The Algorithm of HRM Systems Selection

Ganna Plekhanova

Abstract - **Functionality and classes of the Human Resource Management systems (HRM) as well as key criteria of their choice are generalized in the paper. The author researched theoretical and methodological approaches to the evaluation of HRM systems economic efficiency, the specific criteria relating to HRM systems selection and the algorithm of the selection.**

Keywords - **Human Resource Management systems, HRM Systems Selection Criteria, Economic Efficiency of Information Systems.**

I. Introduction

The success of any business depends on the professional competence of staff, which promotes business development at the management level as well as the executive level. Therefore, organizational improvement and human resource management has become one of the most important functions of management.

Actuality and economic significance of this aspect confirms the fact that the development and use of human resources is becoming a major factor in the competitiveness of the enterprise. One of the most effective ways to improve the efficiency of human resources (HR) is to implement automated integrated systems of personnel management – Human Resource Management systems.

Particularly acute is the problem of automation for large and medium-sized enterprises, for which the retention of the old management technologies threatens the loss of management effectiveness in a competitive market. The first task have to be dialled before the transition to the new information technologies is to define information system (IS) implementation key objectives associated with the overall business strategy and to choose software that is adequate for this strategy.

Since today's software market offers a wide range of software for different areas of business, so the problem of weighted IS selection are particularly relevant.

The typical process of business-software selecting typically includes the following stages: formulation of requirements and criteria for comparing IS, selection and practical use of the selection methods and models, evaluation of the investments effectiveness. The complexity of the selection process caused by the need to take into account the specifics of a particular software class (Enterprise Resource Planning system - ERP, Customer Relationship Management system - CRM, HRM system, Supply Chain Management system - SCM, etc.) and by the impossibility create a typical list of requirements for systems of different classes. Most discussions of users and enterprises software developers going on around the problem of ERP systems selection.

The problem of choosing the systems of other classes remains outstanding.

Despite the fact that HRM systems buyers are given a various Buyers Guides [3, 4, 7, 8, 9, 11, 14], analytical reports [6, 16], HR software comparison on-line services [5, 12, 13], methodologies for selecting ERP system (or systems of other classes) [1], it is difficult to combine all of these recommendations into a unified selection method.

Therefore the objectives of this paper is to summarize criteria for HRM systems selecting, to research theoretical and methodological approaches of HRM systems economic effectiveness evaluating and to develop the algorithm of HRM systems selection.

II. Functionality of modern Human Resource Management Systems

Human Resource Management systems (also known as HR Software, or HR Information Systems - HRIS) is a software application designed specifically for the aggregation and synthesis of employee information [6, 16].

The main objective of HR software is to attract and retain professionals of the company. Therefore, HRM systems allow manipulating not only quantitative, but also qualitative indicators of staff [6, 16].

Among other objectives of HRM-systems are the next:

- structuring all accounting and payment processes related to personnel,
- elimination and minimization of negative impacts associated with the staff dismissal [6, 16].

The key properties of modern HRM-systems are abilities to:

- store large amounts of data, particularly in the distributed databases;
- efficiently process these data on complex algorithms;
- easily modify those algorithms when changing law;
- meet all law requirements for outgoing documents;
- easily change forms of documents when changing law;
- support different types of organizational structures [6, 16].

Functionality of Human Resource Management systems can be divided into six major functional blocks distributed across three technology levels (according to the approach of the research group Forrester Research) [16]:

1. User level includes:

A. Self-service interaction layer

Ganna Plekhanova – S. Kuznets Kharkiv National University of Economics, Lenin Avenue, 9a, Kharkiv, 61166, UKRAINE, E-mail: Ganna.Plekhanova@m.hneu.edu.ua

- Employee self-service
- Manager self-service
- Employee communications
- Management reporting and analysis

2. Strategic level includes:

A. Learning management processes
- Training administration
- Learning content management
- Learning delivery

B. Recruitment processes
- Candidate sourcing
- Applicant tracking
- New-hire onboarding
- Contingent staffing

C. Performance and talent management processes
- Employee performance
- Succession planning
- Competency management
- Compensation and rewards
- Planning and analysis

3. Operational level includes:

A. Workforce management processes
- Time and attendance
- Forecasting and scheduling
-Absence management

B. Transactional HRMS processes
- Employee records and personnel actions
- Benefits administration
- Payroll
- Position management
- HR compliance

III. HRM System Selection Algorithm

The author proposes an algorithm for selecting HRM system. First of all, based on the customer requirements, set of selection criteria should be defined. Formulation of criteria for the system is a stage that has a profound effect on the quality of the final decision. The complexity of this phase is determined by the need to take into account the specifics of a particular class of IS (ERP, CRM, HRM, SCM, etc.) and the inability to form a typical list of requirements for systems of different classes. The topic of most discussions of users and developers of software for enterprises is the problem of selecting ERP systems. The author believes that most of the ERP selection criteria is suitable for the evaluation and comparison of HRM systems.

These criteria include [1, 15]: functional completeness, data protection and system reliability, functional and linguistic localization, distributed mode, the integration of previously implemented systems, the presence of adaptation and support tools, the presence of the tool for analysis of the system elements during its operation; the cost of the software and duration of the adaptation and implementation process, business reputation of a vendor (or integrator) and its experience in implementing similar IS, the ability to use widespread operating systems and databases.

Among the specific criteria relating to HRM systems selection, the author considers to be the most important next criteria:

- support for the organizational structure of the company,
- compliance with the requirements of domestic labour and tax laws,
- ability to conduct two types of parallel accounting - managerial and law-regulated,
- ability to conduct accounting for several legal entities (which are units of one corporation) in the common database,
- ability to prepare consolidated corporate reporting,
- existence of mechanisms for HR-portal integration,
- existence of business analysis, modelling and forecasting tools,
- lack of excessive complexity of the HRM-system implementation process,
- worked out and tested implementation methodology,
- advanced HRM-functionality that will provide opportunities for the development of human resource management approaches in the next 5 - 10 years.

The most difficult to measure is the functional completeness criterion. On the one hand, the requirements for the system functionality can be based on domain knowledge and the knowledge of business specifics, on the other hand - the formalization of these requirements may take only HRM systems experts who know all the details of various HR business processes automation.

Therefore, it is better to involve into selection process external consultants (companies that have an experience in implementing several systems). An important factor is also the experience of a different systems integration with each other and system integration.

The typical company (group of companies) requires from 100 to several thousand criteria for evaluating the functional completeness of HRM system. That is why this criteria should be combined into groups and subsystem. For example:

- Payroll Management: accounting of individual compensation, the company's social contributions, the human resource inventory and the company's analytical accounting.
- Personnel Administration: includes the follow-up of employee personnel records, as well as the management of the company's social capital.
- Human Resources Management: recruitment processes, performance management and competencies assessment processes, compensation policies, career management, and succession planning.

The basic requirements to the criteria should be taken into consideration:

- criteria should be agreed with each other and do not contradict each other,

- the composition of indicators should be minimally sufficient and complete and correlates with the project objectives,

- criteria values should be realistic and achievable.

The algorithm begins with selecting the most significant of these criteria or groups of criteria (Fig. 1). Significant criteria are needed for multi-objective optimization by using Pareto set identification approach. It lets a decision maker focus directly on interesting areas of the objective space and reject the worst in all significant criteria alternatives. This step allows reducing significantly the number of systems-candidates.

The next step is to select 1 or 2 systems among the remaining candidates by calculating and comparing the multiparameter ratings. Detailed lists of questions on all the main points of evaluation system should be prepare to collect and bring to the table the necessary information about the systems, then perform the mathematical analysis of the obtained data. To compare ratings of the selected systems decision maker should:

to provide a list of characteristics that are essential for the system, and add them to a spreadsheet template for comparing systems, grouping by function (each characteristic to assign a weighting factor),

to evaluate each characteristics of each system,

to normalize expert evaluation,

to calculate the rankings of each system for each functional group,

to calculate the integral value of ratings, taking into account weights of each group.

To improve the reliability of the model author proposes to use the confidence score for each criterion for each system.

As the process of evaluating the economic efficiency of IS is complex and expensive, it is advisable to carry out such an assessment only after expert evaluation and selection of not more than 2-3 alternatives.

IV. ASSESSING THE IMPACT OF HRM-SYSTEMS IMPLEMENTATION

Author studies have shown that neither in the world nor in the Ukrainian practice specialized techniques for evaluating the HRM-systems effectiveness are not used. At best evaluation is carried out on a universal technique that particular way adapted to the HRM-systems. Despite the fact that the method of choice ERP systems easily adaptable to choose HR software, according to the author, the specific functionality HRM-systems necessitates the development and use of specialized models for evaluating their effectiveness on the basis proposed in this paper, specific requirements for HRM-systems.

The methods and models for assessing the impact of the implementation of HRM-systems are:

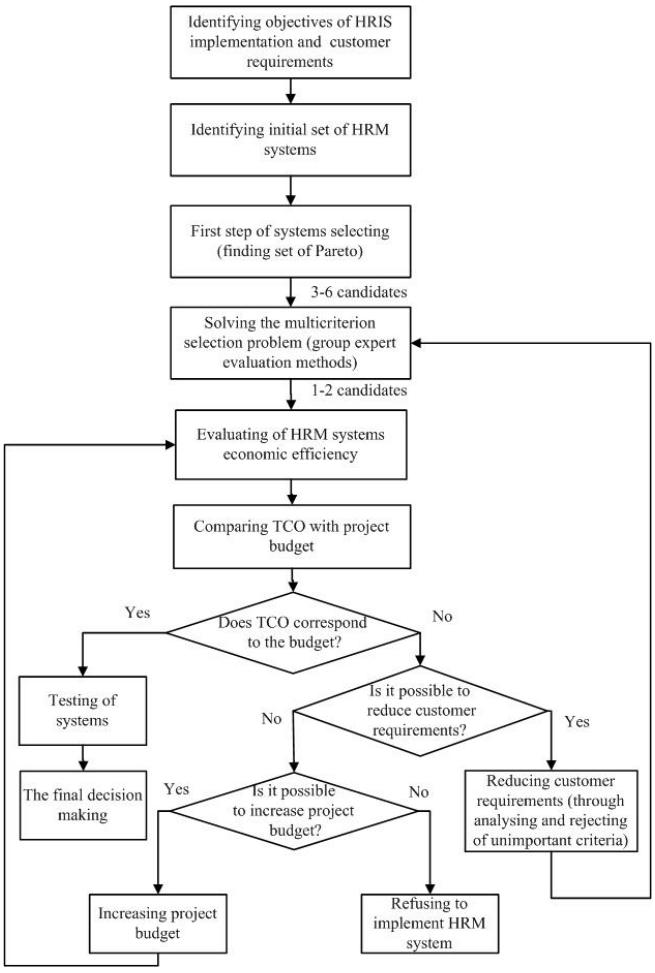

Fig.1. HRM System Selection Process

- Universal approaches used to evaluate any IT project [2, 18, 19]. Among the variety of approaches, the most popular methods in practice are ROI (Return on Investment) and TCO (Total Cost of Ownership). Typically, companies do not use only one method of assessing the economic impact of the IT project. Experience shows that in different situations closer to the truth are different methods.
- Assessment of the impact of the HRM-systems through evaluation of HR-department performance metrics. Evaluation of personnel and HR-department is a complex management problem. The most commonly used methods of evaluating the effectiveness of HR-department are [10, 17]:

- expert assessment,
- HR-Benchmarking,
- method of Jack Phillips,
- indicators of economic performance of staff.

To evaluate the results of HRIS implementation will be appropriate, but not enough to use the HR-performance indicators before and after IS implementation. After the economic evaluation decision maker should choose the best system by minimizing the cost and verify the compliance of the required cost to

planned project budget. In case of exceeding the budget there is reasonable to reduce the least important criterion and repeat the process of multi-selection or increase the budget of the project.

V. Conclusion

Obviously the number of HRM systems will continue to grow, so the problem of reasoned, balanced choice will become increasingly urgent. Today the software market proposes a wide range of HRIS. This fact and the lack of reliable methods of business software comparative analysis cause the complexity of selection process of management IS in general, and HRM systems in particular.

In the IS selecting process following criteria often are used: openness, flexibility and adaptability, distribution, integration, number of successful implementations in enterprises of the same industry, a wide range of functional modules, Database management system, which is the basis of the IS, the image of the vendor. The author proposes also the list of the specific criteria relating to HRM systems selection. The typical algorithm of software selection process was modernized. Author proposed:

- to apply multi-objective optimization by using Pareto set identification approach for rejecting the worst systems in the most significant criteria at the first stage of selection,
- to set the confidence score for each criterion for each system and use it in the calculating of each system rankings,
- to use the weights of each criteria group for reducing the least important criterion and repeat the process of multi-criteria selection in case of exceeding the budget of project,
- not to consider the economic efficiency criteria at the first sages of multi-objective optimization (by using Pareto set identification approach and group expert evaluation method) and to carry out the economic evaluation of HRM systems only after expert evaluation and selection of not more than 3 alternatives.

Making the decision, the head of the organization usually takes into consideration the typical financial indicators such as return on investment, total cost of system ownership and hidden costs. Calculating the efficiency of investment in automation is difficult enough therefore, these calculations are recommended for 1-3 systems which have successfully passed the selection procedure.

It is clear that each method of the IS results evaluating has their advantages and disadvantages. Using multiple methods improves the accuracy of the calculation but at the same time increases the cost of the procedure itself, and eventually the cost of investment project, and as a result reduces its profitability. However, evaluating the effectiveness of IT investments is necessary, reasonable and informative.

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