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Determining and Ranking the Indicators of Evaluating the Performance of Wood Industry-Employees

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Abstract

Performance measurement is an annual process that evaluates employee performance and productivity against predetermined goals. Performance management is a determining factor in raising salaries and promoting employees. It can accurately examine the skills, strengths, and weaknesses of employees. So, it is very essential. In this paper, indicators are determined based on a Balanced Scorecard (BSC) to evaluate the performance of wood industry employees. For this purpose, 47 indicators are suggested and investigated by a questionnaire, of which 38 are confirmed using the nonparametric Wilcoxon's signed-rank. The confirmed indicators are ranked using the TOPSIS and SAW methods. BCS has four dimensions, the dimension of growth and learning, the dimension of internal processes, the dimension of customer, and the dimension of finance. According to the results, the dimension of growth and learning is more important in the wood industry. Among the sub-indicators, the indicator of performing assigned tasks, the indicator of traffic and attendance, and the indicator of trust and responsibility are three critical indicators in the performance of wood industry employees.

Keywords: Employee performance evaluation, Technique for order preference by similarity to ideal solution, Simple additive weighting, Statistical method.

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1|Introduction

Today, many organizations have different performance management systems to be successful and be progressive. One of the critical issues in financial decision-making is performance measurement in all financial and non-financial organizations or companies. Weaknesses and strengths have been identified by performance evaluation, which helps firms make suitable decisions to conquer existing problems [1]. Performance measurement systems must be coordinated with company strategies. It is essential for achieving the purpose of the performance evaluation. Balanced Scorecard (BSC) and the European Foundation for Quality Management (EFQM) are two popular excellence methods [2]. BSC, first proposed by Kaplan and Norton in 1992 [3], helps companies to have a deep understanding of their position in the past and current [4]. Nowadays, many leading companies apply BSC to enhance the achievement of global purposes and improve their performance by connecting their subunits and members. BSC involves a balanced set of objectives and indicators, which is fine. BSC helps companies reflect their strategic vision, lead organizations to better communications (between members and objectives), result in better quality, reduce costs, increase incomes, enhance operating performance, and improve the performance of using the fund [5]. Financial and non-financial outlooks considered in BSC have been divided into four dimensions: a) customers, b) internal procedure, c) finance, and d) growth and learning. These four dimensions make organizations define and balance the general perspectives of business administration [1].

Multiple-Criteria Decision-Making (MCDM) is a branch of science that appraises multiple opposing criteria in decision-making. The purpose of MCDM is not to propose the best solution but to support decision-makers in choosing the most appropriate alternative that complies with their needs and is in line with their distinctions. There are many MCDM approaches that can be expanded and accomplished successfully [6]. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) is one of the broadly applied MCDM approaches with simple mathematics [7]. Nazari-Shirkouhi et al. [8] presented a hybrid MCDM based on two fuzzy MCDM approaches. Quezada et al. [9] applied Analytical Network Process (ANP) and Strengths-Weaknesses-Opportunities-Threats (SWOT), Barati and Rashidi [6] employed fuzzy AHP and fuzzy TOPSIS, Esfahanipour and Davari-Ardakani [1] used different MCDM approaches, including TOPSIS.

In this article, the employee performance evaluation indicators of the north wood industry are determined based on BSC. The obtained indices have been analyzed using statistical methods and prioritized by applying the TOPSIS and SAW methods.

2|Literature Review

Since the emergence of BSC in 1992 and the confirmed effectiveness of this method, much research has been done in this area. For instance, Frederico et al. [10] developed a theoretical approach related to performance measurement in supply chains in the Industry 4.0 era based on BSC. However, their proposed theoretical framework requires more empirical research to be validated. Quesado et al. [11] proposed a theoretical basis for BSC. They concluded that BSC is a simple and suitable performance assessment system. BSC aligns strategic and organizational learning. Tuan [12] measured the performance of Vietnamese commercial banks using BSC by analyzing the opinions of 109 managers. The performance of water and wastewater companies in Iran was evaluated by Data Envelopment Analysis (DEA) and Grey Relational Analysis (GRA) approaches based on the BSC method [4]. In another study, 202 Malaysian firms were investigated to identify the communication between the determinants of innovation and internationalization based on BSC using Structural Equation Modeling (SEM), which resulted in the emergence of trust, knowledge, opportunity development, and commitment as dimensions of internationalization [13]. In the other study, DEA and BSC methods were integrated to choose appropriate measures. Six Iranian banks were studied to validate the new approach [14]. The performance of firms in the food industry was assessed by combining the two methods (SWOT analysis and BSC) via a network

analytical process. However, the applied method took a lot of time, but it was beneficial enough [9]. Skovajsa et al. [15] evaluated the temporary Highway Management System (HMS) and examined it on the main highway in the Czech Republic during the road works period. Many other methods, especially MCDM approaches, have been used in the literature for ranking indicators and organizations. In one study, the Number-Analytic Hierarchy Process (NAHP) method has been used to evaluate and rank the indicators. This method is one of the popular MCDM approaches [16]. Performance audit is the other issue that was discussed and implemented in Indonesia considering BSC. Performance audit is a kind of behavioral survey that is similar to a survey of financial development. Economic, effectiveness, and efficiency are environmental audit concepts that lead to performance audits [17]. Sustainability has been given more attention in recent years, which were integrated into BSC. The presented sustainable BSC (SBSC) framework was studied in Italian companies, which is leading to adjusted SBSC (ASBSC), considering new aspects such as critical perspective [18]. Benkov et al. [19] investigated the importance of applying non-financial measures in performance measurement, which utilized BSC in six months. They also had other hypotheses about the relationship between lack of financial and human resources and BSC.

Esfahanipour and Davari-Ardakan [1] investigated performance evaluation in a holding company mentioned in the Tehran Stock Exchange using MCDM approaches, including TOPSIS. Keshavarznia and Vallace [20] investigated 20 experts from multiple banks in Iran to recognize the Key Performance Factors (KPFs) and objectives for the banking industry using BSC and Delphi methods. Nazari-Shirkouhi et al. [8] studied the services and activities provided by the university. The performance indicators were determined by making use of BSC. Also, they used the two methods of fuzzy MCDM and the Fuzzy Analytic Network Process (FANP) to propose a hybrid MCDM. Barati and Rashidi [6] ranked the factors of turnover intention in Iran's hotel industry using fuzzy AHP and fuzzy TOPSIS. They considered the dimensions related to the employees behavior in the COVID-19 epidemic in order to help the involved managers. Shahbeyk and Banihashemi [21] obtained the validity risk of the loan portfolio by stochastic recovery based on the short interest rate and beta distribution and Valu-at-Risk (VaR) was calculated. They used the Black-Sholes-Merton (BSM) model to measure the probability of default eighth stocks from different industries of the Iran stock exchange market. Ghea Setyo Nugroho et al. [22] distributed 70 questionnaires among textile companies in the Central Java region. They investigated the impact of top management obligation on operational performance through green purchasing and ISO-14000 accomplishments. Nezami et al. [23] studied the risk of BTO (one type of production under the control of governments) projects, determined the weights of indicators, and then graded the tactics and strategies. It is noticeable that they examined the performance of the presented approaches. The presented approaches deleted the contributions, such as calculations of criteria weights and expert weights. Adabavazeh and Nikbakht [24] studied reverse supply chain using DEA to determine the indicators of the airline industry. Then, they presented patterns for improving incompetent units based on the results. Traditional single-level techniques for evaluating have difficulties. So, Ghaziyani et al. [25] suggested the DEA technique. The technique was bi-level to evaluate the performance of bank branches. At first, the best factor was identified with the AHP method, and then the performance of 30 banks was evaluated. Afrasiabi et al. [26] proposed a new hybrid assessment framework for investigating the performance of eight important public sector organizations. For this reason, the BSC, the fuzzy Delphi method, the fuzzy best-worst method, and two fuzzy MCDM techniques were used. In one study, data from 453 employees were gathered to investigate the relationship between organic organizational structure, employee propensity to trust, service innovation, and behavior of sharing knowledge. The empirical analysis had good results [27]. In general, how managers evaluate workers and how companies use these assessments vary substantially. In one study, personnel data from six firms were gathered and examined, then subjective performance related to objective career outcomes were rated [28].

Some new and different studies have been done; for example, Guchait et al. [29] suggested stealing thunder, which was the self-disclosure strategy. They used hospitality managers to investigate the impact of stealing thunder on managers assessment of employee performance. In one study, the performance evaluation of EcoPorts was done in four phases. In the second stage, the fuzzy weighted average operator weighed the

criteria. It is noticeable that in the third stage, the criteria were ranked, and in the fourth stage, the sensitivity analysis was done [30].

According to studies, BSC is the perfect method to identify the factors or indicators. BSC has not been used in wood industry studies. So, we used this excellent method. Also, the MCDM approaches and fuzzy methods were used for ranking the indicators or the firms in the literature. So, we used TOPSIS, which is very suitable for our case. Also, based on studies, TOPSIS is the perfect method for ranking the indicators.

3 | Research Methodology

This research is applicable. It is descriptive-analytical. The study population of this research is the managers and employees of the north wood industry. The development of employee performance assessment indicators in chipboard and melamine factories and the wood industry has not received attention. Little research has been done in this field worldwide. The primary purpose of this research is to specify the best criteria for performance evaluation based on BSC for managing companies in the wood industry. First, the required information was collected from the company, such as the organizational structure of the company, duties description of employees, and the essential purposes of the company. According to four dimensions of BSC, duties of each employee, opinions of company experts, and related research, 47 indicators for the north wood industry (Gonbadkawoos, Iran) have been extracted. To determine proper indicators, a questionnaire containing 47 questions (based on the identified indicators) was prepared and distributed among the managers and supervisors of different company departments. There are different methods for calculating the reliability of questionnaires, including Cronbach's alpha method. In this method, the closer the α value is to 100%, the higher the reliability of the questionnaire. Cronbach's alpha test was used to assess the reliability of questionnaires (*Table 1* & *Figure 1*). Each questionnaire question has been scored in five options based on the Likert scale [12]. The gathered data were analyzed using the SPSS software (ver. 26). Kolmogorov-Smirnov's test has been used to know whether variables/indicators follow a normal distribution (*Figure 2*). So, based on the results of Kolmogorov-Smirnov's test, the indicators were identified. Using Wilcoxon's signed-rank test, identified indicators were rejected or accepted. The hypothesis "Index I is valid as an appropriate indicator to evaluate the performance of the company" has been tested by the Wilcoxon's signed-rank test. In the next step, the TOPSIS and SAW methods have been used to determine the rank of the accepted indicators of company performance evaluation. TOPSIS is one of the significant multi-criteria methods for decision-making [1]. TOPSIS provides two solutions, a positive ideal solution and a negative ideal solution, which maximize and minimize the profit and cost criteria, respectively. For *T* alternatives that should have been appraised according to *m* criteria, w_{ij} explains the quantity of the *i*th criterion for the *j*th alternative. These quantities for *i*=1,2,…*m* and *j*=1,2,…, *J* organize

$$r_{ij} = \frac{w_{ij}}{\sum_{j=1}^{J} {w_{ij}}^2}, \quad i = 1, \dots, m, \quad j = 1, \dots, J. \tag{1}$$

the elements of the decision matrix. The first decision matrix must have been normalized by Eq. (1):

Then r_{ij} is weighed by Eq. (2), and positive and negative ideal solutions are computed by Eqs. (3) and (4) respectively:

$$v_{ij} = w_{ij} \,.\, r_{ij}, \quad i = 1, \dots, m, \quad j = 1, \dots, J. \tag{2}$$

$$A^* = \{v_1^*, v_2^*, \dots., v_m^*\} = \{(\max v_{ij} \ / i \epsilon C'), (\min v_{ij} \ / i \epsilon C'')\}. \tag{3}$$

$$A^- = \{v_1^-, v_2^-, \dots., v_m^-\} = \{(\min v_{ij} \ / i \epsilon C'), (\max v_{ij} \ / i \epsilon C'')\}, \tag{4}$$

where C" and C' represent cost and profit criteria, respectively. So, the interval of each alternative from negative and positive ideal solutions is computed by Eqs. (5) and (6) respectively:

$$d_j^+ = \sqrt{\sum_{i=1}^{m} (v_{ij} - v_i^*)^2}\ , \quad j = 1, \dots, J. \tag{5}$$

$$d_j^- = \sqrt{\sum_{i=1}^{m} (v_{ij} - v_i^-)^2}\ , \quad j = 1, \dots, J. \tag{6}$$

The comparative closeness to the ideal solution is computed for each alternative as follows:

$$CC_j = \frac{d_j^-}{d_j^- + d_j^+}. \tag{7}$$

In the end, due to the relative closeness coefficients of alternatives, the alternatives are ranked in descending order.

4 | Results

As mentioned earlier, in this study, a questionnaire containing 47 questions was prepared and submitted to the company managers and supervisors to collect their ideas on appropriate indicators in each perspective of BSC. Cronbach's alpha test has been used to assess the reliability of the questionnaires (*Table 1*). According to *Table 1*, since the resulting alpha coefficient for the questionnaire is more significant than 0.7, it is clear that the relevant questionnaire has the desired reliability.

Table 1. Cronbach's alpha test.

Reliability Statistics	
Cronbach's Alpha	Number of items
0.939	47

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	17	100.0
	Excluded[a]	0	.0
	Total	17	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.939	46

Fig. 1. Cronbach's alpha test.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a]	Decision
1	The distribution of Traffic and attendance is normal with mean 5 and standard deviation .507.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
2	The distribution of Trust and responsibility is normal with mean 5 and standard deviation . 514.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
3	The distribution of Neatness and tidiness of the work environment is normal with mean 4.00 and standard deviation .70711.	One-Sample Kolmogorov-Smirnov Test	.002	Reject the null hypothesis.
4	The distribution of Perform assigned tasks is normal with mean 4.6 and standard deviation .4926.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
5	The distribution of Client satisfaction is normal with mean 4.00 and standard deviation 1.00000.	One-Sample Kolmogorov-Smirnov Test	.002	Reject the null hypothesis.
6	The distribution of Communication and cooperation is normal with mean 4.12 and standard deviation .78121.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
7	The distribution of Handle problems is normal with mean 4.29 and standard deviation . 58787.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
8	The distribution of Welcome new ideas is normal with mean 3.94 and standard deviation .89935.	One-Sample Kolmogorov-Smirnov Test	.014	Reject the null hypothesis.
9	The distribution of Creating high motivation and morale in people is normal with mean 4.12 and standard deviation .60025.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
10	The distribution of Creating a spirit of cooperation is normal with mean 4.18 and standard deviation .72761.	One-Sample Kolmogorov-Smirnov Test	.008	Reject the null hypothesis.
11	The distribution of Compliance with expectations is normal with mean 3.88 and standard deviation .92752.	One-Sample Kolmogorov-Smirnov Test	.072	Retain the null hypothesis.
12	The distribution of Observance of health and safety regulations at work is normal with mean 4.12 and standard deviation .78121.	One-Sample Kolmogorov-Smirnov Test	.021	Reject the null hypothesis.
13	The distribution of employee satisfaction is normal with mean 4.35 and standard deviation . 60634.	One-Sample Kolmogorov-Smirnov Test	<.001	Reject the null hypothesis.
14	The distribution of How to maintain supplies and tools is normal with mean 4.00 and standard deviation .86603.	One-Sample Kolmogorov-Smirnov Test	.016	Reject the null hypothesis.

Fig. 2. Some results of Kolmogorov-Smirnov's test.

Table 2. Results of nonparametric Wilcoxcon's signed-rank.

Indicator	Results of Nonparametric Wilcoxcon's Signed-Rank Test				
	Median	Test Statistics	Standard Error	Standardized Test Statistics	Significance Level (Sig)
Traffic and attendance	5	55	8.696	3.162	0.002
Trust and responsibility	5	45	7.5	3	0.003
Neatness and tidiness of the work environment	4	18	6.364	0	1
Performing assigned tasks	5	66	9.95	3.317	0.001
Communication and cooperation	4	17.5	5.534	0.632	0.527
Welcoming new ideas	4	27.5	10.29	-0.535	0.593
Creating high motivation and morale in people	4	16	5.292	0.378	0.705
Creating a spirit of cooperation	4	30	7.5	1	0.317
Compliance with expectations	4	36	11.619	-0.258	0.796
Employee satisfaction	4	35	7.5	1.667	0.096
Job skills	4	40	7.5	2.33	0.02
Effectiveness of training/training costs	4	18	7.794	-0.577	0.564
Identifying the educational needs of subordinates	4	27.5	13.565	-1.327	0.185
Problem handling	4	27	6.364	1.414	0.157
Observance of health and safety regulations at work	4	42	9.95	0.905	0.366
How to maintain delivery supplies and tools	4	42	12.619	-0.277	0.782
Product/service quality	4	17.5	4.287	1.633	0.102
Number of software defects in production	3	13	14.765	-2.675	0.007
Green production rate (pollution reduction rate)	3	3.5	11.04	-2.672	0.008
Machine downtime/Machine availability time	4	16.5	10.29	-1.604	0.109
Inventory reduction	3	16.5	15.264	-2.358	0.018
Inventory monitoring and forecasting	4	10.5	9.572	-1.776	0.076
Troubleshooting on a monthly basis	4	17.5	6.828	-0.073	0.942
Quality improvement	4	30	9.014	0.277	0.782
Equipment efficiency	4	22.5	6.364	0.707	0.48
Labor productivity	4	14.0	4.287	0.816	0.414
Rework	3	4.0	9.441	-2.489	0.013
Wastage	3	12.0	14.04	-2.386	0.017
Upgrading of laboratory equipment	3	11	18.782	-3.035	0.002
Service requests resolved within an agreed time period	4	15	7.5	-1	0.317
Customer satisfaction	4	31.5	9.253	0.432	0.666
Client satisfaction	4	30	10.553	-0.284	0.776
Timely delivery of the product	4	22.5	10.747	0.977	0.329
Quality of products	4	44.0	10.29	1.069	0.285
Reducing office automation costs	3	7	16.26	-3.26	0.001
Reducing design and repair costs	4	4.5	7.794	-2.309	0.021

Table 2. Continued.

Indicator	Results of Nonparametric Wilcoxcon's Signed-Rank Test				
	Median	Test Statistics	Standard Error	Standardized Test Statistics	Significance Level (Sig)
Percentage of equity returns	4	16.5	11.911	-1.889	0.059
Reducing transaction costs	3	0	11.911	-3.274	0.001
Property	4	5	9.014	-2.496	0.013
Debt ratio	3	4.5	12.319	-2.801	0.005
Cost of market research	4	3.5	9.579	-2.506	0.012
Distribution cost	3	0	12.319	-3.166	0.002
Product price	4	13.5	9.253	-1.513	0.13
Researching and identifying of products and suppliers	4	16	10.92	-1.557	0.12
Evaluation of tenders and auctions to select suppliers	4	8	10.92	-2.289	0.022
Negotiation of prices and agreeing on contracts	4	20	12.14	-1.565	0.118
Reducing of test costs	3	4.5	13.928	-2.944	0.003

According to the average scores of indicators given by the managers of different departments, the indicators were rejected or accepted. Based on the Kolmogorov-Smirnov's test results, these variables/indicators do not follow the normal distribution, so Student's t-test cannot be used. Therefore, nonparametric Wilcoxcon's signed-rank has been used. *Figure 2* shows the result. The nonparametric Wilcoxcon's signed-rank results approved the average index value to be four and above. The research hypotheses are defined as follows:

I. The Index I is not approved as a suitable index for evaluating the performance of employees in the company $H_0: \mu \leq 4$.

II. The Index I is approved as a suitable index for evaluating the performance of employees in the company $H_0: \mu > 4$.

In this test, μ is the average of expert opinion on the indicators. Nonparametric Wilcoxcon's signed-rank has been used to test these hypotheses. So, at the confidence level of 95%, 11 indicators (out of 47 the identified index) have been rejected by the above null hypothesis, and their opposite assumptions have been confirmed. *Table 2* shows the result of the nonparametric Wilcoxcon's signed-rank test. Therefore, the suitable and final approved indicators for evaluating the performance of employees are shown in *Table 3*.

Table 3. Approved indicators.

Scorecard View	Indicator	Median
	Compliance with expectations	4
	Employee satisfaction	4
	Job skills	4
	Effectiveness of training/training costs	4
	Identifying the educational needs of subordinates	4
Internal processes	Problem handling	4
	Observance of health and safety regulations at work	4

Table 3. Continued.

Scorecard View	Indicator	Median
	How to maintain delivery supplies and tools	4
	Product/service quality	4
	Machine downtime/machine availability time	4
	Inventory monitoring and forecasting	4
	Troubleshooting on a monthly basis	4
	Quality improvement	4
	Equipment efficiency	4
	Labor productivity	4
Customer	Service requests resolved within an agreed time period	4
	Customer satisfaction	4
	Client satisfaction	4
	Timely delivery of the product	4
	Quality of products	4
Finance	Reducing of design and repair costs	4
	Percentage of equity returns	4
	Property	4
	Cost of market research	4
	Product price	4
	Researching and identifying of products and suppliers	4
	Evaluation of tenders and auctions to select suppliers	4
	Negotiation of prices and agreeing on contracts	4

After testing the hypothesis and determining the final indicators, they have been ranked using the TOPSIS technique. Results of ranking based on the four dimensions of BSC are presented in *Tables 4-7*. *Table 4* shows the result of the TOPSIS technique for the dimension of the finance dimension of BSC, which shows the interval of each alternative from negative and positive ideal solutions related to Eqs. (5, 6), the comparative closeness to the ideal solution (Cli), and the rank of each indicator. *Table 5* indicates the result of the TOPSIS technique for the growth and learning dimension of BSC. *Table 6* is related to the internal processes dimension of BSC, and *Table 7* shows the customer dimension of BSC. Also, *Table 8* represents the ranking of all indicators determined. Indicators are ranked by the SAW method. The TOPSIS method is more precise than the SAW method.

Table 4. Ranking of finance dimension.

Indicator	Distance to the Positive Ideal	Distance to the Negative Ideal	Cli	Rank
Reducing of design and repair costs	0.28519	0.375179	0.568135	25
Percentage of equity returns	0.36094	0.327765	0.475915	30
Property	0.34577	0.322812	0.482831	29
Cost of market research	0.40406	0.250202	0.382419	36
Product price	0.38605	0.319096	0.452524	33
Researching and identifying products and suppliers	0.41268	0.302681	0.423116	34
Evaluation of tenders and auctions to select suppliers	0.42575	0.26747	0.385837	35
	0.3528	0.522618	0.596993	22

Table 5. Ranking of growth and learning dimension.

Indicator	Distance to the Positive Ideal	Distance to the Negative Ideal	Cli	Rank
Traffic and attendance	0.1148	0.51094	0.816	2
Trust and responsibility	0.1237	0.50042	0.801	3
Neatness and tidiness of the work environment	0.1998	0.42425	0.67	14
Performing assigned tasks	0.1053	0.5279	0.833	1
Communication and cooperation	0.1822	0.4538	0.713	8
Welcoming new ideas	0.2513	0.4146	0.622	19
Creating high motivation and morale in people	0.1951	0.4215	0.683	11
Creating a spirit of cooperation	0.1865	0.44879	0.706	10
Compliance with expectations	0.2302	0.44822	0.66	16
Employee satisfaction	0.1766	0.46434	0.724	7
Job skills	0.1533	0.49173	0.762	4
Effectiveness of training/training costs	0.2542	0.40197	0.612	10
Identifying the educational needs of subordinates	0.3633	0.36308	0.499	28

Table 6. Ranking of internal processes dimension.

Indicator	Distance to the Positive Ideal	Distance to the Negative Ideal	Cli	Rank
Problems handling	0.1776	0.4788	0.7293	5
Observance of health and safety regulations at work	0.1928	0.46677	0.7075	9
How to maintain delivery supplies and tools	0.2176	0.43583	0.6669	15
Product / service quality	0.1692	0.45108	0.7271	6
Machine downtime / Machine availability time	0.3352	0.34941	0.5103	27
Inventory monitoring and forecasting	0.3458	0.29371	0.4592	32
Troubleshooting on a monthly basis	0.31437	0.42049	0.5722	24
quality improvement	0.2805	0.40808	0.5926	23
Equipment efficiency	0.2037	0.43883	0.6829	12
Labor productivity	0.1975	0.42165	0.6809	13

Table 7. Ranking of customer dimension.

Indicator	Distance to the Positive Ideal	Distance to the Negative Ideal	Cli	Rank
Service requests resolved within an agreed time period	0.23721	0.421224	0.639736	18
Customer satisfaction	0.34628	0.387414	0.528032	26
Client satisfaction	0.23672	0.433508	0.646807	17
Timely delivery of the product	0.411533	0.305029	0.425684	31
Quality of products	0.28268	0.438483	0.608022	21

According to *Table 4*, in the TOPSIS technique, the indicator of performing assigned tasks has first rank. Howevre, in the SAW technique, the indicator of the observance of health and safety regulations at work has first rank. The indicator of traffic and attendance has the second rank in the TOPSIS technique, but several indicators have the second rank in the SAW technique. The indicator of traffic and attendance, the indicator of neatness and tidiness of the work environment, the indicator of performing assigned tasks, the indicator of effectiveness of training/training costs, the indicator of service requests resolved within an

agreed period, and the indicator of quality of products have second rank. So, it is evident that the TOPSIS technique is better than the SAW technique.

According to the results of the TOPSIS technique, among the four main dimensions of BSC, the dimension of growth and learning is superior to other dimensions, and between the indicators, the indicator of performing assigned tasks, the indicator of traffic and attendance, the indicator of trust and responsibility were very important in the performance of north wood company employees. Also, results of the SAW technique indicate that the dimension of growth and learning is better than other dimensions, and the indicator of observance of health and safety regulations at work is the best indicator.

Table 8. Ranking of indicators by SAW.

BSC View	Indicator	A*	SAW
Growth and learning	Traffic and attendance	0.3759	2
	Trust and responsibility	0.3759	2
	Neatness and tidiness of the work environment	0.3007	6
	Performing assigned tasks	0.3759	2
	Communication and cooperation	0.3379	4
	Problem handling	0.3289	5
	Welcoming of new ideas	0.2537	10
	Creating high motivation and morale in people	0.2909	7
	Creating a spirit of cooperation	0.3379	4
	Compliance with expectations	0.3477	3
	Employee satisfaction	0.3289	5
	Job skills	0.3289	5
	Effectiveness of training/Training costs	0.3759	2
	Identifying the educational needs of subordinates	0.3289	5
Internal processes	Observance of health and safety regulations at work	0.4229	1
	How to maintain delivery supplies and tools	0.2537	10
	Product/service quality	0.3289	5
	Machine downtime/Machine availability time	0.3289	5
	Inventory monitoring and forecasting	0.2909	7
	Troubleshooting on a monthly basis	0.2819	8
	Quality improvement	0.3289	5
	Equipment efficiency	0.3289	5
	Labor productivity	0.2818	9
	Rework	0.3379	4
	Improvement of laboratory equipment	0.2537	10
Customer	Service requests resolved within an agreed time period	0.3759	2
	Customer satisfaction	0.3289	5
	Client satisfaction	0.2537	10
	Timely delivery of the product	0.1409	11
	Quality of products	0.3759	2
Finance	Reducing of design and repair costs	0.2909	7
	Percentage of equity returns	0.2537	10
	Property	0.2909	7
	Cost of market research	0.2909	7
	Product price.	0.3289	5
	Researching and identifying of products and suppliers	0.2909	7
	Evaluation of tenders and auctions to select suppliers	0.3007	6
	Negotiation of prices and agreeing on contracts	0.3379	4

5|Conclusion Remarks

Today, performance measurement is considered one of the most critical issues that has attracted the attention of managers as it plays a crucial role in the success and growth of companies. BSC is one of the most widely used performance appraisal techniques to examine the organization's performance from

different aspects. Based on this method, it is necessary to define the indicators of performance evaluation. In this study, 47 applicable criteria/indicators were extracted for the north wood industry with a library review, the company expert opinions, a researcher-made 47-item questionnaire and Wilcoxon's signed-rank test. To specify the appropriate indicators, a questionnaire was prepared and provided to managers and supervisors of different company departments. Thereby, gathered data has been analyzed using the SPSS 26 statistical software to reject or accept the identified indicators with Wilcoxon's signed-rank test.

Therefore, suitable indicators for evaluating the performance of the north wood industry are identified. Also, a suitable scorecard model for the company is designed. The gained indicators are ranked using the TOPSIS and SAW techniques. According to the research results, among the four main dimensions of BSC, the dimension of growth and learning is superior to other dimensions. Among the indicators, the indicator of performing assigned tasks, the indicator of traffic and attendance, and the indicator of trust and responsibility are very important in the performance of the north wood company employees.

For future research, other MCDM approaches, such as fuzzy MCDM, can be used. Training programs, providing employee satisfaction, offering unique and new services to customers in a way that meets their needs and expectations results in a productivity increase of processes, activities and better performance.

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