

ENHANCING INFORMATION TECHNOLOGIES FOR MARITIME PERSONNEL SELECTION IN CREWING COMPANIES BASED ON DECISION SUPPORT SYSTEMS

Iryna Shkitina¹, Olha Izmailova², Hanna Krasovska³, Oleh Ilarionov⁴, Iryna Domanetska⁵

¹ Taras Shevchenko National University of Kyiv / student, Kyiv, Ukraine, ira.shkitina@gmail.com

² Kyiv National University of Construction and Architecture / Department of Cyber Security and Computer Engineering, Kyiv, Ukraine, olga.v.izmailova@gmail.com

³ Taras Shevchenko National University of Kyiv / Department of Intelligence Technologies, Kyiv, Ukraine, hanna.krasovska@knu.ua

⁴ Taras Shevchenko National University of Kyiv / Department of Intelligence Technologies, Kyiv, Ukraine, oleg.ilarionov@knu.ua

⁵ Taras Shevchenko National University of Kyiv / Department of Intelligence Technologies, Kyiv, Ukraine, domanetska@knu.ua

ABSTRACT

This paper explores the process of improving information technologies for the search and selection of maritime personnel in crewing companies. An analysis of traditional management methods reveals that they are time and resource-intensive, and the results do not always optimize the company's performance. A new approach based on human-machine decision-making technologies is proposed, incorporating decision support systems and logical-mathematical methods for personnel selection. The developed information technology formalizes selection processes, candidate evaluation, and enhances decision-making quality through the implementation of multi-criteria analysis and expert evaluation methods. Testing results demonstrated the high efficiency of the new system in real-world.

KEYWORDS: information technology, crewing company, personnel search, candidate selection, human-machine decision-making, decision support system (DSS), multi-criteria analysis, expert evaluation, optimization

INTRODUCTION

Maritime transportation is the foundation of global international trade and logistics, and the demand for quality maritime personnel selection is growing year by year. Therefore, for a crewing company, the most relevant task is to ensure the efficiency of its operations by improving the results of personnel selection for the client [3,4,6]. Analysis of the efficiency of existing management systems [5] in crewing companies has shown that the traditional process of searching and selecting candidates is quite time-consuming, requires significant effort from managers, and most importantly, the results obtained do not always optimize the company's performance and maximize its revenue. A conclusion was made about the relevance of further improving the computerized tools for the implementation of the search and selection process based on human-machine decision-making technology, which ensures a rational compromise between formalized and non-formalized procedures, optimizing results by using logical-mathematical methods of decision-making for personnel selection in conditions of varying degrees of data uncertainty and the need for flexible adaptation to situational decision-making conditions.

1. TASK STATEMENT

The aim of this work is to explore ways to improve computerized tools for the search and selection of maritime personnel in a crewing company based on solving a set of problems, which the authors consider crucial, related to the success and reliability of the results obtained. The chosen direction of work involves developing an information technology (IT) system and creating an assessment technology for candidates, structuring processes, and formalizing decision-making rules, their sequence, the composition of executors, models, and evaluation methods to maximize the systematization and formalization of poorly structured procedures. The creation of this technology is based on the following principles:

- The development of a tool for forming a job profile for candidate selection, where a hierarchical, multi-aspect, flexible structure of requirements and assessments of the applicant is defined.
- The use of improved expert evaluation tools to decisively influence the reliability of the results obtained when assessing the qualitative characteristics of candidates.
- Establishment of a multi-level scale for qualitative and quantitative determination of the candidate's compliance with the job profile requirements, as the ideal point in multi-criteria analysis.
- Formalization of tools that ensure alternative evaluation methods and techniques, to account for the actual situational conditions of the company's operation and the dynamic nature of the candidate's characteristics over time.

To implement the established principles, which require the analysis of large amounts of data, rational use of experts' intuition, experience, and knowledge in the crewing field, as well as the application of various models and methods to solve poorly structured tasks in conditions of incomplete data certainty, the development of information technology is based on the use of modern decision support systems (DSS) [1,2].

2. PROCESSES, MODELS, AND METHODS OF IT SCENARIO IMPLEMENTATION

A scenario for the implementation of information technology is proposed, based on advanced developments of traditional methods in information systems for managing crewing companies, and providing for systematic improvement of their capabilities through the three main components of DSS: interface system, database, and model base. In this study, attention is focused on forming the structure of processes and their connection with the DSS model base and methods of their implementation (Table 1).

Table 1

Processes, Models, and Implementation Methods

№	IT Process	IT Models	Implementation Methods
1	User registration and access formation	Role-based access model	Authentication and access management methods based on the role model
2	Definition of personnel selection requirements	Key employee profile	Methods for building situational and methodological job profiles that define a multi-aspect hierarchical structure of requirements
3	Determination of the candidate pool	Selection of candidates based on established search requirements and constraints	Lexicographic method
4		Hierarchy of criteria	Goal tree method

	Candidate evaluation based on selection optimization criteria	Determination of the weights of criteria at various hierarchy levels	Analytical hierarchy process
		Evaluation of the candidate's qualitative characteristics	Expert direct evaluation method, analytical hierarchy process
		Comprehensive multi-criteria candidate evaluation	Ideal point method
		Control of expert opinion consistency	Delphi method
5	Evaluation of results and decision-making	Decision logging	

Source: Own elaboration

CONCLUSIONS

As a result of the conducted research, an information technology was developed that significantly improves the process of searching and selecting candidates for crewing companies. Based on computerized decision-making tools, a candidate rating is established based on an aggregated assessment of their compliance with the defined job profile requirements. The basic principles of the IT system were tested on real data and demonstrated high efficiency in improving the personnel selection process.

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