Success Factors of Human Resource Information System Implementation: A Case of Ministry of State-owned Enterprise

Wita Puspitarini, Putu Wuri Handayani, Ave Adriana Pinem, Fatimah Azzahro
Faculty of Computer Science
Universitas Indonesia
Depok, Indonesia
wytter@gmail.com, putu.wuri@cs.ui.ac.id, ave.pinem@cs.ui.ac.id, azzahro.fatimah@cs.ui.ac.id

Abstract—This study aims to analyze factors influencing the successful implementation of Human Resources Information System (HRIS) at the Ministry of State-Owned Enterprises (MSOE). There are 22 factors influence the success of HRIS implementation that are categorized into 4 dimensions, namely human, organization, technology and environment based on DeLone & McLean information system success model, HOT (human-organization-technology) fit model and TOE (technology-organization-environment). This research use quantitative method approach and data collection is gathered using questionnaire. Method of data analysis using Entropy method to calculate the weight of success factors and dimensions, and rank factors and dimensions. There are 99 respondents of the HRIS users provided data through the questionnaires distributed to them. This study shows that the dimensions influencing the success of HRIS implementation at the MSOE in priority order are technology, human, environment and organization. In addition, there are 5 factors selected with the highest weights namely information quality, service quality, top management support, system quality and social influence.

Keywords—success factor, human resource information system, state-owned enterprise, Entropy

I. INTRODUCTION

One initiative of e-government implementation at the Ministry of SOE (State-Owned Enterprises) is the use of Human Resource Information System (HRIS) or known as Human Resource Portal. The system was built in 2007 on a web-based basis with funds sourced from the State Budget. Unfortunately, in 2007 when the Human Resource Portal was built, the Ministry of SOE did not have information technology planning that can be used as a standard reference in the manufacture of information systems, therefore the development of Human Resources Portal only meets the needs at that time. Human Resource Portal is used as a tool for collecting data of the Board Directors/Candidates of Board of Directors, Board of Commissioners/Candidates of Board of Commissioners, and Supervisory Board/Candidate of Supervisory Board of SOEs electronically. Then, submission of electronic data from each SOEs to the MSOE has been strengthened by the Regulation of the Minister of SOE No. PER-18/MBU/10/2014 on the Delivery of Data, Reports and Documents of SOE Electronically. Under this regulation, SOEs are required to submit reports, data and documents to the Minister of SOE and/or echelon I and II officials of the MSOE electronically through the information system provided by the MSOE.

Stakeholder Human Resource Portal, among others are internal parties (i.e MSOE) and external (i.e SOEs). Internal user come from the MSOE is Deputy Assistant of the Executive Resources Management of MSOE as the owner of basic tasks and functions within the MSOE as well as responsible for the policy of filling and managing and presenting the data. In addition, Deputy Assistant Data and IT with MSOE is responsible for developing and maintaining information systems and data security. External users are parties that come from SOEs called admin Human Resource (HR) SOE. Deputy Assistant of Executive Resources Management of MSOEs explains that the data of the Board of Directors and Board of Commissioners/Supervisory Board of SOEs in Human Resources Portal has not yet existed so that Human Resource Portal cannot be used by Deputy Assistant Executive Resources Management of MSOEs to monitor the term of the Board of Directors and Board of Commissioners/Supervisory Board of each SOE and stipulates the candidates for the Board of Directors and Board of Commissioners/Board of Supervision of SOEs in a timely manner. Based on the identification of the above problems, compiled the formulation of the problem set forth in a research question. The research question is "What are the factors influencing the successful implementation of HR Information System at the MSOE?" This research on the MSOE is expected to provide reference to the high ranking official of the MSOE in determining the steps of applying HRIS at the MSOE in accordance with the results of this study.

This paper covers 6 sections of literature study and research methodology that are discussed in Section 2 and Section 3. Results, discussion and research implications are discussed in Section 4, Section 5 and Section 6. The last section discusses on the conclusions from this research.

II. LITERATURE STUDY

According to [2], HRIS is defined as an integrated computer system designed to carry out many tasks related to

the flow of information within the organization as it relates to its human resources. HRIS could manage data with functions such as storage, analysis, manipulation, retrieval, dissemination, and control. HRIS is not limited to an integrated system and technology, but HRIS also includes employees, policies, working procedures and data required to manage HR related functions [3].

One of the HRISs included in Magic Quadrant Gartner is SAP (System Application and Product in Data Processing) HR (Human Resource). SAP is one of ERP (Enterprise Resource Planning) that offers a variety of information technology solutions to integrate business processes and support the company's operational activities. Using this SAP HR, a company can manage human resources more regularly and can be used for decision-making tools and performance measurement of human resources. This module provides access to all HR data and transactions in one location. So, it can be a tool for managing the roles and responsibilities of organizations that help in creating the corporate management structure and position within the organizational structure.

III. METHODOLOGY

This research is a quantitative research by using questionnaire to get data. The technology that becomes the object of research is HRIS at the MSOE or known as Human Resource Portal. The population of this study is all employees within the Unit of Deputy Assistant of Executive Resources Management of SOE and Admin HR SOEs. Before the questionnaires were distributed, the questionnaire readability test was performed by distributing draft questionnaires to 5 respondents be tested for their readability. Respondents were asked to provide inputs and responses to the draft questionnaire. With the test of legibility, it can be known whether the draft questionnaire can be clearly understood by the respondent therefore it can be improved before disseminated to the respondent in line with the sample research for data collection. Data processing is performed by using Entropy. All the variables to determine the success factors used in this study are grouped according to the existing dimensions of the research [4] with the HOT Fit model and the TOE framework. Table 1 explains the list of success factors of HRIS.

Table 1 List of Success Factors of HRIS

No	Dimension	Success Factor	Definition
1	Human	System Use	Identify the extent to which the use of information systems can affect user needs
		Perceived Eased of Use	Ease of use of information systems for the purpose in accordance with the wishes of users
		Perceived Usefulness	Benefits of information systems for users associated with increased productivity (performance) and effectiveness
		Innovativeness of Senior Executives	Leadership of the organization plays an important role in the use of information systems
		IT Capabilities of Staff	The adoption of information systems is supported by the capabilities and competencies of staff in the IT department
		Performance Expectancy	Users believe that using an information system will help it to achieve a profit in its performance
2	Organizational	Relative Advantage	The use of information systems will improve the effectiveness and productivity of the organization
		Top Management Support	Leaders of the organization support the adoption of information systems by providing adequate facilities
		Centralisation	Every decision is made by the leadership of the organization. Centralization of information systems related to decisions for initiation, adoption and application of innovation.
		Formalisation (Procedure/ Rules/ Government Regulation)	Information systems are supported by regulated rules (formal procedure/ regulation/rules) of an organization for the smooth flow of work
		Perceived Cost	The adoption of information systems allows the cost of implementing information systems and lower innovations
3	Technological	Information Quality	The level of output quality in the form of information generated by the information system
		System Quality	System quality measures typically focus on system performance characteristics
		Service quality	• Quality of service provided when users experience difficulties • Users feel that the

No	Dimension	Success Factor	Definition
			information system suits the needs of the users
		IT Infrastructure	• The organization has been supported by either local area network or internet network • The organization has supported adequate software and hardware for the adoption of information systems
		Compatibility	Adoption of information systems in accordance with organizational goals, and support (compatible) with the existing process
		Complexity	The ability of complex information systems already includes many organizational processes
4	Environmental	Situational Normality	Success in the use of information systems will be achieved when the existing environmental conditions support for the system
		Competitive Pressure	Conditions where the organization must adopt the information system due to competition with other organizations to improve the quality of the organization.
		Technology Vendor support	Adoption of information systems based on support services from selected technology vendors
		Supporting Facilities and Infrastructure	Users consider the facilities and infrastructure provided by the organization to support the use of information systems
		Social Influence	It is the degree to which users perceive that the importance of other people's existence in using the new information system will affect the user

Questionnaires in this study are distributed in the form of links from google docs and hardcopy. The reason to use these links because respondents have different offices location and there is a time constraint to get answers from respondents quickly. The instrument used in the questionnaire is respondents' profile and a list of success factor statement of HRIS. In the form of respondent data, the repondents are asked to fill in information on gender, education, respondent's position and respondent's division. In the next section, it contains success factor statements. Each success factor is represented by 4 questions, therefore there are a total of 34 proposed statements being submitted. The respondents should provide his/her judgment on the statements on the most appropriate choice based on an ordinal scale. The ordinal scale in this questionnaire has 5 categories: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4 = important, and 5 = very important.

IV. Results

4.1. Respondents Demographics

This study obtained 118 questionnaires that have been filled either through hard copies, soft copies or online forms. Out of 118 questionnaires, there are 10 questionnaires whose respondents came from the same SOE and 9 questionnaires from SOEs that under process of restructuring or liquidation. Thus, there are 99 questionnaires that come from valid respondents in accordance with the method of purposive sampling. Out of the 99 respondents consisted of 9 respondents from the MSOE and 90 respondents came from the Admin of HR SOEs. Table 2 described the demographics of respondents.

Table 2 Respondent Demographics

Demographic		Number of Respondents	Percentage
Gender	Men	64	64.65%
	Women	35	35.35%
Age	<17 years	0	0.00%
	17-25 years	2	2.02%
	26-35 years	35	35.35%
	36-45 years	37	37.37%
	> 45 years	25	25.25%
Education	High School	0	0%
	Diploma	10	10.10%
	Bachelor	51	51.51%
	Master	38	38.39%
	Doctoral	0	0%
Institution	MSOE	9	9.10%
	SOEs	90	90.90%
Position	Staff	51	51.52%
	Head of sub-field or Assistant Manager or equivalent	13	13.13%
	Head or Manager or equivalent	34	34.34%
	Assistant department or General manager	1	1.01%

Demographic		Number of Respondents	Percentage
	or equivalent		
Division/ Working Unit	HR	95	95.96%
	Other divisions	4	4.04%
Experience using HRIS	1 year	2	2.02%
	2 years	7	7.07%
	3 years	22	22.22%
	> 3 years	68	68.69%
The most frequently used feature in SISDM	Personal data	23	23.23%
	Organization data	0	0.00%
	Recapitulation	0	0.00%
	Talent Pool	31	31.31%
	Data of Directors, Commissioners or Supervisory Board and Corporate Secretary	45	45.45%

4.2. Criteria Measurement using Entropy

This method is used for the weighting of existing dimensions and criteria. The steps taken to weight the entropy method are as follows [5]:

a. Normalization of the matrix of the questionnaire results (initial data), i.e. subtract all criteria with the maximum value or the highest value. In this study normalization is done by making the matrix of results from the assessment of respondents. Each value on the matrix is then subtracted by the highest value used in this questionnaire. The reduction result is expressed by Xij. Normalization is done after obtaining the total sum of each subtraction value in the matrix.

b. The value of step 1 divided by the total value of all criteria. Next divide each value of the Xij matrix by the total number of matrix values with the following formula:

$$P_{ij} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}}, \forall i,j \quad (1)$$

With: m = number of respondents (99)
n = number of criterias (22)

c. Determine the value of Entropy, dispersion and weight of each of the following criteria:

- Calculate the Entropy value of each criterion with the following formula:

$$E_j = \frac{1}{\ln M} \sum_{i-1}^{m} P_{ij} \ln P_{ij}, \forall j \quad (2)$$

E_j = Entropy values based on normalized data per criterion.

- Calculate the dispersion value of each criterion with the following formula:

$$d_j = 1 - E_j, \forall j \quad (3)$$

- Calculates the weight of each criterion by the formula:

$$W_j = \frac{d_j}{\sum_{j=1}^{n} d_j}, \forall j \quad (4)$$

The result of weight calculation on 22 criterias in this research is shown by using 6 decimals for displaying data. Table 3 describes the final weighting of each criterion.

Table 3 Value of Criteria's Weight

Rank	Criteria	Dimension	Weight
1	Information Quality	Technology	0.046958
2	Service quality	Technology	0.046929
3	Top Management Support	Organization	0.046644
4	System Quality	Technology	0.046639
5	Social Influence	Environment	0.046639
6	Compatibility	Technology	0.046486
7	IT Infrastructure	Technology	0.046385
8	Situational Normality	Environment	0.046368
9	Complexity	Technology	0.046360
10	Supporting Facilities and Infrastructure	Environment	0.046357
11	Competitive Pressure	Environment	0.046285
12	Perceived Cost	Organization	0.046002
13	Relative Advantage	Organization	0.045603
14	Perceived Ease of Use	Human	0.044696
15	Perceived Usefulness	Human	0.044628
16	System Use	Human	0.044551
17	Innovativeness of Senior Executives	Human	0.043973
18	IT Capabilities of Staff	Human	0.043918
19	Performance Expectancy	Human	0.043918
20	Technology Vendor support	Environment	0.043700
21	Formalisation	Organization	0.043642
22	Centralisation	Organization	0.043321

Table 3 shows that the highest weights are the Information Quality criteria with the weight of 0.046958. This indicates that the HRIS user of the MSOE assumes that the quality of information issued by HRIS is the most important factor in the implementation of HRIS.

V. Discussion

Based on Table 3, the final weight of each dimension shows that the dimension that influences the success factors of

HRIS implementation of the MSOE is the technology dimension (weight 0.279757). The results of this study are in line with [4]. The difference between this study and the results of the study by [4] is the order of dimensions numbered 2, 3 and 6, which in this study dimension sequences are technology, human, environment and organization. In previous research the dimension sequences were technology, organization, human and the last environment. However, the success of the HRIS technology dimension of the MSOE is highly dependent on the organization, especially the top management support factor.

Technology is considered an important part that can give a big influence on the HRIS implementation. In addition, it is known that the technological dimension is considered by respondents to have a high level of importance realized from the average value of respondents to 6 criteria that are entirely above 4. In accordance with the results of the questionnaire about user expectations in the development of HRIS, information quality and service quality are the dominant factors in the technological dimension, followed by system quality, compatibility, IT Infrastructure and complexity.

The second greatest weight after the technological dimension is the human dimension. In the human dimension, there are 6 factors where the average value of the scale in this dimension is 3.5. The order of weight criteria on the human dimension is perceived eased of use with weight 0.044696 which illustrates that HRIS MSOE gives ease of use of information system for the purpose which according to user desire. The second sequence is the perceived usefulness criterion with a weight of 0.044628. This illustrates that HRIS MSOE has benefits for users in improving performance. The ranking of the three HRIS success factors in the human dimension is system use with weight 0.044551, this illustrates that HRIS MSOE can identify the extent to which the use of information systems can affect user needs. Innovativeness of senior executives (weight 0.043973) describes the leadership that plays an important role in the use of HRIS in the MSOE. The IT capabilities of staff criteria weighs 0.043918 where users feel that HRIS has adopted capabilities that support staff competencies. And the last is the criteria of performance expectancy (weight 0.043918) where users who believe in HRIS can help improve their work.

Based on the weight of criteria or factors in the environmental dimension is social influence which describes the HRIS user assumes that HRIS MSOE has a complex function that can cover many organizational processes especially in facilitating data collection and search of SOEs talent for prospective Board of Directors or Board of Commissioners. The next factor is situational normality which illustrates that HRIS can support policies or regulations applied by the MSOE.

VI. Implications

This research could identify the success factor needed in implementing HRIS at the ministry level. The results of this study can be an evaluation and input for the MSOE that the success factors of the implementation of HRIS in accordance with the expectations and objectives of making HRIS MSOE, where the dimension of the most influential on the successful implementation of HRIS MSOE is a technology with the criteria of quality information. Thus, the MSOE can improve the quality of information from HRIS by updating the data periodically through the admin HR MSOE in accordance with existing legal umbrella.

VII. Conclusion

Based on the results of the analysis, the factors that influence the success of HRIS implementation of the MSOE are information quality, service quality, support of top management support, system quality and social influence. Future research is expected to use the recommendation of human resources experts to develop HRIS in the future so that the quality of HRIS could be more improved. Expectations for HRIS MSOE based on user feedback are data updates, feature development, setting of usage procedures, system improvements and ease of use.

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