

# **Explaining the role of the components affecting the functions of artificial intelligence in the practice of human resource management**

**Sayed Baqir Mominian**

*Master's degree, Islamic Human Resource Management, Ardakan University*

---

## **Abstract**

*The current research is aimed at various types of applied research with a quantitative approach and based on the survey-correlation method. Data collection has been done using the library method and the standard questionnaire tool of human resources management. Cronbach's alpha coefficient was used to measure the reliability of the research tool, and confirmatory factor analysis was used to measure the validity of the research tool. The statistical population of the current research is 299 people from managers and human resources experts of knowledge-based companies active in Fars province, based on Cochran's formula, the sample size is equal to 168 people, and sampling was done through random classification method. Data analysis was done with Using structural equation method and path analysis by partial least square method and by using Smart-PLS 3 software. The findings show the confirmation of the research hypotheses and the positive and significant impact of the use of artificial intelligence on the performance of human resources management in dimensions (simulation, ability to do work, screening ability and not having unconscious bias). Therefore, it can be acknowledged that by facilitating and accelerating the process of collecting, screening and analyzing information related to human resource management in the organization, artificial intelligence makes it possible to make decisions, choose and act on time with minimal errors and costs.*

**Keywords:** *artificial intelligence, performance, human resource management*

---

Date of Submission: 16-05-2023

Date of acceptance: 30-05-2023

---

## **I. Introduction and statement of the problem**

In the last two decades, successful organizations consider employees as partners who, through optimal performance, improve the success rate of the organization's plans to achieve success. According to this approach, optimal performance is influenced by a wide range of variables such as how to organize, decision-making method, performance evaluation, leadership style, etc. The results of past research show that innovation capabilities are an important factor for competitiveness in organizations, so that innovation capabilities have a significant impact on company performance. Considering the accelerating speed of scientific, technological, social and cultural changes and developments, successful and efficient organizations are considered to be successful and efficient, which, in addition to being in sync with the developments of today's society, can also predict the path of changes and transformations in the future and are able to implement these changes in To lead to create desirable changes to build a better future (Yasin, 2018).

However, it should be noted that innovation is not a one-time phenomenon, but rather a continuous process consisting of the organizational decision-making process at all stages, from the development of a new idea to its application. The secret of the survival of today's companies is its innovation (Amram, 2017:25). Artificial intelligence is one of the new capabilities that has been widely noticed by managers of organizations and companies today. Artificial intelligence allows managers and decision makers to think and make decisions about things that were previously impossible to think about (Russel Norway, 2016). This has caused even non-technological companies to have the desire to use the opportunities provided by artificial intelligence, because artificial intelligence will help them achieve their business goals and form their profit and loss account. , how to use organization redesign, cost reduction, merger and acquisition, new product introduction and geographic expansion. However, many managers are still unaware or even distrustful of the benefits of artificial intelligence as a powerful tool that can be added to their toolbox. Therefore, the present research was conducted with the aim of answering this main question.

## **Basics and theoretical background of research**

Human resources is an important part of any organization whose performance and efficiency have a great impact on the entire organization. Human resource management is a strategic approach to attract, develop,

manage, create motivation and achieve the commitment of the organization's key resources; That is, the people who work in it or for it (Blenkhorn, 2007:27). Human resource management is a process that includes the four tasks of attracting, developing, motivating and maintaining human resources (Tang, 2020:22). The purpose of human resource management is the policies and actions required to implement part of the management task that is related to aspects of the employees' activities, especially for recruiting, training employees, evaluating performance, giving rewards and creating a healthy and fair environment for the organization's employees. (Jarek, 4:2019).

Artificial intelligence can help human resource management professionals in different ways. Artificial intelligence can predict a certain trend by using different data and information and according to the history of activities. In other words, artificial intelligence can collect data like humans, analyze and review them, and provide various suggestions for future activities according to the history of activities and behavior of employees and employees (Sun, 2:2020). In general, the existential nature of intelligence is the concept of gathering information, induction and analysis of experiences in order to reach knowledge or provide a decision. In fact, intelligence is considered as the concept of using experience to solve received problems. Artificial intelligence is the science and engineering of creating smart machines to use computers and understand the understanding of human or animal intelligence and finally achieving the mechanism of artificial intelligence at the level of human intelligence (Neethu, 2013:5). Comparing artificial intelligence with human intelligence, it can be said that humans are able to observe and analyze issues in order to judge and make decisions, while artificial intelligence is based on rules and procedures already embedded in the computer (Camarero, 234:2018). The purpose of artificial intelligence is to bring the behavior and response of a computer system closer to the patterns on which humans act and respond. Sometimes systems are designed that are more analytical than humans. But they still use our patterns. Artificial intelligence has a close relationship with the fuzzy system or the system that humans make decisions according to (Hernandez, 2017:234).

**Applications of artificial intelligence in human resource management**

Artificial intelligence is a flexible logical agent that can understand its environment and take actions that maximize the chances of success in HR. Artificial intelligence is a branch of computer science that uses machine learning algorithms and imitates cognitive functions. Human resource managers on participation; preservation; Recruiting and strengthening the organization are the focus. Very broad concepts of artificial intelligence; It is complex and changing, and as a result, artificial intelligence is gradually progressing and evolving by focusing on its deep and experiential learning (Abraham, 2000:89). Artificial intelligence is based on simulating human intelligence to automation systems. In the field of talent acquisition resources; evaluation of candidates; Employee participation and management, there are many opportunities for artificial intelligence in human resource technology (Akgun, 2013:502).

Johnson et al. (2020), also believe that electronic human resources and artificial intelligence have the ability to change the way employees are recruited and selected. However, it must be ensured that the insights obtained and the decisions taken by the employees are well accepted and lead to better results for the employees and the organization.

In general, it can be said that by using artificial intelligence in human resources management, managers can have better relationships with employees and customers and create different patterns to increase sales, earn money and satisfy their employees. Of course, analyzing and reviewing data is time-consuming. But artificial intelligence in human resource management can easily recognize patterns. These models can help managers in making decisions based on data and statistics. In the following, we discuss some of the most important functions of artificial intelligence in the organization, especially in the field of human resource management in Table (1):

**Table1-** Functions of artificial intelligence in the field of human resource management

brief description	Functions
Artificial intelligence can act as an intelligent filter in the process of selecting and recruiting employees. By using machine learning algorithms, it is possible to identify the required characteristics for a specific job and analyze the positive and negative feedback of users and apply the necessary improvements in the recruitment process.	Selection and recruitment of labor
Using artificial intelligence, tools and systems can be developed to help employees interact with the organization smarter and faster.	Improving the user experience of employees
Artificial intelligence in human resources management, by using integration methods, facilitates and accelerates various processes such as hiring new staff, starting employees, training, performance analysis and all processes related to human resources.	Detailed analysis of employee and organization performance
The use of artificial intelligence software in the organization's administrative automation space, while increasing security and privacy and reducing human errors, provides the necessary platforms for strategic plans in human resource management.	Office automation optimization

Artificial intelligence-based software can perform repetitive and administrative tasks automatically. These software can play an effective role in determining the strategy of human resource management; employee management; Analysis of company management policies and practices; Manage salary and other matters. With the right algorithms, systems with artificial intelligence capabilities can answer employee questions; Overtime; Leave; traffics; Payroll and... handle more quickly.	Automate some administrative tasks
Artificial intelligence can be used as an analytical tool in the decision-making processes of human resource managers. Using data analysis and advanced algorithms, managers can make better decisions about personnel and human resources.	Decision support
Managers always need accurate and timely information to help them make decisions Slow. In a situation where a lot of information enters the company through communication devices, software Based on artificial intelligence, they can provide such information from humans in automatic ways At the same time, use it wisely	content management
Artificial intelligence provides the possibility of providing a career development plan or, in other words, a guide for every employee. Among the advantages of artificial intelligence in helping human resources, it is possible to provide various technologies in the form of chat; email; He pointed out the virtual meeting room and... for the employees of an organization.	Employee participation and development
Artificial intelligence and its capabilities create a tool for management control over employees' activities.	Control tool

Therefore, using artificial intelligence in human resource management can provide improvement and productivity in the management processes of organizations. By accurately analyzing data, recognizing patterns, and using intelligent algorithms, HR managers will be able to make better decisions and improve employee selection and recruitment processes, analyze resumes, and improve employee user experience.

However, Capelli et al. (2019), the four challenges in using data science techniques for HR tasks are the complexity of HR phenomena, limitations imposed by small data sets, accountability questions related to fairness, and ethical limitations. and legality and possible negative reactions of employees to management decisions through data-driven algorithms, then based on three overlapping principles-causal reasoning, randomization and experiments and employee participation-provides practical answers to these challenges, which are both From the economic and social point of view, it will be appropriate to use data science in the management of employees. It is necessary to consider security issues, privacy and human-machine interaction so that the use of artificial intelligence in human resource management is done in the best possible way.

## II. Research Methodology

The current research is one of the types of applied research with a quantitative approach and based on a survey and correlation strategy that was carried out in a single cross section. Collecting information for compiling the theoretical foundations of the research using the library method and reviewing the documents and available sources, and for the purpose of the field method, the tool of the standard human resource management questionnaire tool of Noo et al. (2000), based on the Likert scale, was used. In this research, Cronbach's alpha coefficient was used to measure the reliability of the research tool, and confirmatory factor analysis was used to measure the validity of the research tool. The statistical population of the current research is 299 managers and human resources experts of knowledge-based companies active in Fars province, based on Cochran's formula, the sample size was determined to be 168 people, and sampling was done through the random classification method. In this research, data analysis was done using structural equations method and path analysis by partial least squares (PLS) using Smart-PLS version 3 software.

### Research findings

The statistical description of the data is a step towards identifying the pattern governing them and a basis for explaining the relationships between the variables used in the research. According to the results of the first part of the questionnaire (demographic characteristics), the following information is summarized in Table No. 3:

**Table 3.** Descriptive findings

relative abundance ((percentage)	absolute frequency ((number)		
74	124	man	gender
26	44	Female	
7	12	Less than 25 years	Age
38	64	Between 25 and 35 years	
31	52	Between 35 and 45 years	

18	30	Between 45 and 55 years	work experience
6	10	Older than 55 years	
39	65	Bachelor's degree	
42	71	Master's degree	
19	32	P.H.D	
26	44	Less than 5 years	
29	49	10-5	
24	40	20-10	
21	35	More than 20 years	

**Examining the assumption of normality of the data using the Kolmogorov-Smirnov (ks) test**

The Komogrove-Smirnov test is a type of non-parametric statistical test that is used to check the distribution of data. If a significant value greater than or equal to the error level (5%) is obtained, then there is no reason to reject the null hypothesis. In other words, the data distribution will be uniform.

When checking the normality of the data, we test the null hypothesis that the distribution of the data is normal at the 5% error level. For the normality test, the statistical assumptions are set as follows:

H0: The distribution of data related to each of the variables is not normal.

H1: The distribution of data related to each of the variables is normal.

Therefore, if the smaller test statistic equal to 0.05 is obtained, then there will be no reason to reject the null hypothesis. In other words, the data distribution is non-normal. The results of this test are shown in Table 3.

**Table 3- Kolmogorov-Smirnov test**

The result of the test	z statistic	meaningful	standard deviation	Average	statistics Variables
Validation of the null hypothesis	1.497	0.102	0.587	4.367	simulation
Validation of the null hypothesis	1.184	0.061	0.512	3.627	Ability to work
Validation of the null hypothesis	1.148	0.129	0.721	3.443	Screening ability
Validation of the null hypothesis	1.192	0.124	0.629	3.824	Not having unconscious bias

According to table (3), the significant value (Sig) for the data, as well as the placement of the Z statistic with a confidence level of 95% and an error of less than 5% outside the range of +1.96 to -1.96, with 95% confidence, we can claim to reject the H0 hypothesis. became. Therefore, non-parametric tests and structural equation tests using Smart PLS software can be used because they are not sensitive to the normality of the data.

**Validation of research measurement tools**

The first factor that should be considered in the evaluation of reflective models is the one-dimensionality of the indicators. This means that each indicator in the total of indicators should be loaded with a large factor loading value to only one dimension or latent variable. In order to analyze the data using PLS software, the two-step method of Holland (1999) is used for partial least square modeling. The first stage includes determining the measurement model through reliability and validity, and the second stage includes determining the structural model through the analysis of fit indices, coefficients of determination, and path analysis.

**Table 4- validity and reliability of the measurement model**

Variables	Cronbach's alpha	CR	Coefficient Rho	AVE	√AVE Convergent validity
simulation	0/821	0/937	0/916	0/749	0/865
Ability to work	0/832	0/982	0/970	0/933	0/966
Screening ability	0/891	0/980	0/954	0/803	0/896
Not having unconscious bias	0/773	0/927	0/911	0/864	0/929
Artificial intelligence	0/812	0/969	0/918	0/722	0/850

As can be seen, Cronbach's alpha values for all variables are above 0.7. Based on the obtained alpha coefficients, it can be concluded that the model has good internal consistency reliability. Also, the values of Dillon

Goldstein's coefficients (composite reliability) show that all the values in this table are above 0.7, which shows that the model has good composite reliability. In addition, as can be seen in the results in the table, the correlation of the variables with each other, as can be seen, the root values of AVE placed on the diagonal of the correlation matrix are larger than the correlation values of that variable with other variables, which indicates the appropriateness of the model's divergence validity. is.

**Determining the structural model**

In structural equation modeling, the part of the model that includes observable variables and model indicators is called the reflective measurement model, and the other part of the model that refers to the relationship between the hidden variables of the model is called the formative measurement model.

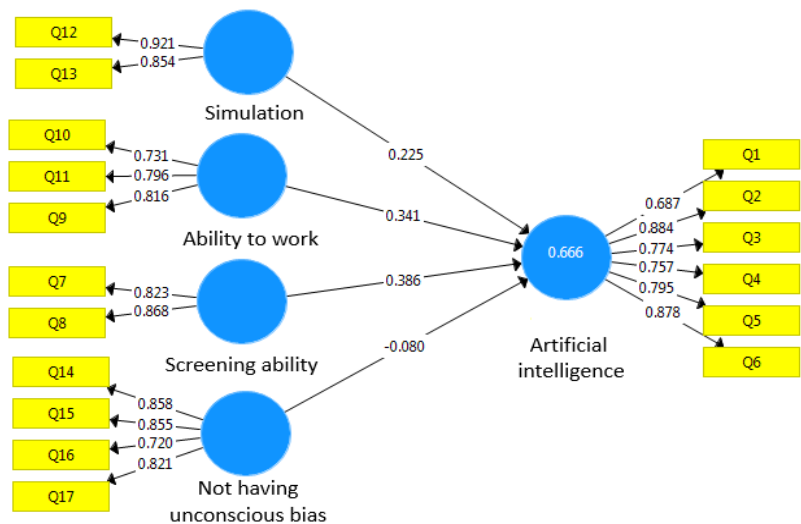


Figure (1) of the research model in standard coefficient estimation mode

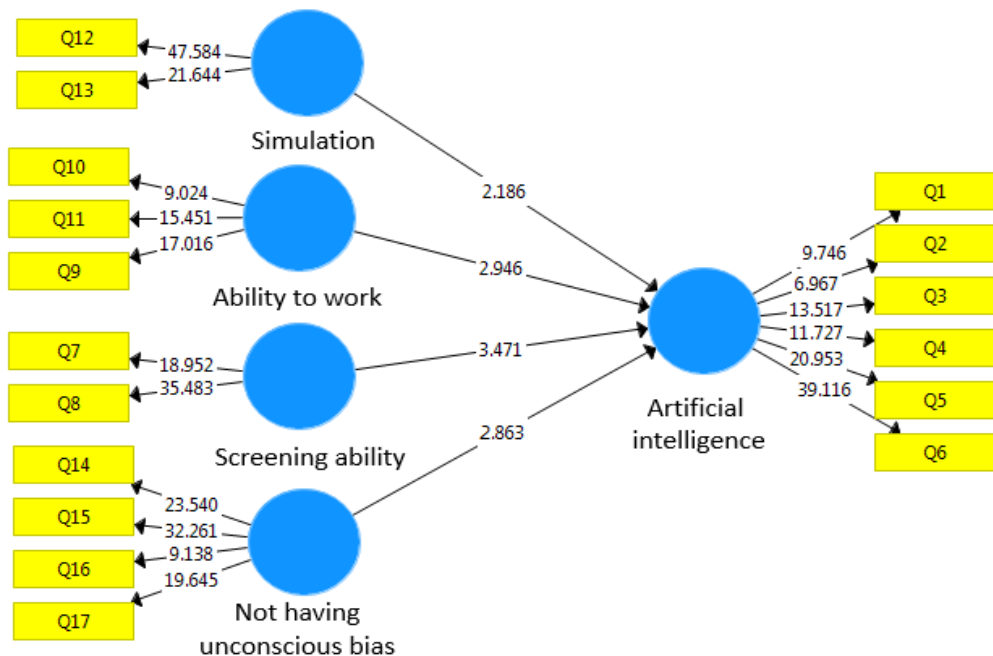


Figure (2) significance coefficients of the hypotheses in the model

Figure (2) (significant coefficients of hypotheses) shows the research models in the significance mode of coefficients (t-value). According to the type of hypotheses expressed in the present research, naturally, the hypotheses will be confirmed when the relevant path coefficient is positive and its significant number, which is the same as the t-statistic, is significant. According to this model, the path coefficient (Figure 3) and factor loading are significant at the 95% confidence level if the value of the t statistic is outside the range (-1.96 to +1.96) and if the value of the t statistic is within this range, As a result, the factor load or path coefficient is not significant. The coefficient of path and factor load is significant at the 99% confidence level if the value of the t statistic is

outside the range (-2.58 to +2.58). According to the results obtained from the t-test, all factor loadings have become significant at the 95% confidence level and have played a significant role in the measurement of their constructs.

**Testing the quality of the measurement model or subscription index**

Tenenhaus et al. (2005) have introduced the general fit index to check the fit of the model. The overall criterion of fit (GOF) can be obtained by calculating the geometric mean of the shared mean and R2.

$$GOF = \sqrt{\text{average}(\text{Comunalitie}) * R2}$$

The GOF index in the PLS model is a practical solution to this problem of checking the overall fit of the model and examines the overall prediction ability of the model and whether the tested model has been successful in predicting the latent endogenous variables or not.

Table 5- communality test

communality	Variables
0/821	simulation
0/887	Ability to work
0/892	Screening ability
0/884	Not having unconscious bias
0/851	Artificial intelligence

The average value of the index of shared values through the following formula is:

$$\text{Communalitie} = 1/N * \sum \text{Communalitie}$$

The subscription amount is: 0.867

The amount of R2 is also equal to 0.888. This value can be seen based on the output of path coefficients in standard mode. According to the GOF calculation formula, we have:

$$GOF = \sqrt{0/867 * 0/888} = 0/871$$

The limits of GOF index are between zero and one. Wetzles et al. (2005) have introduced three values of 0.01, 0.25 and 0.35 as weak, medium and strong values for GOF, respectively. According to the value of 0.827, the research model is highly desirable.

Testing research hypotheses

Accept or reject the hypothesis	meaningful	t statistic	Standardized path coefficient β	theories
accept	Sig<0.05	2/186	0/225	Simulation of artificial intelligence → The performance of human resource management in knowledge-based companies
accept	Sig<0.05	2/941	0/341	The ability to do artificial intelligence work → The performance of human resource management in knowledge-based companies
accept	Sig<0.05	3/471	0/386	AI screening ability → The performance of human resource management in knowledge-based companies
accept	Sig<0.05	2/863	0/080	Not having unconscious bias in artificial intelligence → The performance of human resource management in knowledge-based companies

**III. Conclusion and Recommendations**

Although the age of artificial intelligence is still in its infancy in terms of the number of years it has passed, it has had an undeniable impact on societies. Jobs requiring middle skills are rapidly disappearing and being replaced by system automation. People are more and more interested in using artificial intelligence technology in their daily life. Nearly 50% of organizations in the world have reported the use of some kind of artificial intelligence in their activities. Digitalization and artificial intelligence have revolutionized the way we work, live, communicate, learn and have fun. Two decades into the 21st century, many businesses have been affected by new human innovations and inventions. Today, many national policies focus on artificial intelligence,

which has created its impact on industry and agriculture, services, value chains and the organization of the workplace.

The first hypothesis is that artificial intelligence simulation has a significant effect on the performance of human resources management in knowledge-based companies, according to the results obtained from the path coefficient ( $\beta$ ) equal to 0.225 and the value of the significance coefficient (t-statistic) equal to 186 2.0, which is outside the range of  $\pm 1.96$ , it can be acknowledged that artificial intelligence simulation has a significant effect on the performance of human resource management in knowledge-based companies. This finding is consistent with the results of Johnson et al. (2020), Januba et al. (2019), Rajabi Farjad et al.

The second hypothesis: the ability to perform artificial intelligence work has a significant effect on the performance of human resource management in knowledge-based companies. Based on the results obtained from the path coefficient ( $\beta$ ) equal to 0.341 and the value of the significance coefficient (t statistic) equal to 2.941, which is outside the range of  $\pm 1.96$ , it can be acknowledged that the ability to do the work Artificial intelligence has an effect on improving the performance of human resources management in knowledge-based companies. This finding is consistent with the results of studies by Januba et al. (20109), Rajabi Farjad et al. (1401).

The third hypothesis: Screening ability has a significant effect on the performance of human resources management in knowledge-based companies. Based on the results obtained from the path coefficient ( $\beta$ ) equal to 0.386 and the value of the significance coefficient (t statistic) equal to 3.471, which value is outside the range of  $\pm 1.96$ , it can be said that the ability of screening on performance Human resource management in knowledge-based companies has a positive and significant impact. This finding overlaps with the results of studies. Ahmadi Moghadam et al. (2017), Johnson et al. (2020), Al-Ziari (2017) are consistent.

The fourth hypothesis: There is no unconscious bias on the performance of human resources management in knowledge-based companies according to the results obtained from the path coefficient ( $\beta$ ) equal to 0.80 and the value of the significance coefficient (t-statistic) equal to 2.863, which value is From the range of  $\pm 1.96$ , it can be said that not having unconscious bias has a significant effect on the performance of human resource management in knowledge-based companies. This finding is consistent with the results of the studies of Salimi et al. (2012) and Johnson et al. (2020).

### **Practical suggestions**

According to the research results, it is suggested:

- Implementation of the succession management system, using artificial intelligence data in the field of human resources of the organization with the aim of finding potential talents.
- The use of computer simulation of human intelligence in the processes of recruitment, selection, employment, development and maintenance of employee talents
- Using the ability to screen artificial intelligence, in order to periodically monitor the level of human resources' abilities and develop training courses needed for the development of abilities.
- Setting up training programs using human resources system data based on artificial intelligence and the training needs of the company to fulfill its goals and missions.

### **References**

- [1]. Abraham, R. (2000), "The Role Of Job Control As A Moderator Of Emotional Dissonance And Emotional Intelligence Outcome Relationships", *The Journal Of Psychology*, 134,169-84
- [2]. Akgun A, Keshin J, & Bayme J, (2013), "Emotional And Learning Capability And Their Impact On Product Innovativeness And Firm Performance", *Technovation*, 27, 9, 501-513
- [3]. Amram, Y. & Dryer, C. (2017), *The Development And Preliminary Validation Of The Integrated Spiritual Intelligence Scale (Isis)*, Palo Alto, Ca, Institute Of Transpersonal Psychology, Working Paper.
- [4]. Bansal, H.S Mendelson, M.B., & Sharma, B. (2011). *The Impact Of Internal Marketing Activities On External Marketing Outcomes*. *Journal Of Quality Management*
- [5]. Blenkhorn D. L & Fleisher C. S, (2007), "Performance Assessment In Competitive Intelligence: Zn Exploration, Synthesis, And Research Agenda", *Journal Of Competitive Intelligence And Management*, 4, 4-22
- [6]. Buchda S, (2017), "Rulers For Business Intelligence And Competitive Intelligence: An Overview And Evaluation Of Measurement Approaches", *Journal Of Competitive Intelligence And Management*, 4, 22-54
- [7]. Burnett, K. (2019). "Handbook Of Key Customer Relationship Management: The Definitive Guide To Winning, Managing And Developing Key Account Business". Prentic Hall. New Jersey.
- [8]. Camarero, C. Gutie' rrez, J. & San Marti' n S. (2018) *The Impact Of Customer Relationship Marketing On The Firm Performance: A Spanish Case*", *Journal Of Service Marketing*, Vol. 19, No. 4, Pp. 234 - 244
- [9]. Carolyn, Folk Man C (2022) *Karen Norman Kenedy, From Prisoners To Apostles: A Typology Of Repeat Buyers & Loyal Customers In Bussiness* , *Journal Of Services Marketing*, 1664 .
- [10]. Chang, H. H., Yao, H. W., & Wen, Y. Y. (2019). *The Impact Of E-Service Quality, Customer Satisfaction And Loyalty On E-Marketing: Moderating Effect Of Perceived Value*. *Total Quality Management*, 18, 423-443.
- [11]. Ciarrochi, J. Chan. A. Y. C & Caputi, P, (2010), "A Critical Evaluation Of The Emotional Intelligence Construct", *Personality And Individual Difference*, 30, 539-561
- [12]. Cote S, & Miners T. H. (2016), "Emotional Intelligence, Cognitive Intelligence, And Job Performance", *Administrative Science Quarterly*, 51, 1-28

- [13]. Hernandez-Nieves, E., Hernández, G., Gil-González, A. B., Rodríguez-González, S., & Corchado, J. M. (2020). Fog computing architecture for personalized recommendation of banking products. *Expert Systems with Applications*, 140,
- [14]. Huang, J. J., Tzeng, G. H., & Ong, C. S. (2021). Marketing segmentation using support vector clustering. *Expert systems with applications*, 32(2), 313-317.
- [15]. Jarek K. & Mazurek G. (2019). Marketing and Artificial Intelligence. *Central European Business Review* 8(2) 46.
- [16]. Molitor, D., Spann, M., Ghose, A., & Reichhart, P. (2020). Measuring the effectiveness of location-based advertising: A randomized field experiment. Available at SSRN 2645281.
- [17]. Nayak, M., & Narain, B. (2020). Big Data Mining Algorithms for Predicting Dynamic Product Price by Online Analysis. In *Computational Intelligence in Data Mining* (pp. 701-708). Springer, Singapore.
- [18]. Neethu, M. S., & Rajasree, R. (2013, July). Sentiment analysis in twitter using machine learning techniques. In *2013 Fourth International Conference on Computing, Communications and Networking Technologies (ICCCNT)* (pp. 1-5). IEEE.
- [19]. Nturambirwe, J. F. I., & Opara, U. L. (2020). Machine learning applications to non-destructive defect detection in horticultural products. *Biosystems Engineering*, 189, 60-83.
- [20]. Sun, W., & Wang, Y. (2020). Factor analysis and carbon price prediction based on empirical mode decomposition and least squares support vector machine optimized by improved particle swarm optimization. *Carbon Management*, 1-15.
- [21]. Tang, L., Zhang, C., Li, L., & Wang, S. (2020). A multi-scale method for forecasting oil price with multi-factor search engine data. *Applied Energy*, 257, 11-33.