

Determining and ranking organizational commitment factors in knowledge-based organizations using the multi-objective Gray Wolf Optimizer (MOGWO)

Ruhollah Sohrabi^a, Vahid Chenari^{a,*}, Mohammad Hemati^b, Mehrdad Hamrahi^c

^aDepartment of Public Administration, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

^bDepartment of Management, Semnan Branch, Islamic Azad University, Semnan, Iran

^cDepartment of Management, Kazerun Branch, Islamic Azad University, Kazerun, Iran

(Communicated by Asadollah Aghajani)

Abstract

Some of the important and effective issues of HRM and senior managers of knowledge-based organizations are maintaining and improving the commitment level of employees who are the most valuable resources of these organizations. So, this study was conducted to determine and rank organizational commitment factors in knowledge-based organizations using the multi-objective gray wolf optimizer (MOGWO). The study was conducted using a mixed method (qualitative and quantitative) and is applied in terms of objectives and descriptive. The statistical population was selected using exploratory factor analysis (EFA) and included 200 senior managers of knowledge-based companies in Tehran and Alborz provinces, and the sample size was calculated as 132 using Cochran's formula. The best employee commitment (optimal) factors, which were 42 factors, were determined using the MOGWO. Finally, the SWARA method was used to weigh and rank the principal and sub-components from the opinions of 16 experts who were selected by purposive sampling, and it was found that corporate culture is the most important aspect of optimizing employee commitment in knowledge-based organizations. In today's changing and highly competitive environment, organizations must focus more on employee commitment to survive. Besides, knowledge-based organizations should use process re-engineering in human resource processes and working conditions to improve employee commitment levels.

Keywords: organizational commitment, multi-objective optimization, gray wolf optimizer (GWO), knowledge-based organizations

2020 MSC: 90C29

1 Introduction

Critically, organizational commitment has appeared significantly in the literature on organizational behavior and has become one of the challenges of organizations, greatly affecting the relationship between the work environment

*Corresponding author

Email addresses: roholasohrabi@yahoo.com (Ruhollah Sohrabi), vahid.chenari@iau.ac.ir (Vahid Chenari), mo928hem@yahoo.com (Mohammad Hemati), mehrdadhamrahi@gmail.com (Mehrdad Hamrahi)

and employee performance. Organizational commitment may concern a sensitive factor that links employees with the organization and contributes to improving organizational success [10]. The prominence of organizational commitment due to this issue is a challenge facing HRM and has made it important to develop and implement policies and practices that strengthen organizational commitment. Organizational commitment is an indicator that reflects the human resource management practices used in the organization, enabling the organization to create psychological links between organizational goals and employees [37]. According to Letchmiah and Thomas [22], employees perceive that organizations ignore them as assets, thus increasing employee turnover. Talented employees significantly contribute to organizational success. Evidence suggests that employees with high levels of motivation and commitment are likely to stay with the organization for longer. Organizations invest heavily in recruiting and selecting employees and then over time even more in training and developing them. Organizations need to retain trained employees to stay on the job for maximum time and contribute to the success of the organization to get a return on such investment. Losing good employees will reduce productivity and work quality, imposing direct (replacement, training, and management time) and indirect (morale, cooperation, and pressure on remaining employees) costs on the organization [34]. Current organizational commitment research programs show the complexity of organizational commitment in recent decades, and the results of surveys indicate the high importance of studies in different domestic and international scenarios to solve the problem of organizational commitment [21]. Experts argue that the lack of attention and sufficient study on the individual interaction of employees and their organizational commitment leads to a lack of commitment, reduced level of commitment, and poor results in individual performance. More importantly, the decrease in the level of organizational commitment has important consequences for organizations, some of which are weak turnover of the organization, increased absenteeism, unwillingness to stay in the organization, reduced customer confidence, and, subsequently, loss of organizational income. Organizational goals will be met if the employees strive. However, they will strive if they are committed to the organization [24]. The establishment of knowledge-based companies is a prerequisite for success to achieve development goals faster due to the importance of knowledge in today's highly competitive environment [39]. Talented and loyal manpower is the main key to success in the knowledge-based economy where having a competitive advantage differentiates the company from other companies. Accordingly, knowledge-oriented companies pay special attention to employees, especially their knowledge workers, seeing them as their most valuable capital [6]. To encourage their knowledge workers to stay, knowledge-based companies must take measures, an important part of which is talent management activities. However, the evidence indicates that most knowledge-based companies in Iran are facing the problem of not adopting talent management strategies, resulting in leaving the organization by knowledge workers and the lack of talented people to occupy strategic positions in the organization. This has significantly limited the growth capability of these companies. So, this study was conducted to determine and rank organizational commitment factors in knowledge-based organizations using the multi-objective gray wolf optimizer (MOGWO). For this purpose, organizational commitment factors were first extracted from the literature, and the bi-objective feature selection problem was then solved using the Pareto archive-based MOGWO to select the optimal organizational commitment factors. Finally, the principal components of the commitment model were determined and categorized using factor analysis, the factors in the model were ranked using the fuzzy SWARA method, and their importance and priority were determined.

2 Literature review

Nowadays, human resources are recognized by everyone as an important resource for achieving competitive advantage. Organizations adopt several policies and procedures to retain their talented employees for a long time. Thus, employee retention is recognized as one of the key drivers for organizational success, along with reducing unnecessary costs and improving employee motivation and capabilities [2]. Employee retention is one of the biggest challenges of the 21st century. So, the factors affecting the retention of human resources and organizational commitment have been examined by many researchers [13]. Az [4] studied the relationship between employees' organizational commitment and the performance of the banking sector in Lahore, Pakistan. The results showed that there is a positive relationship between affective, normative, and continuance commitment with employee performance. In a study by Kaur [18], employee retention models and factors affecting employee retention in IT companies were investigated. In this study, an attempt was made to examine various issues concerning employee retention in IT companies operating in India. According to the results of the model review, retention strategies enable organizations to provide effective employee communication to improve commitment and increase workforce support for key company initiatives. When organized and published in an easy-to-use format, these policies can prevent many misunderstandings between employees and employers about their rights and obligations in the workplace. Green recruitment as a new approach to attracting and retaining talent was reviewed by Aranganathan [3]. The results suggested that green HRM practices such as green recruitment create a positive view of employees towards the organization, thus increasing their commitment.

Rawshdeh et al. [33] studied the effect of socially responsible HRM practices on talent retention, arguing that the adoption of socially responsible human resource management practices as different CSR practices can affect organizational workforce retention through different processes and also affect stakeholders in different ways. In a study to examine the relationship between organizational commitment, job satisfaction, and performance in Pakistani industries, Qureshi et al. [32] showed that normative commitment is the most effective form of organizational commitment in Pakistani industries, while continuance commitment is the least effective. Moreover, job satisfaction affects all aspects of organizational commitment. Aburub [1] addresses the solution of employee retention and engagement and shows how an organization can find and retain talent. This study sought to measure the perception of employee retention and engagement and provide solutions in a specific environment. The results showed that, although salary and benefits are important, money alone cannot be relied upon to attract and retain qualified employees. However, companies should not overlook key factors in attracting and retaining employees such as a challenging and stimulating work environment, opportunities to learn and grow, good supervision, and great people to work with. In a study by Onyeaku [29], a systematic literature review was made to answer the question of how organizations can effectively use performance evaluation systems and competent evaluators to retain knowledge workers. The results indicated that knowledge-based organizations will be able to improve and increase employee commitment if they effectively use performance evaluation systems and competent evaluators to improve the retention of knowledge workers. Monteiro et al. [28] examined the effect of the business brand on the attraction and retention of talent and provided a model accordingly.

The relationship between employee retention and organizational performance was investigated by Khan [19]. According to the results, employee commitment is affected by variables such as career development, supervisor support, work environment, and rewards, which lead to the reflection of how they affect employee retention, that is, their effect on employee retention, which ultimately affects organizational performance. Mabaso et al. [26] stated that reward, work-life balance, performance management system, training and development improvement, employee recognition, and career advancement opportunities significantly affect retaining knowledge workers in the consulting industry. In a study by Ilmia et al. [16], the effect of green HRM (GHRM) on the attraction of the Indonesian millennial workforce was examined. The results showed that the millennial workforce is attracted to industries where GHRM strategies are adopted to measure work performance, indicating that companies that focus on environmental sustainability goals and practices and have more innovative green training programs are more attractive to millennials. Liu et al. [23] conducted a study to investigate the retention of teachers in rural China and found that the shortage of young teachers in rural schools is mainly due to social spillover caused by the need to adjust and change professional roles in rural schools rather than the insufficient supply of teaching manpower. The analysis of teacher shortage in rural schools showed that the nature of the long-term shortage is changing the professional role of teachers in knowledge, capabilities, and emotional conflicts.

According to Carleton et al. [6], some strategies for motivating and retaining employees include providing challenging and meaningful work, creating opportunities for learning and career development, ensuring adequate resources, identifying partnerships, and creating a supportive environment. In a study by Chatzoudes [7], a conceptual framework for factors affecting employee retention was proposed. The findings indicated that employee commitment and job satisfaction significantly affect the increase in employees' intention to stay in the company. The findings also show that companies need to develop supportive work relationships, a good organizational climate, and supportive HRM practices. Employee retention can be indirectly affected by focusing on general working conditions (e.g., work environment, supervisor support) and HRM initiatives (e.g., career opportunities). According to Ghani et al. [13], employee retention depends on employee satisfaction, which includes four factors as follows: stable positive work environment, a stable growth opportunities, stable and effective communication, and stable and effective recruitment practices.

According to the above table, many researchers have investigated the relationship between organizational commitment and employee retention in different organizations in different years and especially in recent years, indicating the necessity of conducting studies in this field. However, only a few researchers have investigated factors such as social responsibilities, corporate brand, and principles of sustainability and greenness. The distinguishing feature of this study is the consideration of social responsibilities, corporate brand, and the principles of sustainability and greenness in addition to the factors examined in previous studies. Unlike the previous study, it did not limit itself to a small number of factors and comprehensively considered the factors affecting organizational commitment and employee retention.

This study examined organizational commitment in knowledge-based organizations in Iran. This topic has only been investigated by Peikarnegar et al. [30] and Hosseini Tabaghdehi [14].

In terms of the solution method, this study first determined the factors affecting organizational commitment by deeply searching the theoretical foundations and then identified the optimal organizational commitment factors using

Table 1: Explanation of the research gap

Reference	Organizational commitment	Social responsibilities	The principles of sustainability and greenness	Corporate brand	Factor analysis	Multi-objective optimization	Metaheuristic algorithms	Multi-criteria decision-making	knowledge-based companies
[18]	*								
[33]	*	*							
[3]	*		*						
[32]	*								
[1]	*								
[29]	*								*
[28]	*	*			*				
[19]	*				*				
[26]	*				*				
[16]	*		*						
[23]	*								
[6]	*								*
[7]	*								
[13]	*	*	*						
The present study	*	*	*	*	*	*	*	*	*

the multi-objective gray wolf optimizer (MOGWO) as a feature selection approach. After choosing the optimal features or factors, factor analysis was used to categorize the factors in the principal components and provide the organizational commitment model. Finally, the factors were weighted using the SWARA method. As can be seen in the table above, the Delphi technique and factor analysis have been used in some studies in this field, but this problem has not been studied as a multi-objective feature selection problem using multi-objective metaheuristic algorithms and the SWARA method. So, this study differs from previous studies and is innovative in terms of the data analysis method.

3 Methodology

This is an applied study in terms of objectives, descriptive in terms of the data collection method, and mixed (qualitative and quantitative) in terms of the data analysis method. The statistical population included senior managers of knowledge-based companies in Tehran and Alborz provinces who have master's and Ph.D. degrees and at least ten years of management experience and are active in the following fields:

- Biotechnology
- Medicines and advanced products for diagnosis and treatment (synthetic, herbal, natural, cellular, tissue engineering, and biotechnology)
- Advanced materials and products based on chemical technologies
- Advanced machines and equipment and related specialized software and systems
- Medical supplies, supplies, and equipment
- Electrical, electronic, laser, and photonics hardware
- ICT and computer software
- Commercialization services

The number of these companies in Tehran and Alborz provinces was 3745, which were selected by simple random sampling. In this method, the required people of the statistical population (senior managers of companies with master's and Ph.D. degrees with 10 years of management experience) who have been selected for this purpose and all members of the statistical population who have the same chance of selection are randomly selected. Cochran's formula was used to determine the size of the sample members that all have equal chances. Then, the appropriate formula for n was as follows.

$$n = \frac{N \times Z_{\alpha/2}^2 p(1-p)}{d^2 (N-1) + Z_{\alpha/2}^2 P(1-P)} \quad (3.1)$$

The number of people in the statistical population who met the mentioned conditions was reported as 200 in this study. Considering $N = 200$, the sample size was calculated using Cochran's formula as 131.755, which was considered as 132.

$$\frac{200 \times 1.96^2 \times 0.5 \times 0.5}{0.05^2 \times 199 + 1.96^2 \times 0.5 \times 0.5} = 131.755$$

The validity of the questionnaires used in this section was checked using Cronbach's alpha, the value of which was 0.78. Since this value was more than 50%, the questionnaires were highly reliable and valid. The statistical population concerning the SWARA method included academic (associate professors and above) and organizational experts (managers of knowledge-based companies with Ph.D. degrees familiar with the SWARA method), and the sample size was determined to be 16 using purposive sampling. These people completed questionnaires specific to the SWARA method. The reliability of questionnaires concerning the SWARA method was checked using the test-retest method. The questionnaires were sent twice to one of the experts (with the academic rank of professor) who could be accessed again. The total correlation between the answers announced by the expert for both stages was 0.785, indicating the acceptable reliability of the questionnaires. MOGWO, factor analysis, and the SWARA multi-criteria decision-making approach were used to analyze the data.

3.1 Feature selection optimization model

This study sought to provide an optimal model for selecting the best features (factors) affecting the organizational commitment of human resources in knowledge-based organizations in Iran. It should be noted that the way of displaying the solution plays a vital role in the performance of the algorithms to find different points of the solution space of the problem. Furthermore, matching the operators of each algorithm with this solution structure is an inevitable part of using any algorithm.

For the problem, two objective functions were considered as follows:

$$\min z1 = y_{fit} \quad (3.2)$$

$$\min z2 = N_f \quad (3.3)$$

Where y_{fit} is the prediction error calculated based on the decision tree technique.

$$y_{fit} = \text{Predict}(\text{tree}, x) \quad (3.4)$$

The prediction error was calculated and considered as the goodness of the solution after calculation and prediction based on the above command and the tree corresponding to the solution x . The smaller the error value, the better the solution.

As mentioned, x represents a feasible solution to the problem. In this study, a one-dimensional matrix with n cells ($n = \text{total number of the features}$) was used to display the solution, and the values of the cells were 1 (if the feature was selected) and 0 (if not).

N_f is the number of selected features calculated using the following equation.

$$N_f = \sum_{i=1}^N x_i \quad (3.5)$$

Where N is the total number of factors resulting from the Delphi technique.

besides, the constraint of the studied problem was as follows:

$$x_i = \{0, 1\} \quad (3.6)$$

In this way, the optimization model was as follows:

$$\min z1 = y_{fit}$$

$$\min z2 = N_f$$

So that:

$$\sum_{i=1}^N x_i \leq B$$

$$x_i = \{0, 1\}$$

where B indicates the maximum number of features that are allowed to be selected.

In each iteration, the algorithm requires a population of solutions. To select the population of the next iteration, the solutions in the population of that iteration and the new solutions generated by the algorithm are put together in a solution pool and N solutions that have the highest quality and dispersion are selected as the next iteration population of the algorithm using Deb's rules after leveling and calculating the crowding distance for each solution according to its level.

3.2 The SWARA method

Employing a group of experts to examine all aspects of a decision-making problem is inevitable due to its complexities. The SWARA method is one of the multi-criteria decision-making methods, the purpose of which is to calculate the weight of criteria and sub-criteria. In this method, experts (respondents) play an important role in determining the weight of the criteria.

4 Data analysis

In this study, organizational commitment factors in knowledge-based organizations were determined and ranked using MOGWO. The data were analyzed using MOGWO, factor analysis, and the SWARA method. The initial list of effective measures was prepared by comprehensively reviewing the literature on organizational commitment. After determining the organizational commitment criteria, MOGWO was used to determine the optimal features or criteria. The principal and sub-components of the organizational commitment model were then extracted using factor analysis. Finally, optimal factors in knowledge-based organizations were ranked and prioritized using the SWARA method.

4.1 Factors affecting organizational commitment

An in-depth literature review was done to determine the factors affecting organizational commitment. The initial list of the factors was prepared and provided to the members of the statistical sample to comment on the factors. After the survey, the final list of factors was prepared according to Table 2.

4.2 The results of pareto optimal feature selection by MOGWO

MOGWO was implemented in MATLAB to solve the model. Parameter tuning with the Taguchi L9 experiment design was used in Minitab software to select model solution parameters using the algorithm, the results of which are as follows:

The total number of features was 58 and the maximum number of selected features was 45 to solve the model. In the final implementation of MOGWO, the population size was 150, the number of VNS iterations was 5, and the number of algorithm iterations was 300. MOGWO with tuned parameters was implemented, and optimal features of organizational commitment were selected (Table 3). Since the feature selection model was multi-objective and the output of the algorithm was a set of solutions as a Pareto archive, the solution with the highest quality and dispersion was selected as the final solution according to the study by Deb [11].

The values of the objective functions of the final solution are given in Table 4.

4.3 The results of factor analysis

In the previous section, organizational commitment factors were identified using MOGWO. In this section, EFA was used in SPSS software to categorize the components into principal components. The results of data analysis initially suggested that 132 questionnaires completed by company managers were suitable for factor analysis. This was obtained due to the significant values of KMO and Bartlett's tests, which both confirmed the ability of scale items to perform factor analysis. The KMO test is specific to EFA, indicating whether the data are sufficient to perform EFA calculations. For this purpose, the KMO value should be greater than 0.50. In this case, the data are valid enough to continue the study. In this study, the KMO test value was 0.749 at the significance level of 0.000. This strongly confirmed the data for factor analysis (this value varies between 0 and 1, and the closer it is to 1, the more fit the data is for factor analysis). The value of Bartlett's test, judged at the significance level of χ^2 , is significant at the significance level of 0.001.

Table 2: The components of organizational commitment in knowledge-based organizations

Row	Component	References	Row	Component	References
1	Support and work-life balance	[31, 36, 26]	30	Corporate social responsibilities	[33? , 15, 8]
2	Career independence	[14]	31	Quality of work life	[12, 23, 27]
3	Job satisfaction	[14, 12, 25, 13]	32	Clarifying the company's mission, goals, and vision	[5, 28, 9, 13, 7]
4	Healthy work conditions	[12, 23, 13]	33	Teamwork	[1]
5	Job security	[31, 13]	34	Perceived organizational support	[17, 15]
6	Career advancement opportunities	[31, 36, 12, 23, 13]	35	Type of personality	[17]
7	Adequate salaries	[31, 36, 12, 23, 20, 19]	36	Talent management	[1, 13]
8	Special service compensation system	[31, 36, 23, 5, 13, 1]	37	Paying attention to sustainable development and greening of the organization	[27, 15]
9	Fulfillment of self-actualization needs	[31, 14, 12, 23, 5]	38	Corporate reputation	[28]
10	Management support	[36, 25]	39	Organizational trust	[13]
11	Meritocracy	[36]	40	Recognition	[26, 13]
12	Environmental opportunities	[36, 23]	41	HR policies	[1, 13]
13	Empowerment	[36, 7]	42	Employee requirements	[1]
14	Justice orientation and organizational justice	[14, 36, 13]	43	The company philosophy	[1]
15	Corporate culture	[36, 14, 5, 28, 1]	44	Self-awareness	[1]
16	Fit between job and employee	[36, 19]	45	Cultural competence	[1]
17	Job capabilities	[36]	46	Regulatory support	[19, 7]
18	job position	[36]	47	Workplace	[19, 7]
19	Participation in decision-making	[14, 12, 5]	48	Employee turnover	[19, 27]
20	Financial incentives and rewards	[14, 28, 13, 19, 26, 7]	49	Job participation	[19]
21	Management and leadership	[14, 38, 1, 13]	50	Employee performance	[26]
22	Corporate brand	[14, 28, 35, 15]	51	Social welfare	[27]
23	Labor market	[14]	52	Job stress	[9]
24	Job implications	[14, 23]	53	Perceived support from coworkers	[9]
25	Supportive laws and regulations	[14]	54	Organization's relationship with employees	[?]
26	Job motivation	[14, 23, 20, 1, 25]	55	Organizational climate	[7]
27	Flexible work hours	[14, 23]	56	Peer group interaction	[7]
28	Workflow	[14, 20, 25, 27]	57	The quality of the workplace	[7]
29	A sense of worth and usefulness	[14, 12, 23]	58	Customer orientation	[7]

Principal component analysis (PCA) with varimax rotation was used for factor analysis. Eight factors were deduced according to the results. The set of these factors explains more than 81% of organizational commitment based on the results of factor analysis. Optimal factors affecting organizational commitment were grouped into eight main categories as follows: reward system, organizational reputation, organizational strategy, corporate culture, HRM, working conditions, personality characteristics, and job attitude. Table 6 shows the principal and sub-components.

4.4 The Results of the SWARA Method

In the following, the sub-components were weighted using the SWARA method, the results of which are provided below.

According to the above table, corporate culture was ranked first with a weight of 0.212, corporate reputation was ranked second with a weight of 0.210, reward system was ranked third with a weight of 0.19, and HRM was ranked fourth with a weight of 0.147, was job attitude was ranked fifth with a weight of 0.127, personality factors were ranked sixth with a weight of 0.065, organizational strategy was ranked seventh with a weight of 0.029, and work environment

Table 3: List of optimal commitment factors in knowledge-based organizations

Row	Component	Row	Component
1	Career independence	22	A sense of worth and usefulness
2	Job satisfaction	23	Corporate social responsibilities
3	Job security	24	Clarifying the company's mission, goals, and vision
4	Career advancement opportunities	25	Teamwork
5	Adequate salaries	26	Perceived organizational support
6	Special service compensation system	27	Talent management
7	Management support	28	Paying attention to sustainable development and greening of the organization
8	Meritocracy	29	Corporate reputation
9	Environmental opportunities	30	Organizational trust
10	Empowerment	31	HR policies
11	Justice orientation and organization justice	32	Self-awareness
12	Corporate culture	33	Cultural competence
13	Job position	34	Regulatory support
14	Participation in decision-making	35	Workplace
15	Financial incentives and rewards	36	Employee turnover
16	Corporate brand	37	Job stress
17	Labor market	38	Perceived support from coworkers
18	Supportive laws and regulations	39	Organization's relationship with employees
19	Job motivation	40	Organizational climate
20	Flexible work hours	41	Peer group interaction
21	Workflow	42	The quality of the workplace

Table 4: The values of the objective functions

Objective functions	Values
$\min z1 = y_{fit}$	1.032
$\min z2 = N_f$	42

Table 5: KMO and Bartlett's tests

Test		Value
KMO		0.549
Bartlett's test	χ^2	1556.33
	df	946
	Sig.	0.000

was ranked eighth with a weight of 0.023. Moreover, the results of the ranking of the principal components showed:

Among the corporate culture factors, supportive rules and regulations were ranked first and the organization's relationship with employees was ranked last. Employee retention and corporate culture mutually affect each other. Employee retention transforms corporate culture, increasing competitive advantage [28]. Corporate culture is a focal point that affects employee commitment and participation in an organization. It is easy to understand but the most difficult to do. Studies on corporate culture and employee retention show that corporate culture is one of the important factors affecting employee retention [36, 14, 28, 5].

Among the corporate reputation factors, paying attention to the sustainable development and greening of the organization is ranked first and the corporate brand is ranked last. Since sustainable development and greening have become important slogans of organizations, managers argue that this component contributes more to the rise of corporate reputation than other components such as corporate brand.

Among the HRM factors, talent management is ranked first rank and employee turnover is ranked last. Talent management increases job satisfaction, creates a sense of recognition, etc., and is more important than other HRM factors according to experts and managers of knowledge-based companies.

Among the workplace factors, environmental opportunities are ranked first rank and the quality of the workplace is ranked last. The workplace is a very important factor for employee satisfaction, affecting the employees' perception of the organization. A favorable and environmentally protected workplace encourages and motivates employees to perform better, and this behavior is maintained throughout the day. Employees feel more satisfied and goal-oriented in the workplace where advancement opportunities are provided for them. Therefore, managers of knowledge-based

Table 6: The weight of the principal and sub-components of the commitment of knowledge-based organizations

Principal components	Weight	Sub-components	Weight
Reward system	0.19	Adequate salaries	0.529
		Special service compensation system	0.350
		Financial incentives and rewards	0.121
Corporate reputation	0.210	Justice orientation and organizational justice	0.0893
		Corporate brand	0.0172
		Corporate social responsibilities	0.2038
		Perceived organizational support	0.2585
		Paying attention to sustainable development and greening of the organization	0.3063
		The identity perceived by others (corporate reputation)	0.0289
Organizational strategy	0.029	Organizational trust	0.0960
		Clarifying the company's mission, goals, and vision	1
Corporate culture	0.212	Management support	0.163
		Dominant corporate culture	0.165
		Participation in decision-making	0.027
		Supportive laws and regulations	0.166
		Teamwork	0.163
		Cultural competence	0.083
		Perceived support from coworkers	0.137
		Organization's relationship with employees	0.024
		Peer group interaction	0.072
		HRM	0.147
Empowerment	0.236		
Talent management	0.286		
HR policies	0.195		
Employee turnover	0.011		
Working conditions	0.023	Career advancement opportunities	0.164
		Environmental opportunities	0.180
		Job position	0.131
		Flexible work hours	0.146
		Regulatory support	0.143
		Workplace	0.076
		Organizational climate	0.127
		The quality of the workplace	0.033
Personality factors	0.065	Job motivation	0.696
		A sense of worth and usefulness	0.031
		Self-awareness	0.273
Job attitude	0.127	Career independence	0.203
		Job satisfaction	0.224
		Job security	0.129
		Labor market	0.150
		Workflow	0.177
		Job stress	0.117

companies suggest that creating environmental opportunities gets a higher score than others.

Among the personality factors, job motivation is ranked first and a sense of worth and usefulness is ranked last. According to researchers, job factors such as job motivation, job satisfaction, job security, etc. affect organizational commitment and employee retention in an organization [38, 13]. Managers of knowledge-based companies argue that people with higher job motivation have more job satisfaction and that this element (job motivation) has a greater effect on the commitment of employees to knowledge-based organizations by strengthening job satisfaction and reducing job stress and job burnout.

Among the reward system factors, adequate salaries are ranked first and financial incentives and rewards are ranked last. By increasing job satisfaction, job motivation, job security, etc., adequate salaries increase organizational commitment in knowledge-based organizations. According to the managers of these organizations, this element has a higher priority than the other relevant factors.

Among the job attitude factors, job satisfaction is ranked first and job turnover and job stress are ranked last. Job satisfaction is considered the most important variable in the field of organizational behavior and is a factor in increasing efficiency and individual satisfaction among employees. Job satisfaction guarantees the job security of employees and affects employees' capabilities up to a 95% confidence level. Empowerment has become one of the concerns of managers today because managers have realized that people spend a third or more of their time at work.

Empowering employees increases power and dignity in the workplace. People who are aware of their capabilities are more willing to work, participate in work more, and are more committed to their organization.

5 Conclusion

This study was conducted to determine and rank organizational commitment factors in knowledge-based organizations using the multi-objective gray wolf optimizer (MOGWO). The study was conducted using a mixed method (qualitative and quantitative). In the qualitative phase, the factors affecting organizational commitment in Iranian knowledge-based companies were identified using a literature review as 8 principal components of the reward system, corporate reputation, organizational strategy, corporate culture, HRM, work conditions, personality factors, and job attitude, including 42 sub-components. In the quantitative phase, the components were first identified using EFA. The best features (factors) affecting the organizational commitment of human resources in knowledge-based organizations were selected using MOGWO. The identified components were ranked using the SWARA method. Corporate culture was recognized as the most important factor affecting organizational commitment. Corporate reputation is ranked second, reward system is ranked third, HRM is ranked fourth, job attitude is ranked fifth, personality factors are ranked sixth, organizational strategy is ranked seventh, and workplace is ranked eighth or last. However, studies on corporate culture and employee retention indicate that corporate culture is one of the important factors affecting employee retention and organizational commitment. What distinguishes this study from those by Az [4], Qureshi et al. [32], Monteiro et al. [28], and Khan [19] is that these studies examine the effect of organizational commitment on other variables. However, this study aims to maximize organizational commitment using artificial intelligence (AI) and MOGWO. Most of the previous studies, such as the study by Kaur [18], were only conducted with quantitative methods, or the study by Onyeaku [29] only used qualitative methods, while this study used a mixed approach (qualitative-quantitative) which is more valid. In the study by Chatzoudes [7], a conceptual framework for employee retention was proposed, but this study focused on optimizing employee commitment using MOGWO-based AI. One of the innovative aspects of this study is the use of AI, which can significantly reduce errors and increase accuracy. The decisions that AI makes at each stage are determined by previously collected information and a specific set of algorithms. Errors can even be reduced to zero if this is planned correctly. Moreover, humans are driven by emotions whether they like it or not. AI is devoid of emotions and very practical and logical in its approach. The big advantage of AI is that it has no biased view, ensuring more accurate decision-making. In this study, corporate culture was recognized as the most important component of employee commitment. Organizations should focus more on employee commitment to survive in today's changing and highly competitive environment. Previous studies indicate that "corporate culture" is one of the factors affecting employee commitment in organizations. This is important to the extent that a strong and distinct corporate culture is one of the key success factors for organizations. Corporate culture is the strongest driving force that affects an organization, as well as organizational variables such as organizational commitment and job satisfaction. Accordingly, managers of knowledge-based organizations are recommended to seriously consider the policy of continuous improvement to improve the corporate culture. Furthermore, policymakers and senior managers of knowledge-based organizations are advised to make efforts and plan for the fairness and appropriateness of the reward system in HRM. Knowledge-based organizations should use process re-engineering in HR processes and working conditions to improve employee engagement levels.

References

- [1] B. Aburub, *Employee retention and engagement solution*, Open J. Bus. Manag. **8** (2020), 2805–2837.
- [2] A. Aman-Ullah, A. Aziz, and H.A. Ibrahim, *Systematic review of employee retention: What's next in Pakistan?*, J. Contemp. Issues Thought **10** (2022), 36–45.
- [3] P. Aranganathan, *Green recruitment, A new-fangled approach to attract and retain talent*, Int. J. Bus. Manag. Res. **8** (2018), 69–76.
- [4] H. AZ, *Relationship between organizational commitment and employee's performance evidence from banking sector of Lahore*, Arab. J. Bus. Manag. Rev. **7** (2017), no. 2, 117–139.
- [5] P. Bhagia, *Dealing with the turnover tsunami: Strategies for attracting and retaining the best talent*, AJO-DO Clinical Compan. **2** (2022), no. 3, 209–212.
- [6] K. Carleton and C. Edmonton, *How to motivate and retain knowledge workers in organizations: A review of the literature*, Int. J. Manag. **28** (2022), no. 2.

- [7] D. Chatzoudes and P. Chatzoglou, *Factors affecting employee retention: Proposing an original conceptual framework*, Int. J. Econ. Bus. Admin. **10** (2022), 49–76.
- [8] S. Chen and Y. Ji, *Do corporate social responsibility categories distinctly influence innovation? A resource-based theory perspective*, Sustainability **14** (2022), 3154.
- [9] Y. Choi and Ch. Huynh, *Corporate purpose and its impact on an organization's ability to attract and retain talent*, Acad. Manag. Proc. **2021** (2021), 12706.
- [10] M. Davila and C. Andersen, *Labor practices and organizational commitment*, Ciencia Trabajo **20** (2022), 145–150.
- [11] K. Deb, A. Pratap, S. Agarwal, and T. Meyarivan, *A fast and elitist multi-objective genetic algorithm: NSGA-II*, IEEE Trans. Evol. Comput. **6** (2002), no. 2, 182–197.
- [12] E. Diana, M. Anis, and A. Anwar, *Creating the path for quality of work life: A study on nurse performance*, Heliyon **8** (2022), e08685.
- [13] B. Ghani, K. Memon, M. Zada, A. Khattak, L. Araya-Castillo, and R. Ullah, *Challenges and strategies for employee retention in the hospitality industry: A review*, Sustainability **14** (2022).
- [14] L. Hosseini Tabaghdehi, *A qualitative study of factors affecting the retention of academic staff in the university*, Human Res. Educ. Improv. Quart. **1** (2019), no. 1, 79–92.
- [15] A. Ikram, M. Fiaz, A. Mahmood, A. Ahmad, and R. Ashfaq, *Internal corporate responsibility as a legitimacy strategy for branding and employee retention: A perspective of higher education institutions*, J. Open Innov.: Technol. Market Complexity **7** (2021), no. 1.
- [16] A. Ilmia and M. Arquisola, *Is the Indonesian millennial workforce attracted to companies with green HRM strategies?*, Int. J. Appl. Bus. Res. **4** (2022), no. 2, 100–114.
- [17] T. Islam, Z. Ahmer, and N. Mushtaq, *Retaining talent: The role of the personal and contextual factors*, Lahore J. Bus. **8** (2019), 33–53.
- [18] R. Kaur, *Employee retention models and factors affecting employees retention in IT companies*, Int. J. Bus. Admin. Manag. **7** (2017), no. 1.
- [19] U. Khan, *Effect of employee retention on organizational performance*, J. Entrepreneur. Manag. Innov. **2** (2021), 52–66.
- [20] D. Kopp, *Recruiting, selecting, and retaining talent*, Human Resource Management in the Pornography Industry, Springer, 2020, pp. 15–25.
- [21] N. Leite, A.C. Rodrigues, and L. Albuquerque, *Organizational commitment and job satisfaction: What are the potential relationships?*, BAR-Brazil. Admin. Rev. **11** (2014), no. 4, 476–495.
- [22] L. Letchmiah and A. Thomas, *Retention of high-potential employees in a development finance company*, SA J. Human Resource Manag. **15** (2017), 1–9.
- [23] A. Liu, N. Liu, and A. Wang, *Why can't rural schools retain young teachers? An analysis of the professional development of rural school teachers in China: Taking teachers in rural western China*, Soc. Sci. Human. Open **5** (2022), 100238.
- [24] A. Loomis, K. Dreifuerst, and C. Bradley, *Acquiring, Applying and Retaining Knowledge Through Debriefing for Meaningful Learning*, Clinic. Simul. Nurs. **68** (2022), 28–33.
- [25] P. Lyons and R. Bandura, *Turnover intention: management behaviors to help retain talented employees*, Dev. Learn. Organ.: Int. J. **35** (2021), no. 5, 7–10.
- [26] C. Mabaso, M. Maja, M. Kavir, L. Lekwape, Sh. Makhasane, and M. Khumalo, *Talent retention strategies: An exploratory study within the consulting industry in Gauteng province, South Africa*, Acta Commer. **21** (2021).
- [27] G. Magaisa and A. Musundire, *Factors Affecting Employee Retention in Zimbabwean Companies*, Int. J. Appl. Manag. Theory Res. **4** (2022), 1–20.
- [28] B. Monteiro, V. Santos, I. Pinto dos Reis, M. Sampaio, B. Sousa, F. Martinho, M. Sousa, and M. Au-Yong Oliveira, *Employer branding applied to SMEs: A pioneering model proposal for attracting and retaining talent*,

- Information **11** (2020), 574.
- [29] J. Onyeaku, *How can organizations effectively use appraisal systems to retain knowledge workers? A systematic review of the literature*, *Muma Bus. Rev.* **4** (2020), 157–168.
- [30] A.H. Peikarnegar, Gh. Memarzadeh Tehran, and A. Peikarnegar, *The relationship between employee commitment and organizational performance in Iranian organizations*, *Nat. Conf. Manag. Human Sci. Res. Iran*, 2016.
- [31] A. Qamari, R. Zainabadi Hasan, H.M. Arasteh, and M. H. Behrangi, *Organizational productivity by retaining human resources talents: providing a model (case study: National Gas Company of Iran)*, *Sci.-Res. Quart. Econ. Urban Manag.* **6** (2017), no. 23, 67–80.
- [32] M.A. Qureshi, J. Qureshi, J. Thebo, Gh. Shaikh, B. Ghulam Mustafa, and Sh. Qaiser, *The nexus of employee's commitment, job satisfaction, and job performance: An analysis of FMCG industries of Pakistan*, *Cogent Bus. Manag.* **6** (2019).
- [33] Z. Rawshdeh, Z. Zain, and I. Ismail, *The influence of socially responsible-HRM practices on retaining talents*, *Int. J. Engin. Technol.* **7** (2018), 384.
- [34] J. L. Rodríguez-Sánchez, T. González-Torres, A. Montero-Navarro, and R. Gallego-Losada, R., *Investing time and resources for work-life balance: The effect on talent retention*, *Int. J. Environ. Res. Public Health* **17** (2020), no. 6, 2–14.
- [35] B. Sančanin, *The impact of branding on the efficiency of the process of attracting and retaining talented employees*, *Trendovi Poslovanju* **9** (2021), 107–115.
- [36] B.E. Sarfrazi, N.M. Yagoubi, M. Mohammadi and J. Jarhiri, *Presenting the model of effective factors on talent management in knowledge-based companies with an emphasis on the longevity of knowledge workers*, *Product. Manag.* **16** (2022), no. 60, 77–107.
- [37] A. Sendoghu, A. Kocaback, and S. Guven, *The relationship between human resource management practices and organizational commitment: A field study*, 9th Int. Strategic Manag. Conf., 2015.
- [38] N. Wilson, M. Verma, and A. Nanda, *Leadership in recruiting and retaining talent in academic dentistry*, *J. Dentistry* **87** (2019).
- [39] N. Yaghoubi, M. Dehghani, A. Derakhshan, N. Ghiyasi, and M. Omidvar, *Success drivers of new product development in knowledge-based companies*, *J. Bus. Admin. Res.* **14** (2022), no. 27, 27–45. [in Persian]