNOLOGY INVESTMENT AND ROI

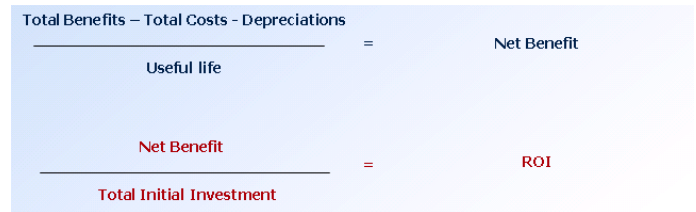
The author of this paper conducted a “return in IT investment” exercise where he consulted at a large oil tanker company.

“Costs” were booked in for hardware, system software, application software and telecommunication services

“Tangible benefits” were booked in for increased profits, low operational costs, lower computer expenses, and lower professional costs, reduced rate of growth in expenses and reduced facility costs.

“Intangible benefits” accrued to

- improved asset utilization
- improved resource utilization
- improved organizational planning
- increased organizational flexibility
- faster decision making
- increased organizational learning
- increased job satisfaction
- improved operation
- high client satisfaction
- technology savvy corporate with systems in place



The author furthered the study of his experience at the shipping company with quantifying benefits and costs over a useful life of 6 years(the software can in fact run for 10 -12 years or even more with periodical updates and upgrades).

It was concluded that return on IT investment in shipping over a period of six years generates arithmetically 9% returns.

NEXT GENERATION MARITIME ENTERPRISE SOLUTION



Shipping industry has seen fragmented IT implementation that has been two-fold –

- In house development
- Common off the shelf products that are largely standalone or answer a particular business unit type or a department type. On one hand, there are applications

for technical management alone that include – safety, planned maintenance and inventory, while on the other hand there are other applications for commercial management. The investment from shipping companies in IT has mostly restricted to what the regulations require. Inefficiencies have been a part and parcel of the system and strategic alignment of business processes and IT has been missing.

The author has been involved in a series of studies with large tanker companies where the only way to go forward is integrated IT. An investment into integrated systems is required definitely after a threshold of 12 – 15 ships in the fleet.

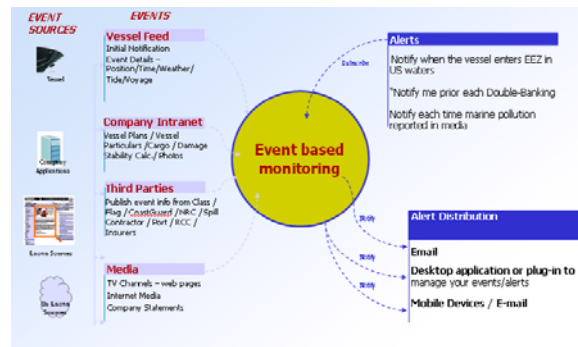
The requirements and deliverables from an enterprise system have to essentially commence at the strategic level. These requirements tie into the missions and the overall vision of the company. Usually these include profitability, safety performance, informed decision making and business intelligence. The exhibit included in this section explains it further. Most of these deliver into decision dashboards for senior and operations managers.

The analysis and reporting needs at the strategic level set the stage for requirements at the operational levels. Most functional managers use transactions in commercial operations, safety and quality, purchase, technical and crewing. These transactions draw crucial data from ships or the office and throw outputs for operational and strategic levels of the organization. At tactical levels the ships are entering operational data such as position messages, consumption data, safety records, crew sign on and sign off including master cash management on board. Other examples of tactical data input from ships are maintenance completions, creating requisitions, acknowledging delivery receipts.

The pillars of the next generation maritime enterprise solutions are Reporting, Analysis, and Monitoring. Reporting usually takes place at the tactical layers and thus ships enter data in this case, and analysis and monitoring at the operational and strategic layers.

Further, such an application for the management for ships must include predictive analysis, performance monitoring, reliability analysis, decision support platform, self check dashboards, exception based alerts, portal and web services and push technology extension to display on handheld devices.

A DAY IN THE LIFE OF A MARINE MANAGER



A marine manager in 2009 and beyond should be able to leverage vastly on the features of the next generation maritime enterprise application.

To put things into a maritime perspective, a manager will be able to extract data from “event sources” such as the ERM applications and the web. The examples include –

- position related feed from the ships
- cargo information from the company intranet
- access to information submitted by third party users such as class societies, ship agents, suppliers and more
- the web sources – subscription channels from media and maritime research

This information can be then thrown into an event based monitoring engine that will deliver mission critical alerts and notifications.

Marine managers can be notified each time a hot work permit is required to be approved, or the vessel enters the EEZ in the US or before a ship-to-ship operation and so on, all delivered using push technology on his device.

THE ECONOMIC DOWNTURN AND INFORMATION TECHNOLOGY IN SHIPPING

Shipping companies need to look at life beyond cost cutting measures.

IT budgets are becoming prime targets of the cost cutting exercise. The management should take a careful look now, even more than ever before on how IT is used across the organization.

“Targeted IT investments can make operations more efficient and increase revenues, delivering returns larger than simple cost cutting.”(Kaplan, Sikes, Roberts, 2008)

CONCLUSIONS

This paper commenced with a critique to the old school thoughts on the use of IT is the management of ships. It successfully creates a need for enterprise IT in shipping.

A detailed need analysis is conducted by the author largely through his consulting and product development experience in shipping.

An introduction is made to the next generation maritime enterprise solution in shipping.

The author touches upon competitive edge and IT and the use of same during the economic downturn.

To conclude the author expresses that - a successful IT enabled process in shipping will not only take the organization through the downturn in delivering gains but will also make a competitive difference for companies.

Successful IT enabled business processes that includes maritime businesses have a number of important characteristics:

- they cover a wide span
- they produce immediate results
- they are precise
- they are consistent
- they make monitoring easy
- and, they build in enforceability

(McAfee and Brynjolfsson, 2008)

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