The “Make or Buy” dilemma in Digital Shipping

How convenient it is for Shipping companies to internally develop the IT systems they use?
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2 Introduction

In General Management, the “Make or Buy” analysis is a technique of deciding between developing a system internally (in-house) or buying it from an external supplier (also known as outsourcing). It can be used to determine whether a product or service can be cost-effectively, developed by the performing organization or should be instead procured through external suppliers.

Such analysis should include both direct out-of-pocket costs as well as indirect, hidden costs including perks or fringe benefits to internal employees.

Another aspect of the “make-or-buy” process closely related to the above definition is the option to perform one of the activities in the value chain in-house, instead of purchasing externally from a supplier.

3 “Make or Buy” in Digital Shipping?

Shipping companies nowadays, recognize the necessity of installing and operating Ship Performance Monitoring system. They need to be able to have accurate and reliable, real-time information about their fleet navigational performance, fuel oil consumption, etc.

We are experiencing worldwide an increase in the number of maritime companies with forward-thinking managerial teams eager to adopt value-adding intelligent IT systems. This trend is led by the awareness they now have, that the only way to be competitive is to be technologically ahead. They realize that companies not willing to adopt this approach run the risk of falling far behind or being left by the wayside.

Very often though, maritime companies are confronted with a fundamental dilemma: “Is it advisable to DEVELOP our own system internally, or we can fulfill our requirements by selecting one of the solutions available on the market?”

4 Internal Development Requirements

Indicatively, there are 10 major requirement concerns in proceeding to the Internal Development.

4.1 Human resources

A primarily major task would be to trace and hire experts for the internal development team. The staff could also be allocated from existing resources, if the company identifies idle workforce holding the proper skillsets. It is considered quite difficult for a shipping company to attract exceptional technical executives with proved professional and/or academic background mainly because of inability to offer long-term vision or future professional prospects.

The required resources need to have an extended versatility as far as competences and skills are concerned. The team need to include the following indicative list of job descriptions:
• Electronic engineers specialized in automatic control, digital and analog interfaces, sensors, shipping equipment and devices installed in vessels

• Experienced marine field electricians to perform the installations onboard

• Data scientists to calculate the algorithms and performing the analysis models, justifying the measurements and indications

• Software engineers for the development of the low-level embedded software applications to be able to handle signals generated by the sensors, ensuring reliability of the data collected, justification with physical parameters, etc

• Software engineers for the development of the front applications, for the user interface to be simple and ready to be adopted by the performing organization.

• Support engineers responsible to continuously support the systems, after the installation.

4.2 Technology

The critical procedure to choose the proper technology for developing an in-house solution requires very important and fundamental considerations. Usage context, licenses, patterns, hosting requirements, ease of installation and support, learning curve for the junior members of the team, availability of core libraries, compatibility with specific database or otherwise database agnostic, testing, scaling, documentation, ease of creating extensions, bug fixing. Technology adoption and its maintenance is not a one off action. It is a never-ending, relentless procedure in a fast-changing environment.

The recent developments in Artificial Intelligence, Learning Machines & Deep Learning, Natural Language Processing, BOTs, they all need significant investments, such as human capital with peculiar skills with specialized know-how and background.

4.3 Hardware infrastructure

It is essential to have an infrastructure plan in place to procure all the devices and machineries necessary to equip a research laboratory such as: oscilloscopes, picoscopes, industrial scope meters, laboratory triple output DC power supplies, Digital multimeters, etc. Additionally, IT infrastructures also need to be in place like: servers, storage subsystems, networking devices, switches, routers, and dedicated network appliances, such as firewalls.

4.4 Software development tools

Before starting the development phase, a list of software development tools need to be purchased and installed such as: source code editor, a compiler or interpreter and other tools, depending on the professionalism of the team, like a debugger or profiler, that can also be part of an integrated development environment (IDE).
4.5 Versioning

One of the major tasks of a technology company is to upgrade their products and offer new enhanced versions to optimize the solution and increase customer satisfaction. An essential component of software development and software configuration management, is the version control, for the management of changes to documents, computer programs, web sites, and other collections of information. Revisions can be compared, restored, and with some types of files, merged.

The need for a logical way to organize and control versions has become much more important and complicated today in software development, where many people at the same time may act on the same files.

4.6 Bugs fixing

An issue for the in-house software product will be the possibility of being “exposed” and tested on a variety of hundreds of different vessels. The missing opportunity of performing a thorough set of tests implies as a consequence that each new version will suffer from all “childhood diseases”.

4.7 Hosting

The biggest difference between Cloud and On-Premise software is how they are deployed. Cloud-based software is hosted on servers and accessed through Web browsers. An on-premise software instead, is installed locally, on the company’s computers.

Needless to mention that any software development addressing the shipping industry nowadays, should always be developed by adopting Cloud Computing.

The procedure to select the hosting provider and the criteria to conclude on such a fundamental decision includes the following critical parameters: Reliability and speed of access (uptime), Data Transfer (Traffic/Bandwidth), Disk space, Technical support, choosing between FTP – PHP – Perl – SSI – SSH · MySQL, etc., Secure Server (SSL), Control Panel, Multiple Domain Hosting and Subdomains, Web Server and Operating System, Price and Payment Plans, Internationality.

4.8 Support

Usually the members of the development team undertake the duty of supporting the existing installations, this because a specific vertical structure would create underemployed people with partly capacity allocation. Such twofold roles often lead to a decrease of quality in support service to the internal stakeholders.

4.9 Certifications

A quality management system including a set of policies, processes and procedures required for planning and execution (production/development/service), considerably affects the results in the core business area of
any organization. The adopted Quality Management System does not define the actual quality of the product or service. It helps the company achieve consistent results and continually improve the processes.

ISO 9001 and even more specifically ISO 20000 certifications are for organizations that provide managed IT services. It ensures that best practices are in place, and that the management system is compliant.

Furthermore, ISO 27001 is specific for information security management system. It has been developed to provide a model for establishing, implementing, operating, monitoring, reviewing, maintaining and improving an information security management system. It is built on a risk-based approach, defining security policy, conducting risk assessment, managing identified risks, etc.

A shipping company, not having some specific dynamics and activities in place is mostly unlikely to be successful in a such demanding, time consuming and costly procedure to get the above-mentioned certifications.

4.10 Marine Type Approval

Any shipowner must ensure that the materials and equipment installed and operated on the vessels comply with all the rules and regulations applicable.

The Marine Type Approval from esteemed classification societies provides standardized certification rules to improve safety at sea, prevent marine pollution and ensure that international safety standards for equipment on ships are interpreted in the same way, ensuring a smooth approach in accepting marine equipment as required by International Institutions To gain such type of approval, a prototype of the system is subject to a technical appraisal of its design, examined and tested, and only if compliant, a type approval certificate is then issued. The advantage of the type approval process is that a manufacturer is thus assured that the equipment will be accepted without the need of a components’ detailed examination during the ship’s routine surveys.

5 Pros vs. Cons

Below a Pros vs Cons table can help determining whether such a system can be developed cost effectively by the shipping company in house, or whether is preferable to purchase the system from the market. Of course, our analysis should include both the actual out-of-the-pocket cost to purchase the system as well as the indirect costs of managing the internal project.
### “Make” from In-House Development

| Human resources | METIS was established by a skill-diverse team of visionary engineers and researchers who share similar ambitions and most of all the same values. |
| Technology Know-How | METIS is continuously strengthened by skillful engineers with strong educational background and knowledge. |
| H/W Equipment | METIS is equipped with the state-of-the-art infrastructure, supporting the latest trends in technology |
| S/W Development | Artificial Intelligence applied in METIS Agents use a combination of Machine Learning and Big Data. METIS Virtual Assistants communicate with customers in a natural-language simply converted into text transcriptions |
| Versioning | METIS is devoted to relentless development of new features such as, Weather routing etc |
| Bugs Fixing | METIS is devoted to continuous improvement & offers continuously improved services to all customers |
| Hosting | METIS has an agreement in place with Microsoft Azure |
| Support | METIS has a dedicated support team to monitor the operation of any module and detect instantly the system |
| Certifications | Applied for ISO 9001, 20000, 27001. Also, METIS technology is Patent Pending |
| Marine Type Approvals | METIS has applied for Marine Type Approval by Lloyd’s Register |
6 Conclusion

Further to above argumentation, the most obvious direction would be to trust the professionals, to carefully select a company with the proper expertise and positive track records. A company whose main goal is to make customers satisfied, improve their daily experience by developing new services and work on adopting the latest available technologies.

MAKE OR BUY CONCLUSION

PERFORM A REALISTIC ASSESSMENT OF THE CAPABILITY AND EXPERTISE OF BUILDING AND MAINTAINING IN-HOUSE TEAM

EVEN IN THE CASE THAT CORE COMPETENCES EXISTED, WHAT HAPPENS IF A KEY MEMBER LEAVES?

EVALUATE EXTERNAL STRATEGIC PARTNERSHIPS AND SELECT THE APPROPRIATE PARTNER BASED ON STRICT SPECIFICATIONS AND TERMS

Management Decision-Making Quote
“Make or Buy” dilemma in Digital Shipping,

Make

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Buy

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Metis Cyberspace Technology

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