Expanding Frontiers -
Challenges and Opportunities in Maritime Education and Training

A Decision Making Human Resource Information Management System for Ship Management

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Abstract: Human Resource Management (HRM) is a complex process in the shipping industry due to a variety of constraints: national, international rules and regulations such as International Maritime Organization's (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), flag state rules, International Labour Organization (ILO) rules. Besides that, each employee (seafarer) has individual records including personal information, qualifications, travel arrangements and certificates. These records hold lots of information which can become complex for crewing/personnel departments to follow all necessary issues. According to this view point, information technology (IT) becomes more important for reliable and effective HRM applications. Employed seafarer's quality and qualification to work on board are other important issues for a safe ship management process and also for shore based personnel. Labour cost is another issue which makes HRM valuable and it is getting to be a large factor in overall operational costs in this global financial crisis. The world merchant fleet is increasing in size and deadweight; however, suitable/appropriate seafarers are becoming difficult to find and crewing departments in shipping companies and ship managers put much effort into handling available seafarers.

In this paper, seafarer recruitment process and assessment factors are outlined and a work flow for suitable assessment and recruitment of seafarers is examined. As a result of this study, appropriate functional web based Human Resource Information Management (HRIM) applications are developed for crewing departments in ship management companies as a decision support for eligible seafarer selection. With these applications for decision making support, a seafarer can be assessed and selected according to important factors such as nationality, international rules & regulations and company policy and, in the end, an eligible seafarer can be chosen for a suitable/appropriate position on board. This web based application can be modified for other important topics which aim to improve the quality of the recruitment process or other

process steps following the recruitment process such as seafarer training, trial period, performance measurement and career upgrading opportunities. These can be future studies which analyse and modify new structures and flows in web based application.
Keywords: Ship management, Human Resources Information Management (HRIM), Seafarer resources, Maritime Human Resource Management (M-HRM), seafarer recruitment process, .Net technology

1. Introduction

The qualified manpower shortage is one of the most important issues not only in Turkey, but also for the entire world. This is due to its natural phenomena, as man power is limited. According to regulations and laws for ship crews, especially STCW (Standards of Training, Certification and Watchkeeping), TMSA (Tanker Management Self-Assessment) and SIRE (Ship Inspection Report); crew performance shall be evaluated properly, so appropriate training should be given according to evaluation and a reward/penalty system must be applied for assigning to a higher position or dismissals. This study looked at determination of criteria for crew recruitment for ships, identifying new standards according to international/national standards and regulations to identify necessary training for personnel and application tools for their employment and recruitment. This study also covers an application work flow design with information technology tools, testing process and publishing results. As a result, this attempt improves evaluation of seafarer performance with high accuracy, helps to decrease work casualties, provides determination of proper training and tracking, hopefully reduces deficiencies related to crew served in, and finally, has positive effects on total quality benefits to the maritime industry.

In shipping management (technical and operational), labour is the primary factor of the maritime sector [1]. In technical shipping management, the easiest way to decrease the running cost of a ship is "labour costs". On the other hand, humans are the dominant factor in maritime accidents [2, 3]. As a result of that, human resources (planning, competency, training and development, performance measurement, payment, etc.) are critical management processes in shipping management. In the literature, some studies focused on integrating new approaches into the organizations on maritime policy and management for supporting their managerial activities (see Panayides [4], Jensses and Randoy [5]). In addition, Asyali and Zorba [6] handled a web-based survey on the human resource managers in Turkish shipping companies for understanding of their human resource strategies. They describe some human resource strategies in the field of resourcing, recruiting, selection and retention, compensation, performance management, training and development.

The role and systems of Human Resource Management (HRM) in the shipping business require different procedures compared with the other disciplines, due to various expectations and constraints on operational processes in the maritime industry [7]. Celik et al. [7] propose a model based on an Analytic Network Process to support the personnel selection facilities of crewing departments in ship management companies. According to their study, employing the Master is the prioritised evaluation factor due to he/she being the most significant and key person on board.

Hough and Oswald [8], Lievens et al. [9] and Robertson and Smith [10] presented excellent reviews on personnel selection and employment. Other papers published in the literature are mostly focused on knowledge measurement, skill, technical proficiency, personality, interview, performance, and so on for improving the personnel recruitment function of HRM. To find the right people for the right jobs and positions is the primary strategy for personnel recruitment in

HRM; this is also discussed by Chien and Chen [11]. Furthermore, there are some models and techniques in personnel employment using IT [12-14].

There are mainly two approaches in human resource management (HRM); the classical approach known as personnel management and the modern approach known as HRM. HRM is broader than personnel management. In the classical approach, a human was considered as a cost for the company. On the other hand, HRM considers a human as a benefit for the company. So, human resources could be competitive advantages through technology and financial capital. Today an effective HRM is the main issue for sustainable competitive advantage in global shipping. Personnel recruitment with its process is the most critical issue in Maritime HRM (M-HRM). Many shipping companies have performed HRM activities (especially recruitment of the crew) under personnel management activity in the crewing department instead of managing a HRM department in the shipping organization. As a result of that, this study will aim to support a systematic way for application in HRM departments of a shipping company by using information technology tools. This study considers not only the basic applications of a HRM department in a company but also considers additional requirements of STCW and ILO in the HRM of a shipping company.

2. Methodology

2.1 ".NET" Technology

Microsoft started development on the ".NET" Framework in the late 1990s; originally under the name of Next Generation Windows Services (NGWS). NET 1.0, which is the first beta version of .NET, was released in 2000. The .NET Framework is an integral Windows component that assists developing and running the following generation of computer applications and XML Web services. The .NET Framework is developed to meet the following objectives:

- To provide a consistent climate for object-oriented programming whether object code is saved and performed locally, performed locally but Internet-allotted, or executed at a distance.
- To provide a code-execution climate that decreases software deployment and versioning disagreement.
- To provide a code-execution environment that support safe performing of code, including that developed by not well known third parties.
- To provide a code-execution environment that removes the performance problems of scripted or interpreted climates.
- To make the developer knowledge logical across widely varying types of applications, such as Windows-based applications and Web-based applications.
- To build all communication on industry standards to provide that code based on the .NET Framework can combine with any other code.

The .NET Framework has two main constituents: one is the common language runtime known as CLR and the .NET Framework class library. The common language runtime is the infrastructure of the .NET Framework. CLR can be thought as an agent that controls code at execution time, performing core services such as memory management, thread management, and remoting, while also enforcing strict type safety and other forms of code certainty that promote security and durability.

A fundamental principle of the runtime is the concept of code management. Managed code is known as the code that targets the runtime and unmanaged code is known as the code that does not target the code.

The class library, the other main component of the .NET Framework, is a wide, object-oriented collection of reusable types that you can use to build applications ranging from traditional command-line or graphical user interface (GUI) applications to applications based on the latest innovations provided by ASP.NET, such as Web Forms and XML Web services [15].

2.2 Common Language Infrastructure (CLI)

The purpose of the Common Language Infrastructure (CLI) is to provide a language-neutral platform for application development and execution, including functions for exception handling, garbage collection, security, and interoperability. By implementing the core aspects of the .NET Framework within the scope of the CL, this functionality will not be tied to a single language but will be available across the many languages supported by the framework. Microsoft's implementation of the CLI is called the Common Language Runtime (CLR), or CL. Visual overview of the CLI is illustrated in Fig.1, and it shows that different programming codes can be compiled in CLI for execution. Fig. 1 shows how to use .NET technology in the CLI within its visual ovierview.
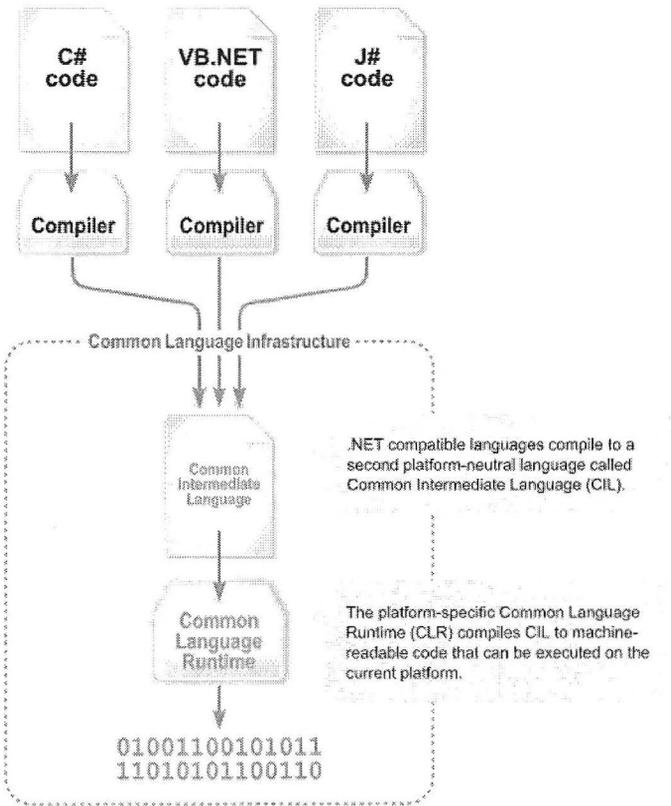

Figure 1 Visual overview of the Common Language Infrastructure (CLI)[1]

2.3 Database Flowchart

Database flow has been created to analyse the complete M-HRIM. The database diagram is shown in Fig.2. The centre of the concept is the "Crew Identity Card" which will collect all the information from other important topics. These topics are created according to requirements for shipping industry, such as: crew matrix index, certificates, trainings, performance evaluation, job history, seaman book, crew on ship, crew position, etc. Fig. 2 shows database diagram for the construction of HRIM tool and interfaces.
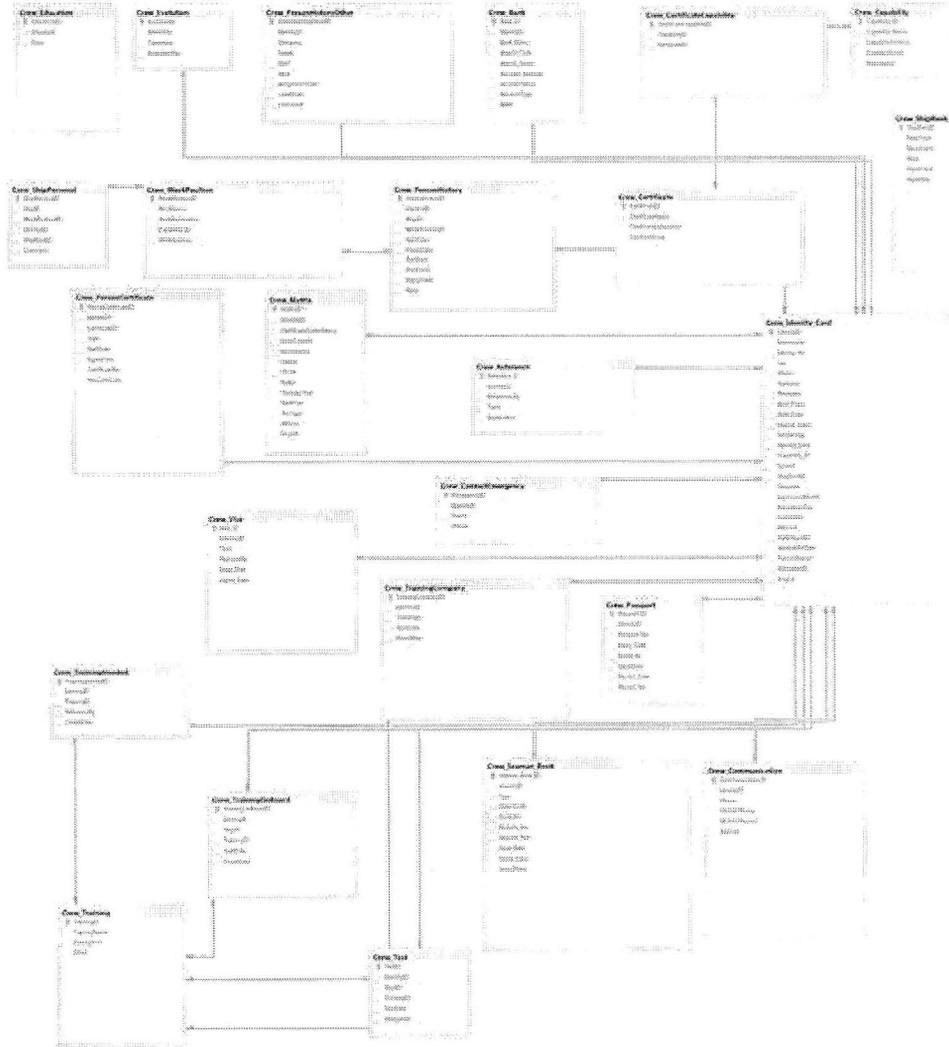
Figure 2 Database diagram

3. Application of Human Resource Information Management (HRIM) Tool

In this chapter, the basic concept of the M-HRIM outline is explained as shown in Fig. 3. The first phase of the recruitment process is the application form, and the form should be filled in by the seafarer candidate herself/himself. All information will be stored in the application and the company will easily evaluate the application form from the web. In addition, the person who is involved in the recruitment process can also view a candidate's application and review simultaneously. After that, the application will inform the candidate if he/she is eligible for an interview with responsible managers at the office. If it is preferred by the company, a pre-interview could be made by the Personal Manager or Deputy of Personal Manager. After interviewing with the personal manager, he/she would consult with the relevant manager. If the process of interviewing is finalized, then the next step will be to assess for competence. Some logical, physiological and psychological tests may be applied in this part, and other required measurements may be requested for details.

Fig. 3 shows logical algorithm of recruitment process for employment of seafarer to a vessel.
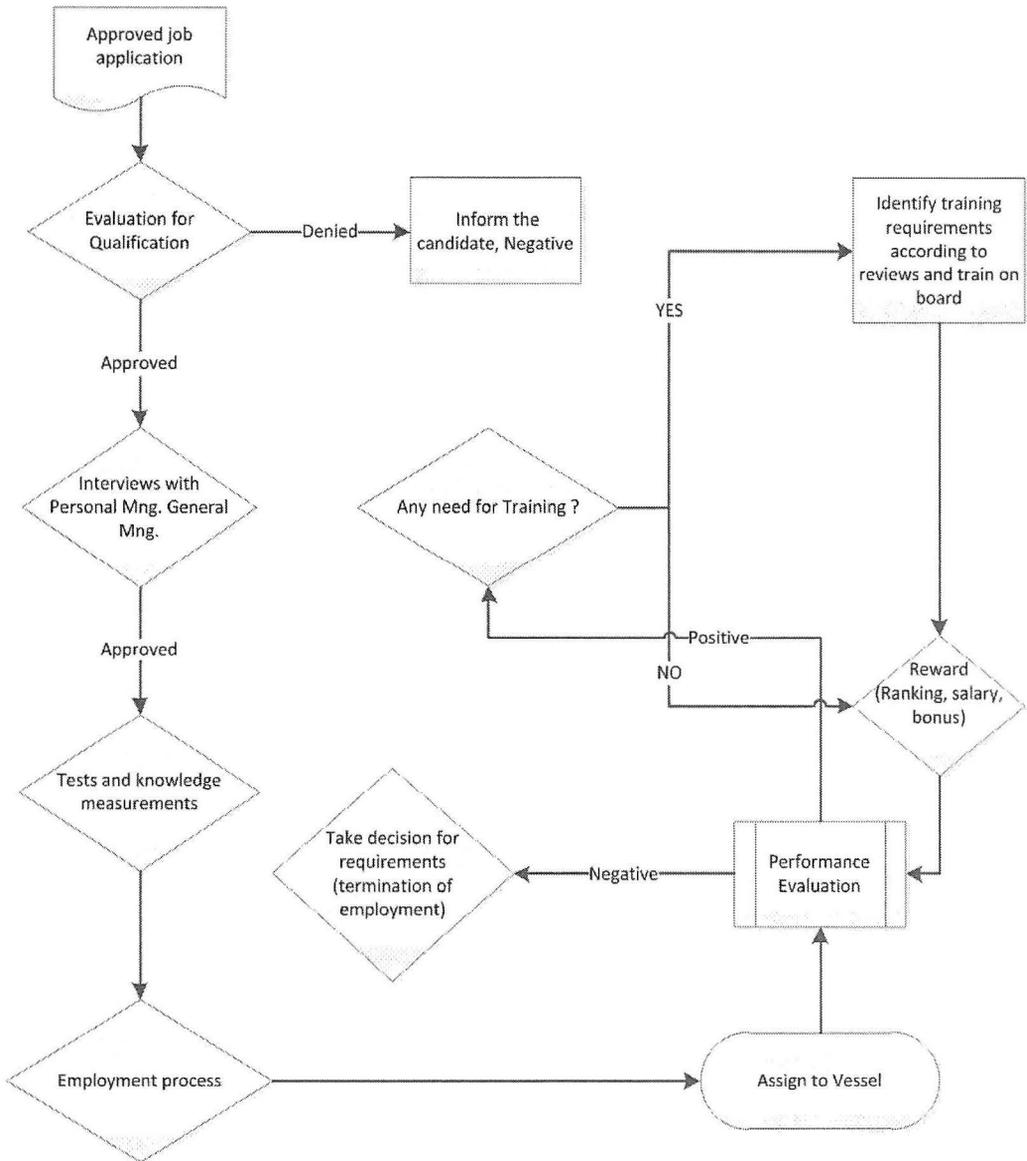
Figure 3 Basic work flow for M-HRIM

4. Conclusion

The seafarer recruitment process and assessment factors are very important for a shipping company. This selection can be organized properly by using a decision making support (with some applications). In this study, the seafarer recruitment process and assessment factors are outlined and a work flow for suitable assessment and placement of seafarers examined. As a result of this study, an appropriate functional web based application (called Maritime-Human Resource In-

formation Management (M-HRIM)) was developed for crewing departments in any ship management company. M-HRIM will be a tool for decision support for eligible seafarer selection. With its applications, a seafarer can be assessed and selected according to important factors, such as; nationality, international rules and regulations, and company policy. At the end, an eligible seafarer can be chosen for a suitable and appropriate position on board. This web-based application can be modified for other important topics which aim to improve quality of the recruitment process or other process steps following the recruitment process such as seafarer training, trial period, performance measurement and career upgrading opportunities. There can be future studies which analyse and modify new structures and flows in web-based application.

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