Proposed Design of Performance Indicators based on Balanced Scorecard using ISM-ANP at the Directorate of Human Resources, Al Azhar University, Indonesia

Farra Nabila Murti[1], Ahmad Chirzun[1]

[1]Industrial Engineering, Faculty of Science and Technology,
Universitas Al Azhar Indonesia, Komplek Masjid Agung Al Azhar, Jalan Sisingamangaraja, Kebayoran Baru, Jakarta Selatan 12110
farra.murti@gmail.com; chirzun@uai.ac.id

Abstract. In a higher educational institution, the implementation of a high-quality academic service system must go hand in hand with the provision of supporting non-academic services. The Directorate of Human Resources of UAI is a work unit with the aim of being a key work unit that can drive changes in the UAI organization so that it continues to grow and be sustainable in the future. To support the objectives of the Directorate, a strategy map was designed using an Interpretive Structural Modeling (ISM) based on the perspective of the Balanced Scorecard (BSC) to find out the composition/mapping from each perspective, which is continued with the design and performance indicators based on the BSC to produce a comprehensive performance measurement base and help in the implementation of a more measurable and effective HR function. In this study, priorities will also be determined from the perspective of the BSC, strategic objectives, to the KPI at each perspective using the Analytical Network Process (ANP) method. Based on the results of data processing, it is found that the perspective of growth and learning occupies the top position as the goal in the strategy map, and 16 strategic objectives in the BSC are derived from the KPI. In weighting using ANP, obtained a financial perspective with the highest weighting of 0.123, the highest strategic target is the optimization of employee normative rights with a value of 0.171, and the largest KPI weighting value is the implementation of employee satisfaction surveys of 0.054.
Keywords: performance indicators, strategy map, balanced scorecard, interpretive structural modelling, analytical network process

1. INTRODUCTION

Higher Education bears a very relevant contribution to improving the quality of human resources in a country. The Directorate of Human Resources (HR) of UAI as a work unit that has a goal of encouraging dignified human resources who have intellectual abilities based on Islamic spiritual, moral and ethical values. The main problem faced by the UAI HR Directorate is referring to that the job description of each organizational function which does not yet have a specific design basis that results in the functions under the UAI HR not having performance indicators to be met, thus performance indicators are only carried out based on the achievements already implemented. Therefore, it is necessary to design a standardization of achievement based on performance indicators, particularly at the Directorate of Human Resources at Al Azhar University in Indonesia, which is intended to be used as a basis for

measuring performance in more depth and assisting in the implementation of HR functions that are more measurable and effective. The design of performance indicators at the UAI HR Directorate will be carried out using the Balanced Scorecard (BSC) approach. In this research, a strategy map will be prepared using the Interpretive Structural Modeling (ISM) method, which is a method that is able to identify and summarize dependencies between perspectives of the BSC. After identifying the interrelationships between BSC perspectives, weighting will be made between strategic performance targets and KPIs using the Analytical Network Process (ANP) method. Where the use of the ANP concept is able to facilitate the linkages and feedback from each cluster of BSC perspectives and Key Performance Indicators (KPI) variables to produce priority weighting of each BSC perspective [3].

1.1 Balanced Scorecard (BSC)

The Balanced Scorecard (BSC) is a strategic management approach that was first introduced by [5] aimed at measuring the performance of a company. The use of the BSC approach is able to provide organizational management with knowledge, skills and systems that allow employees and management to learn to develop consistently in fostering innovation in order to be able to build appropriate strategic capabilities, as well as to encourage development which leads to an increase in the value of shares [4].

1.2 Strategy Map

According to [6], the strategy map is used to describe the process of value creation through a series of causal relationships between strategic objectives in four BSC perspectives. The four perspectives are financial perspective, market perspective, internal process perspective and learning and growth.

1.3 Key Performance Indicators (KPI)

According to [5] it has been described that all indicators in the BSC must use a certain generic size. This generic measure is notated as the main measure of organizational performance results that reflect common goals. These generic measures are more likely to be categorized as lag indicators such as profitability, market share, customer satisfaction, customer retention and employee expertise.

1.4 Interpretive Structural Modelling (ISM)

ISM is a methodology that helps in identifying relationships between certain items, which are able to define a problem. The model developed by ISM depicts complex problem structures, field systems of study, in patterns that are carefully designed using graphics and words.

1.5 Analytical Hierarchy Process (ANP)

ANP is an analysis tool that is able to represent the level of importance of various elements by considering the relationship of dependence between criteria and sub-criteria [9]. The main concept of ANP is the influence and ANP network is formed from the connection of several clusters which consists of criteria and alternatives [3]

2. METHODS

In this study, the object of the problem to be examined is the need to design performance indicators at the Directorate of Human Resources at Al Azhar University in Indonesia. The first stage is conducting a brief interview related to the scope of HR management. The next step is to design strategic objectives for the four BSC perspectives based on primary and secondary data. The next stage is the implementation of data processing using approaches and tools related to research, namely ISM and ANP, and analyzing the results obtained. The last step is drawing conclusions from the results of the analysis.

3. RESULTS AND DISCUSSION

3.1 Data Collection

In designing performance indicators based on the BSC for the Directorate of Human Resources at Al Azhar University, Indonesia, firstly, determining strategic performance targets based on the four BSC perspectives namely financial, customers / stakeholders, internal business processes, and growth and learning. The identification of strategic objectives for the four perspectives is based on brainstorming with relevant experts and secondary data collection. The secondary data needed in the determination of the strategic objectives of the UAI HR Directorate is the 2019 UAI HR Directorate Work Program Work Plan Report and the UAI HR Organization Job Description.

3.2 Data Processing

3.2.1. Design of Strategy Map Using Interpretive Structural Modeling (ISM). The purpose of using the ISM method is to help facilitate the classification of sub-elements based on their level of importance. The first stage in processing data using ISM is filling the Structural Self-Interaction Matrix (SSIM) with V, A, X, O assessments to determine the contextual relationships between perspectives examined in the design of BSC-based performance indicators in this study:

a. V, if the first A sub-element is affected compared to the Bth sub-element.
b. A, if the first B sub-element is affected compared to the A sub-element.
c. X, If the two sub elements that are compared together are affected.
d. 0, If the two sub-elements being compared are equally unaffected.

The filling out of the questionnaire was carried out by 3 experts namely UAI Deputy Rector II, UAI HR Director, Ka. Sub. Directorate of Planning and Employee Development. The following are the results of the processing of the inputting questionnaire into the initial SSIM using SisISM software:

Table 1. Initial structural self-interaction matrix (SSIM) sub element bsc perspective study (Result of the combination of three experts)

Perspective	Financial	Stakeholders	Internal Business Process	Learning Growth
Financial		V	A	X
Stakeholders			X	X
Internal Business Process				V
Learning and Growth				

Referring to the results of the initial SSIM, it will then be converted into the initial Reachability Matrix (RM). In converting the SSIM matrix to RM, the valuation values V, A, X, O will be changed to binary values of 0 and 1. The initial RM is converted to a transitivity matrix where the aim is to reduce the absence of relationships between sub-elements. The following are the final RM results:

Table 2. Final reachability matrix sub element **BSC** perspective study (results of the combination of the three experts)

Description of Sub-Elements (I-J)		1	2	3	4	**DP**
Financial	1	1	1	1	1	4
Stakeholders	2	0	1	1	0	2
Internal Business Process	3	0	0	1	0	3
Learning and Growth	4	0	1	1	1	3
Dependence (D)		1	3	4	2	
Level (L)		4	2	1	3	

Based on Table 2 shows the results of the final reachability matrix with total Driver Power (DP) based on the total of each row and the Dependency value (D) obtained based on the total of each column that will indicate Level (L). Based on the results of this interpretation, it is found that the sub-element with the highest amount of Dependency is the Learning and Growth Perspective (2), then the Customer Perspective (4), then the Internal Business Process Perspective (3), then the last is level 4 occupied by the Financial Perspective (1). Based on the results of processing using the ISM method generated grouping of variables, based on the value of the dependence and power drivers that have been presented previously. It was found that from the four BSC perspective sub-elements were classified into 2 quadrants, quadrant II (dependent) and quadrant IV (independent). Sub-elements included in quadrant II are dependent on other sub-elements, while sub-elements included in quadrant IV have the nature of the remainder of a system and are called free variables. Sub-elements included in quadrant II have a close relationship with other sub-elements, but are not the main actors/ activators of the system, or can be interpreted as a result resulting from other sub-elements. Sub-elements of the Customer Perspective and Learning and Growth Perspective are included in quadrant II. Meanwhile, for the learning and growth sub-elements entered into quadrant IV, where the sub-elements included in this quadrant have the nature of the rest of a system and are called free variables that include the Financial Perspective and the Internal Business Process Perspective.

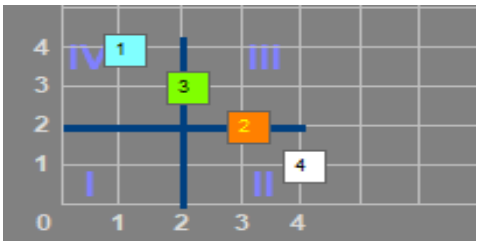

Figure 1. Power-dependence matrix graph (result of the combination of three experts)

Based on the ISM data processing, a hierarchy is divided into 4 levels based on the BSC perspective sub-elements. The following is the results of the hierarchy mapping based on ISM data processing.

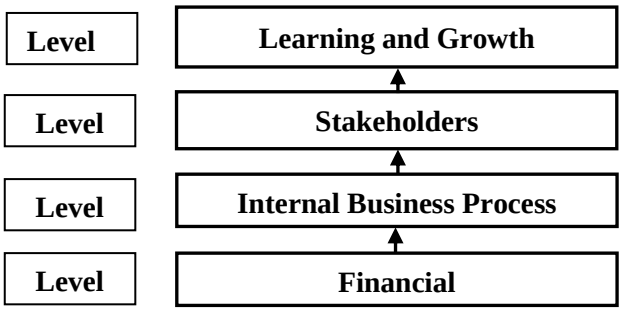

Figure 2. Structural model diagram of balanced scorecard perspective in directorate of HR UAI

The value of the DP results for each element will be defined as a global weight value for the four BSC perspectives that will be used as a multiplier weight globally in the weighting stage of the BSC perspective and BSC performance indicators in data processing using ANP. The purpose of determining global weights by referring to the DP results in the ISM method, is to produce an integration between mapping the strategy map using ISM and weighting performance indicators with ANP in this research study. This is intended so that the resulting weighting results in values that reflect the interests of each BSC perspective on the relevant and integrated strategy map. The following are the weighted results of the driver-power values based on ISM data processing for each BSC perspective:

Table 3. The BSC driver-power perspective weight

Perspective	Driver – Power	Driver – Power Weight
Financial	1	0.1
Stakeholders	2	0.2
Internal Business Process	3	0.3
Learning and Growth	4	0.4
Total	10	

3.2.2. Weighting of Performance Indicators with Analytical Network Process (ANP). The determination of KPI is done by referring to secondary data related to research, namely the 2019 UAI HR Directorate Work Program Work Plan Report and the UAI HR Directorate Functional Job Description. The results of the determination of the KPI will be re-validated against the relevant experts, namely by conducting brainstorming with members of the UAI HR organization. Each KPI variable will be used in the ANP Method to show the priority of performance indicators based on the perspective of the BSC at the UAI HR Directorate, with the aim of determining which perspective has the most significant interest in the development of the UAI HR organization. Weighing between BSC perspectives, strategic performance targets and KPIs using the Analytical Network Process (ANP) method. Where the use of ANP concepts from each cluster BSC perspective and Key Performance Indicators (KPI) variables to produce priority weighting interests of each BSC perspective [3]. In the weight of alternative priority perspectives, strategic objectives, and key KPIs selected for weighting the design of performance indicators is done using the help of the Super Decisions software. In processing data using the ANP method, the steps taken are inputting the results of all expert judgment aggregations into the comparison matrix questionnaire in the Super Decisions software. The next step that will be taken is to determine the global weighting of each BSC perspective, strategic objectives and key performance indicators. This calculation is done by integrating (multiplying) the results of the weight values obtained from ISM data processing, namely the value of the driver-power (DP) with local weights, the results of the normalized by cluster weight of the limiting matrix processing.

Table 4. Results of BSC perspective weighting

Perspective	Driver – Power Weight	Local Weight	Global Weight
Learning and Growth	0.1	0.2406	0.024
Stakeholders	0.2	0.1665	0.033
Internal Business Process	0.3	0.2849	0.085
Financial	0.4	0.3080	0.123

Based on the results of data processing using the Super Decisions software, it was found that the financial perspective has the highest priority as an alternative with a weight of 0.123, which when converted into a percentage value of 12.30%. The existence of this really reflects the actual conditions in the UAI HR Directorate, where based on the results of discussions and interviews, this work unit gives a great emphasis (emphasis) on the financial aspects.

Table 5. Results of weighing strategic perspectives of BSC

Perspective	Strategic Target	Driver – Power Weight	Local Weight	Global Weight
Learning and Growth	Improvement of innovation and governance on IT – based planning and development	0.1	0.238	0.024
	Increased HR competence	0.1	0.222	0.022
	Increased corporate awareness	0.1	0.225	0.022

Table 5. Results of weighing strategic perspectives of BSC

Perspective	Strategic Target	Driver – Power Weight	Local Weight	Global Weight
	Improved management governance and HR system	0.1	0.316	0.032
	HR suitability	0.2	0.327	0.065
Stakeholders	Increased employee satisfaction	0.2	0.341	0.068
	Increased employee satisfaction	0.2	0.331	0.066
	Increasing the quality of hiring	0.3	0.126	0.038
Internal	Improving the quality of recruitment & development of human	0.3	0.143	0.043
Business	Optimizing the implementation of orderly administration	0.3	0.175	0.053
Process	Welfare of all University employees	0.3	0.154	0.046
	Increased collaboration with	0.3	0.170	0.051
	Optimizing the Human Resource	0.3	0.232	0.069
	RKAT Efficiency	0.4	0.309	0.124
Financial	Effectiveness of managing benefits	0.4	0.265	0.106
	Optimization of normative rights	0.4	0.427	0.171

In the learning and growth perspective it was found that the goal of improving management governance and HR systems had top priority with a weight of 0.032. While the customer perspective found that the target of increasing employee satisfaction occupies first priority with a weight of 0.066. Furthermore, from the perspective of internal business processes, the highest weight is obtained for the HR system optimization target with a priority weight of 0.069. then in the financial perspective it is found that the optimization goal of normative rights of employees occupies top priority with a weight of 0.171. KPI weighting results based on ANP data processing can be seen in Table 6 to Table 9:

Table 6. Results of KPI weighting learning and growth perspective

Lead KPI	Driver – Power Weight	Local Weight	Global Weight
Website maintenance is done 2 times a year	0.1	0.082	0.008
Compliance with HRIS evaluation and recruitment modules	0.1	0.084	0.008
Comparative study of the HR Directorate once a year	0.1	0.074	0.007
HR Directorate internal training to 2 people each year	0.1	0.082	0.008
Debriefing for new employees is done	0.1	0.076	0.008
Competency training for 10 tendons	0.1	0.074	0.007
The annual employee gathering	0.1	0.073	0.007
Use of uniforms and name tags, given 1 set each year	0.1	0.076	0.008
Implementation of University values in the SOP of the Directorate of HR	0.1	0.076	0.008
Changes in the registration of staffing regulations that have been passed by the Ministry of Manpower	0.1	0.075	0.008
Implement the latest remuneration	0.1	0.076	0.008
Implement rewards system that has	0.1	0.075	0.008
The HR strategic plan has been update	0.1	0.075	0.008

Table 7. Results of KPI weighting of stakeholder perspective

Lead KPI	Driver – Power Weight	Local Weight	Global Weight
There are 6 lecturers per study program	0.2	0.101	0.020

Table 7. Results of KPI weighting of stakeholder perspective

Lead KPI	Driver – Power Weight	Local Weight	Global Weight
Adequacy ratio on lecturers	0.2	0.110	0.022
Adequacy of tendik employees by 20	0.2	0.111	0.022
The addition of the number of lecturers	0.2	0.121	0.024
The addition of employee promotions	0.2	0.103	0.021
The addition of 8 internship alumni	0.2	0.103	0.021
Increasing the number of work	0.2	0.103	0.021
A targeted survey of satisfaction to the tendency is completed every	0.2	0.138	0.028
The level of satisfaction of stakeholders toward the services of the HR	0.2	0.109	0.022

Table 8. Results of KPI weighting of internal business process perspective

Lead KPI	Driver – Power Weight	Local Weight	Global Weight
The availability of HR in accordance with the needs of the University	0.3	0.051	0.015
Availability of promotion, rotation	0.3	0.036	0.011
Recruitment SOP and functional UTP	0.3	0.031	0.009
Appraisal of superiors	0.3	0.021	0.006
Orientation, training and development programs are carried out every year	0.3	0.027	0.008
Evaluate the implementation	0.3	0.083	0.025
Employee award every December	0.3	0.030	0.009
Timelines of payroll and overtime every 21st of the month	0.3	0.105	0.031
Punctuality payment of BPJS	0.3	0.077	0.023
Accurate payment of BNI Simponi	0.3	0.066	0.020
All employees are registered	0.3	0.027	0.008
Timeliness of BPJS contribution	0.3	0.057	0.017
Timeliness of reporting to Kopertis	0.3	0.050	0.015
The level of administrative	0.3	0.058	0.017
Training based collaboration with third parties once a year	0.3	0.026	0.008
Timelines for recapitulation	0.3	0.038	0.011
Recapitulation of salary renewal	0.3	0.036	0.011
Availability of draft letters in a timely	0.3	0.051	0.015
There are no missing document	0.3	0.089	0.027
LPJ is completed in accordance	0.3	0.040	0.012

Table 9. Results of KPI weighting of financial perspective

Lead KPI	Driver – Power Weight	Local Weight	Global Weight
Timeliness of completion of the RAB to financial institutions in October	0.4	0.053	0.021
Implementation of budget control per 3 month	0.4	0.072	0.029
Benefits are paid	0.4	0.079	0.031
Pension savings/severance pay	0.4	0.079	0.032
Health assistance funds are paid	0.4	0.099	0.040
Medical check-up are done regularly	0.4	0.099	0.040
Social funds are given within the limits	0.4	0.090	0.036
Payroll is paid on time and on the right	0.4	0.135	0.054

Table 9. Results of KPI weighting of financial perspective

Lead KPI	Driver – Power Weight	Local Weight	Global Weight
Merit payment are paid on time	0.4	0.079	0.032
BPJS employment compliance is paid	0.4	0.079	0.031

4. CONCLUSION

Based on data collection and analysis results interpreted from data processing that has been carried out. Following are the conclusions drawn:

1. Referring to the results of the design of the strategy map for the UAI HR Directorate using the help of the ISM method with SisISM software, it can be described that the financial perspective is at the lowest level as a key element. Where at this level there are 3 strategic objectives whose purpose is to allocate management funds efficiently, and optimize the granting of normative rights to employees. If the funds are sufficient, and the allocation of funds is able to meet the funding needs of the work program, then at the next level namely the internal business processes will be fulfilled. The objectives rather than strategic objectives in the perspective of internal business processes are able to carry out organizational operations effectively and efficiently. Furthermore, if strategic objectives in internal business processes can be carried out effectively and efficiently, then it will further encourage customer satisfaction with the services provided by the organization. Where the increase in customer satisfaction will encourage increased motivation from employees, which in turn will increase productivity in the long run.
2. By conducting interviews and collecting secondary data, the Balanced Scorecard has been designed with perspectives arranged according to the results of the strategy map drawing. 16 strategic objectives were obtained for all four perspectives as a whole, from which these targets have been broken down into their respective main KPIs, with a total of 53 to setting targets for 2019.
3. The results of data processing using ANP using Super Decisions software obtained priority BSC perspective that is the financial perspective as an alternative with a weight of 0.123. At the level of strategic objectives, at the financial perspective it is found that the optimization goal of normative rights of employees occupies top priority with a weight of 0.171. The highest priority weight is generated on the KPI variable related to the accuracy of timely and precise employee payroll calculations with a weight of 0.054, in order to optimize the fulfilment of employee normative rights.

5. REFERENCES

[1] Bush T and Middlewood D 2005 *Leading and Managing People in Education*. (London: SAGE Publication Ltd.)
[2] Eriyatno 1998 *Ilmu Sistem: Meningkatkan Mutu & Efektivitas Manajemen*. (Bogor: IPB Press).
[3] Fakhrina Z, Munandar MJ and Dirdjosuparto S 2017 Evaluasi Implementasi Balanced Scorecard Pada Departemen Manajemen IPB Sebagai Program Studi Berbasis Kinerja. *Jurnal Manajemen dan Organisasi* **VIII**(2), Agustus 2017
[4] Gasperz V 2002 *Total Quality Management*. (Jakarta: PT. Gramedia Pustaka Umum).
[5] Kaplan RS and Norton DP 1996 The Balanced Scorecard – Measures that Drive Performance. *Harvard Business Review*, January-February: 1.
[6] Kaplan RS and Norton DP 2004 *Strategy Maps: Converting Intangible Assets into Tangible Outcomes. (*Boston, Massachusetts: Harvard Business School Press).
[7] Mohd Nishat Faisal DK, Banwetm RS 2006 An Analysis of the Dynamics of Information Risk in Supply Chains of Select SME Clusters. *Vision: The Journal of Business Perspective*.
[8] Permana DJ 2018 Perancangan Sistem Pengukuran Kinerja Perguruan Tinggi Melalui Metode Academic Scorecard. *Jurnal Informatika:Jurnal Pengembangan IT (JPIT)* **03**(01).
[9] Saaty T 2005 *Theory and Applications of the Analytic Network Process*. (Pittsburgh (US): RWS Publications).