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ORIGINAL PAPER

Identifying Internet of Things (IoT) solutions in the complex process of industrial machinery maintenance

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Abstract:
Objective: Today, the Internet of Things (IoT) is used as an optimization tool in many aspects of monitoring. It seems that IoT is a suitable approach to transfer data related to various activities, including industrial activities, and ultimately leads to cost optimization and increase the life of some equipment. Accordingly, this study examines the identification of IoT solutions in the maintenance of industrial machinery. **Research Method:** The method used was estimative and fuzzy in MATLAB software environment. The required data for estimation were collected in DTA format and with the opinion of experts using industrial equipment in the form of pairwise comparison matrices. **Findings:** Findings from estimation in fuzzy environment showed that the best possible solutions for identifying and using IoT tools in repair and maintenance of machines based on ranking and respectively to the components of heating system monitoring, direction optimization Reducing power consumption and managing power consumption, creating data transmission firewalls to ensure security and safety, as well as providing automation of inspection equipment along with critical event management. **Results:** Also, for the most optimal use of the Internet of Things in the repair and maintenance of industrial machinery, it is necessary that sensors continuously provide data related to intelligent air conditioning, equipment consumption management in the cloud computing space to engineers and repair technicians.

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Keywords: *Internet of Things (IoT); heating system; optimization to reduce power consumption; power management.*

1. Introduction

Industrial machinery is considered as one of the most important parts in energy consumption management in the field of bank databases and banking data transfer. These machines are the most important approach to the use and transfer of data between the Internet of Things due to their large scale and high processing capability in Internet networks. One of the issues of remote equipment control as well as automatic control is equipping the equipment with IoT. The Internet of Things is a collection of objects that can be uniquely defined as part of the Internet. These include small phones, digital cameras, and tablets. When these devices are connected to each other via the Internet, they are able to provide most of the small processing and economic, environmental and health support services. A large number of devices connected to the Internet provide different types of services and produce large amounts of data and information (Habibi, 2017). In another definition, it means the possibility of communicating all objects with each other and with humans, along with identifying and discovering them under an integrated network (Najafpour et al., 2018). Nethravathi et al. (2020) pointed out that interaction between human beings is always based on complex emotional dimension. Standards required by the Internet of Things according to the IoT ecosystem, different standards are necessary in different areas such as: wireless communication, technical, application and service quality, and therefore different organizations and institutions are involved in its standardization (Najafpour et al., 2018).

With the advancement of this technology in the international arena, most of the equipments that currently need manual activation will be equipped with remote control as well as automatic control. On the other hand, the increase in energy prices in recent years has caused consumers to pay more for the use of electrical equipment they need. Especially the price of consumption during peak hours has caused consumer dissatisfaction, which is also true of maintaining data backups in the central bank. Rising population growth, industry growth and, consequently, increased energy consumption, have highlighted the need for energy efficiency optimization for banks more than ever. The central bank is also the most important sector in the banking industry, and the need to use new technologies to reduce energy consumption in this industry in the last decade is fully felt. Therefore, the use of intelligent inspection and safety equipment in the processes of storage, security, transfer and monitoring of financial information seems very necessary. In view of the above, studies in the field of Internet of Things applications have focused mainly on technical issues and have not identified and categorized Internet of Things applications, and this issue is less common for banking. Therefore, the purpose of this study is to identify and prioritize solutions and applications of the Internet of Things in the banking industry with a focus on its performance in the central bank. To achieve this goal, the following question is answered: What are the applications of the Internet of Things in controlling smart energy in the central bank? To answer this question, the FAHP method is used, in which existing articles are analyzed and determine the importance and support of past research in each of the applications. IoT applications are also prioritized in terms of cost, savings, and performance to identify the most important IoT applications in the central bank. To answer this question, the TOPSIS algorithm is used to determine which applications are most considered by central bank managers to control and manage smart energy?

The results of this study provide the most optimal solutions for using the Internet of Things (IoT) in the central bank, which move in this direction, in addition to reducing energy costs, investing in future generations and better protection of industrial machinery.

Research goals

1. Explaining the solutions and applications of Internet of Things in the repair and maintenance of industrial machinery in the Central Bank
2. Explaining the prioritization of the components of repair and maintenance of industrial machines based on the Internet of Things in the Central Bank

Research questions

1. What is the ranking of the components affecting the repair and maintenance of machinery?
2. On what basis is the prioritization of the components of repair and maintenance of industrial machines based on the Internet of Things in the Central Bank?

Research Hypotheses

1. Management and consumption approaches to the repair and maintenance of machines based on the Internet of Things in the central bank system has priority.
2. Prioritization of the components of repair and maintenance of industrial machines based on the Internet of Things in the Central Bank is done based on the existing improvements in the Central Bank.

2. Literature review

From the aspects of Internet of Things, we can point to the identification of objects through sensor devices (such as object detection through digital photography and biometric identification) in creating security and personalization of Internet of Things systems (Khedmatgozar, 2015). It is built on the applications of key technology enablers. These enablers are: RFID, wireless sensor technology, intelligent technologies and nanotechnology (Manouchehr et al., 2017). Cisco Systems, the global leader in IT predicts that the Internet of Things will connect 50 billion devices to the Internet by 2020. This platform includes standards such as low-power Bluetooth WIFI, NFC, RFID and so on. Internet-enabled objects have many benefits for both organizations and individuals by facilitating or simplifying environmental sensors, automated sensors, and actuators, which can be used in a variety of fields, including automated home appliances. It is smart to create an intelligent network and product management (Khadijeh and Merrick, 2015) so by implementing data storage systems and data analysis technology, craftsmen can predict the condition of factory equipment before it malfunctions or produces a malfunction in the product, and in the direction of implementing the necessary measures to eliminate the predicted defects (Mostafa Pour, (2015). With the help of technologies such as locators, communication between people and objects in any place is possible. Following this trend, a wide range of new products and services have been created in various fields (Tavakoli et al., 2017). Some IoT roles such as application service providers, application platform providers, and a number of other similar roles in the field of telecommunications may not be defined. In fact, the roles of telecommunications are a subset of the roles of the Internet of Things (Khadijeh and Merrick, 2015).

In recent years, the development of the Internet with interconnected physical objects and devices and their virtual display has been a growing trend, which has created a wide range of potential new products and services in various fields (Tavakoli et al., 2017). Knowledge is created through the Internet of Things. Knowledge creation can be considered as the process of creating new knowledge or replacing and improving existing organizational knowledge through social relations and organizational collaborations. This process occurs at the individual and organizational levels and leads to the creation of tacit knowledge or new explicit knowledge (Rezaei Noor and Mashayekhi, 2018). Many articles have referred to the applications of the Internet of Things in various industries. Here are some of them: In China, RFID tags and barcodes are attached to firefighting tools to help develop a global fire information system and database (Manouchehr et al., 2017). According to estimates by the Gartner Institute for Information Technology Research (published in July 2014), in the emerging technology cycle, IoT technology is expected to evolve in the next 5 to 10 years (Khadijeh and Merrick, 2015).

The Internet began in 1966 with the connection of two computers at the ARPA Military Research Center in the United States. But half a century later, the range of communication has expanded to such an extent that human beings today are connecting objects to each other and using the data obtained from them. This relationship is called IoT (Mostafa Pour, (2015). With this technology, everything around us, such as mobile phones, cars, watches and accessories, will collect useful user data using different technologies and put the data in an ecosystem. And the collected data will be used to perform various operations autonomously (Najafpour et al., 2018).

Power consumption management

Intelligent management is an intelligent grid that automatically balances as well as monitors itself and accepts any energy source and converts it into the end user (heat, light, hot water, etc.). Maximum use of renewable energy sources and minimum environmental negative effects of electrical systems can be achieved in smart grids. In addition, smart grids have the ability to sense overload lines and re-use electricity to reduce overloads and prevent potential power outages (Lim et al., 2019).

Heating systems

Heating is defined as the cycle of creating fluid flows that ultimately raises the temperature of a particular environment. In studies in this field, using different materials of sand heating panel and phase change materials, and different pipes were examined experimentally and numerically and showed that the concept of heating system is an important element in determining the effectiveness of variables using It is a temperature control tool.

Smart air circulation ventilation

To reduce energy consumption in the building, mandatory standards are required for new residential buildings. These standards require significant thermal improvements over previous buildings, which require building designers or architects to simulate the energy performance of designed buildings and run only buildings that have energy-saving performance in accordance with the design standard (Yao, 2018).

Residential air conditioners, as the most important participants in home electricity bills, have a high potential for smartening and have attracted the most interest (Hu et al., 2017).

Functionally, intelligent building systems are less flexible due to centralized architecture and proprietary communication protocols. In addition, they do not have many intelligent designs and technologies that support decentralized control, intelligence, and energy optimization. As a result, building owners are looking for a cost upgrade over their smart building system, which can also save energy and increase intelligence (Png et al., 2019).

Provide security and safety

Network security is an activity designed to protect the usability and integrity of your network and data. This type of security includes both hardware and software technologies. Targets various threats. Prevents it from entering or broadcasting on your network. Effective network security manages network access (Li et al., 2019). Network security is defined as a challenge that changes over time in its settings, where such changes include topological changes, the discovery of a new vulnerability. Therefore, understanding the security situation of dynamic networks and the security situation is extremely important (Enoch et al., 2019). Due to the heterogeneity, complexity and continuous expansion of scale in the current network system, traditional network security techniques do not have effective compatibility and coordination to deal with network security problems. This leads to severe economic damage, adverse social effects and deadly security incidents (Liu et al., 2019).

Reduce power consumption

Awareness of residential consumers about behavioral changes and the basis of measures to reduce electricity consumption is becoming increasingly important. Significant reduction for all parties involved, including: as electricity consumption peaks, so do electricity costs; Suppliers can buy cheaper electricity from the electricity market this way; Manufacturers in this regard have reasons to produce less than the following very sensitive electrical charge; In this way, network operators can avoid heavy investments in network infrastructure (Oprea et al., 2018). Smart meters and home energy management systems allow customers to use the energy and time of their home. Such programs may charge the actual cost of electricity at any time, from high prices at peak times to low prices during off-peak hours (Büchs et al., 2018).

Critical event management

Unpredictable breakdowns in the industrial workplace have made on-site security policies more important than ever. Natural storms such as Hurricane Harvey and Maria have disrupted travel and disrupted industrial equipment, disrupted supply chains and shut down long sites for long periods of time. Many companies today address these concerns in a variety of areas. A centralized approach to proper planning, management, and correction of modern crises that companies face on a daily basis is essential (Villiers et al., 2019). Crisis management helps corporate and government organizations to improve response time, minimize disruption, and gain better management control over important events (Krausmann et al., 2019).

Inspection equipment automation

In recent years, technological advances have significantly expanded the building automation capability. Despite advances, it is clear that automation has not been widely adopted by occupants in buildings. To increase the usability of automation, the automation method in buildings should include determining the level of user preferential automation, in different situations and areas of control and dynamics of learning preference over time (Ahmadi-Karvigh et al., 2019). The term "office automation" originally began as data processing and word processing tools, and now includes more and more complex tasks such as integrating front office and backup systems (Thomson and McElvania, 2019). There are several types of automation that can be used in a variety of commercial industries around the world. With a network connection, all data and information, including text documents, presentations, spreadsheets, images and videos, can be sent in real time in seconds. By demonstrating the participatory nature of the office automation system, this allows your employees to collaborate in real time and improve their productivity (Sun et al., 2017).

Table no.1: Research background

Research result	Research title	Researcher
The findings of this study show that the existence of Internet systems has increased the speed of transactions and all banking activities and optimizes energy management in banks.	The impact of digital trends using the Internet of Things on banking processes	Khanboubi et al. (2019)
The findings show that by using encryption and privatization, a large part of banking contracts and blockchain can prevent the disclosure of personal information and optimize energy consumption levels.	Privacy protection in IoT systems	Hassan et al. (2019)
Controlling access to data based on the privatization of user identities, permissions and certificates based on these systems can help maintain the security and privacy of the system and improve the ability to improve monitoring management in these systems.	Information security and privacy in the IoT system	Varadharajan (2019)
As the penetration of users and bank payments by digital banking services increases, so does the banking system require a more precise security network and optimize energy management for the Internet of Things.	Mobile banking services and business information management with mobile payments	Markoska and (2018) Ivanochko
The use of IoT technology, although it has brought challenges and problems in developing countries, but has led to the development and solution of other problems in this banking system of these countries and improves energy management for banking networks. Forgive.	IoT acceptance is a key challenge, opportunity and implication for a developing country	Sharma and Al-(2018)Muharrami,
Banks can prevent the disclosure of their users' information by personalizing and encrypting all banking operations and can improve energy management.	Content security using IoT banking system	Trnka et al. (2017)
Smart cards have opened up new payment methods for bank customers, but in terms of security and technology, they also need to develop banking networks and improve monitoring management.	Smart card for banking and finance	Markantonakis (2017)
With an overview of software tools, methods and strategies in the real data flow system, IoT financial system in addition to the benefits also has problems that can improve energy management.	Data flow analysis in an IoT financial system	Cuomo et al. (2017)
Since the collection and use of data and their fast transfer speed is one of the	Big Data and the Internet of Things are a prime	(2017) Boumlik

problems of traditional banking, the use of the Internet of Things can solve this problem well and improve the monitoring and supervision of banking information systems.	opportunity for the banking industry	
To describe and evaluate financial derivatives, we can use the Black-Scholes model and improve the monitoring of the organization.	A new approach to IoT financial data	Cuomo et al. (2016)
IoT technologies offer great potential for tracking, observing, and managing challenges in this area, so that IoT technologies can collect, process, and distribute data throughout the chain.	Use of the Internet of Things in the food supply chain	Pang et al. (2015)
RFID tags and barcodes are attached to firefighting tools to help develop a worldwide firefighting information system and database.	Use of the Internet of Things to fight fires	Zhang (2013)
They examined the use of technologies such as identification and communication capabilities in the Internet of Things and concluded that all objects in the health system (people, equipment, drugs, etc.) can be continuously tracked and monitored.	Use of the Internet of Things in the healthcare industry	Pang et al. (2013)
Using Internet of Things technologies, accidents in mines can be detected and warnings can be issued. On the other hand, with the help of data obtained from mining accidents, the occurrence of accidents can be predicted and the safety of mines can be improved.	IoT for safer production in mines	Qiuping et al. (2011)
The greater the number of physical objects with RFIDs or sensors, the more transportation and logistics companies can monitor the movement of objects from origin to destination.	Using the Internet of Things in transportation and logistics	Atzori et al. (2010)

3. Research methodology

In this research study, the solutions are presented as research variables that are measured and prioritized based on the proposed indicators [(Behzad and Behnam (2017); Seifi (2013)]. This research is part of applied research. The research method is estimative and computational-fuzzy. And the fuzzy computation method will be performed using normalized rhythmic matrices. To do this research, pattern making in MATLAB software will be used. The statistical population of this research is the Central Bank of the Islamic Republic of Iran. Examples include equipment used in data transmission systems based on database approaches to IoT services. Examples include industrial devices and equipment installed in industrial sites that have the ability to provide return rate data due to their connection to IoT devices that have been able to be determined by experts and extracted so that experts can calculate their values based on fuzzy criteria to measure. Library resources are used to collect theoretical literature and research background. Observation tools and meta-combination techniques are used to determine the solutions presented in the articles. To prioritize the solutions, two techniques of fuzzy hierarchical analysis and fuzzy TOPSIS are used. In this way, the fuzzy hierarchical analysis (FAHP) technique is used to determine the weights of the indicators. The input of this technique is to extract computational data based on fuzzy ranking in matrix calculations. Which is complemented by industry expert data. The software used is MATLAB software. The data collection tool was a computational checklist based on the determination of the initial pairwise comparison matrix, which the specialists completed after examining and obtaining the output rates of industrial devices maintained by the Internet of Things. Also, in order to identify the solutions of the Internet of Things in the Central Bank through the meta-combined method, the seven-step method has been used. Keywords for searching in Science Direct, Springer Library databases are determined and based on the following acceptance criteria, articles are extracted and after screening, selected articles are used for analysis.

Table no.2: Acceptance criteria

Acceptance criteria	
scientific studies	Geographic Area
English	Research language
2021To2011	Study time
Qualitative and technical-engineering	Study methods
IoT and machine maintenance management	Study community
Articles published in prestigious scientific journals	Type of study

After screening to prioritize the proposed solutions, first using the Fuzzy Analytic Hierarchy Process (FAHP), the weights of the indicators will be estimated based on data extracted by experts and specialists in data format.

First, the components affecting environmental indicators in the use of chemical inputs are identified and prioritized, and then the model will be studied using the structural equation technique. Finally, the sensitivity of environmental indicators to each of the chemical inputs is investigated.

Step 1: Identify and prioritize the components affecting environmental indicators

Fuzzy Hierarchical Analysis Process (Chang Method)

In the fuzzy AHP technique, after drawing the hierarchical decision tree, a pairwise comparison of the elements of each model level must be performed. In the calculation stage, using the definitions and concepts of fuzzy AHP, the coefficients of each matrix of pairwise comparisons are calculated. Thus, for each row of the pairwise comparison matrix, the value S_k, which is itself a triangular fuzzy number, is obtained from the following equations.

$$S_k = \sum_{j=1}^{m} M_{ki}^{j} \otimes \left[\sum_{i=1}^{m} \sum_{j=1}^{m} M_{ij} \quad (1)$$

$$\sum_{j=1}^{m} M_{ij} - \left(\sum_{i=1}^{m} l_j, \sum_{i=1}^{m} m_j, \sum_{i=1}^{m} u_j\right) - 1,2,\ldots, \quad (2)$$

$$\sum_{i=1}^{m} \sum_{i=1}^{n} M_{ij} = \left(\sum_{i}^{n} l_i, \sum_{i}^{n} m_i, \sum_{i}^{n} \quad (3)$$

$$\left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{ki}^{j}\right]^{-1} = \left[\frac{1}{\sum_{i-1}^{n} u_i}, \frac{1}{\sum_{i-1}^{n} m_i}, \frac{1}{\sum_{i-}^{n}} \quad (4)$$

In these relations, K represents the line numbers and i and j represent the options and indicators, respectively.

After calculating all S_k, in this step we have to calculate the magnitude of each level element on the other elements of that level separately according to the following equation.

$$\begin{cases} V(M_1 \geq M_2) = 1 & if\ m_1 \geq n \\ V(M_1 \geq M_2) = hgt(M_1 \cap M_2) & otherwis \end{cases} \quad (5)$$

$$hgt(M_1 \cap M_2) = \frac{l_2 - u_1}{(m_1 - u_1) - (m_2 -} \quad (6)$$

The magnitude of a triangular fuzzy number is obtained from K of another triangular fuzzy number from the following equation:

$$V(M_1 \geq M_2, \ldots, M_k) = V(M_1 \geq M_2) and \ldots and\ V(M_1 \geq M \quad (7)$$

Also, to calculate the weight of the indicators in the pairwise comparison matrix, we do the following:

$$w'(x_i) = min\{v(s_i > s_k)\} \qquad K = 1,2, \ldots, n, k \quad (8)$$

Therefore, the weight vector of the indices will be as follows, which will be the same as the vector of abnormal fuzzy AHP coefficients:

$$W' = [W'(x_1) W'(x_2), \ldots, W'(x_n \quad (9)$$

Step 1) The first step of the fuzzy hierarchical analysis process method method, like the definitive AHP method, is to draw the hierarchical structure or hierarchical state of the research problem. This issue has only two levels of purpose and main indicators.

Step 2) The second step of the fuzzy hierarchical analysis process method is to design a pairwise comparison questionnaire and collect the opinions of agricultural jihad experts and pistachio producers. After collecting the opinions of experts, their opinions are first converted into fuzzy numbers by tables and then the incompatibility rate of each pairwise comparison questionnaire is calculated based on the Gogus and Boucher method. After determining that the incompatibility rate of the questionnaires is acceptable (less than 0.1), the fuzzy paired matrix comparison matrix is calculated.

Step 3) In this step, based on the stated relations, the fuzzy sum of each row and the fuzzy compound expansion are calculated.

Step 4) In this step, based on the stated relations, the degree of possibility, the degree of preference and the normalization of preference are calculated.

Step 5) In this step, the weight of the indicators related to the paired comparison questionnaire will be calculated.

Step 6) Draw a chart of research indicators based on their weight.

4. Research findings

Description of research data

Table no.3: Statistical description of the main research variables

Variance	The standard deviation	Average	The main research variables
2.343	1.53064	2.6667	Maintenance of industrial machinery
2.149	1.46602	3.2778	Power consumption management
1.997	1.41309	2.9444	Heating system

2.352	1.53349	2.8611	Smart air circulation ventilation
2.250	1.50000	3.0833	Provide security and safety
1.894	1.37639	2.8611	Reduce power consumption
1.743	1.32017	2.8333	Critical event management
1.628	1.27584	2.5278	Inspection equipment automation
14.066	3.75045	3.8611	Power consumption management

Estimation of research data

To estimate research data in a fuzzy environment due to the properties of the data extracted based on Dta, we need to first know what distribution the nature of our data will follow. If the nature of the data is not very important in fuzzy computing because the nature of the fuzzy data is such that it will eventually distribute the collected data in the pairwise comparison matrix, which can preferably the nature of the computation Matrix calculates, but it is necessary to determine whether the data distribution has a normal approach, in other words, fuzzy algorithm calculations have been able to use the nature of the estimated data by calculations in a normal way to determine the preference, for this purpose, the Jarque-Bera test will be used in Eviews software. One of the tests that considers the elongation and skewness of the variable under study. It is a test based on Jarque-Bera statistics. The larger the value of Jack's statistic, the farther away from the normal distribution of the variable under study. For a normal distribution of data, the value is zero. Since this statistic is calculated only for a small sample of the population, statistical inference is required to draw conclusions about the changing situation in the population. Regarding the judgment for this test, it can be said that when the probability level in this test is more than 0.05, it can be considered that the distribution of data in the matrix space for fuzzy calculations will be normal and based on this approach, it can be inferred that The normality of the variable will not be rejected with 95% certainty.

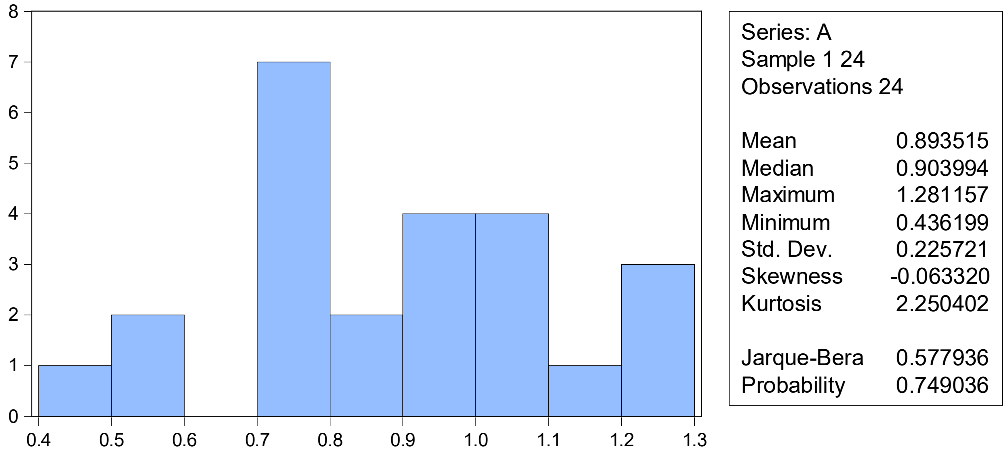
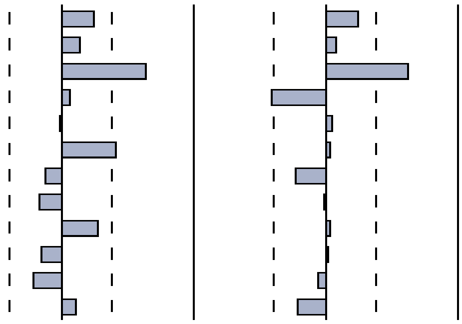


Figure no.1: Estimated data status in MATLAB for industrial machinery maintenance variable

According to figure 1, it can be said that the value of Jarque-Bera statistic for the maintenance variable of industrial machinery was equal to 0.577 and is at the level of more than 0.05, so we can say that the data collected in the matrix of pairwise comparisons have a distribution. They were normal. If, after calculating the covariance of variance, the values obtained from the residues total a large number of values less than 0.05, it can be said that the problem of uncertainty in the results of fuzzy calculations will be solved in the outputs of the estimates in Can be seen below.

Date: 11/15/19 Time: 15:31
Sample: 1 24
Included observations: 24

Autocorrelation | Partial Correlation



	AC	PAC	Q-Stat	Prob
1	0.267	0.267	1.9363	0.164
2	0.149	0.083	2.5622	0.278
3	0.661	0.653	15.537	0.001
4	0.070	-0.414	15.689	0.003
5	-0.013	0.065	15.694	0.008
6	0.438	0.035	22.331	0.001
7	-0.108	-0.227	22.762	0.002
8	-0.166	-0.000	23.841	0.002
9	0.285	0.044	27.227	0.001
10	-0.149	0.018	28.215	0.002
11	-0.210	-0.055	30.337	0.001
12	0.115	-0.211	31.029	0.002

Figure no.2: Significant level results from autocorrelation calculations for the maintenance of industrial machinery variable

According to figure 2, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the maintenance variable of industrial machinery were less than 0.05, and it can be said that these data can be reliably Used part for fuzzy computing. Eviews software provides the ability to estimate the reliability of the extracted data, the figure below shows the calculation process of the Dickey-Fuller test. If the calculated values for this test were less than 0.05, it can be said that the data obtained for calculations and estimates in matrix spaces such as fuzzy spaces can have sufficient validity and reliability, which is shown in the figure below:

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.060205	0.0482
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10% level	-2.660551	

Figure no.3: Dickey Fuller test values Reliability for maintenance of industrial machinery

According to figure 3, it can be said that the significance level of Dickey Fuller test for the maintenance variable of industrial machinery is less than 0.05 and therefore matrix data have sufficient reliability for calculations and trust in them.

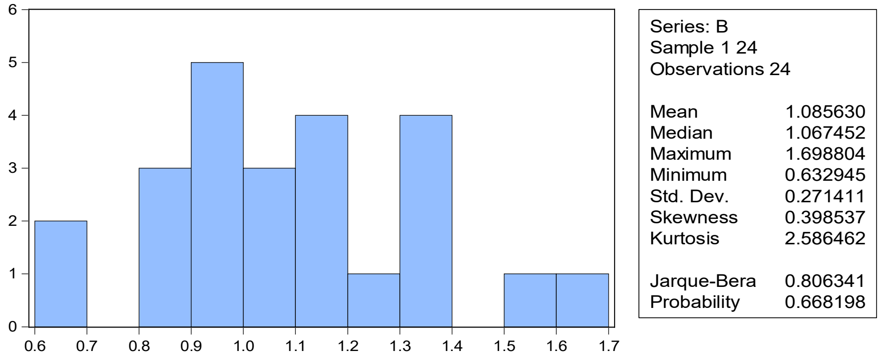


Figure no.4: Estimated data status in MATLAB for power consumption management variable

According to figure 4, it can be said that the value of Jack's statistic for the power consumption management variable was equal to 0.806 and is at the level of more than 0.05, so it can be said that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:33
Sample: 1 24
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.030	0.030	0.0243	0.876
		2	-0.199	-0.200	1.1489	0.563
		3	0.352	0.380	4.8253	0.185
		4	-0.276	-0.451	7.2094	0.125
		5	-0.335	-0.073	10.888	0.054
		6	0.212	-0.013	12.447	0.053
		7	-0.247	-0.218	14.688	0.040
		8	-0.226	-0.045	16.676	0.034
		9	0.317	0.045	20.853	0.013
		10	-0.118	-0.133	21.478	0.018
		11	-0.120	0.007	22.165	0.023
		12	0.344	0.024	28.304	0.005

Figure no.5: Significant level results from autocorrelation calculations for power consumption management variable

According to the informations included in figure 5, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the power consumption management variable were less than 0.05, and it can be said that these data can be used as a reliability for calculations Fuzzy used.

Null Hypothesis: D(B) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.097389	0.0374
Test critical values:	1% level	-2.685718	
	5% level	-1.959071	
	10% level	-1.607456	

*MacKinnon (1996) one-sided p-values.

Figure no.6: Dickey Fuller test values Reliability for power consumption management

According to figure 6, it can be said that the significance level of Dickey-Fuller test for power consumption management variable is less than 0.05 and therefore matrix data have sufficient reliability for calculations and reliability.

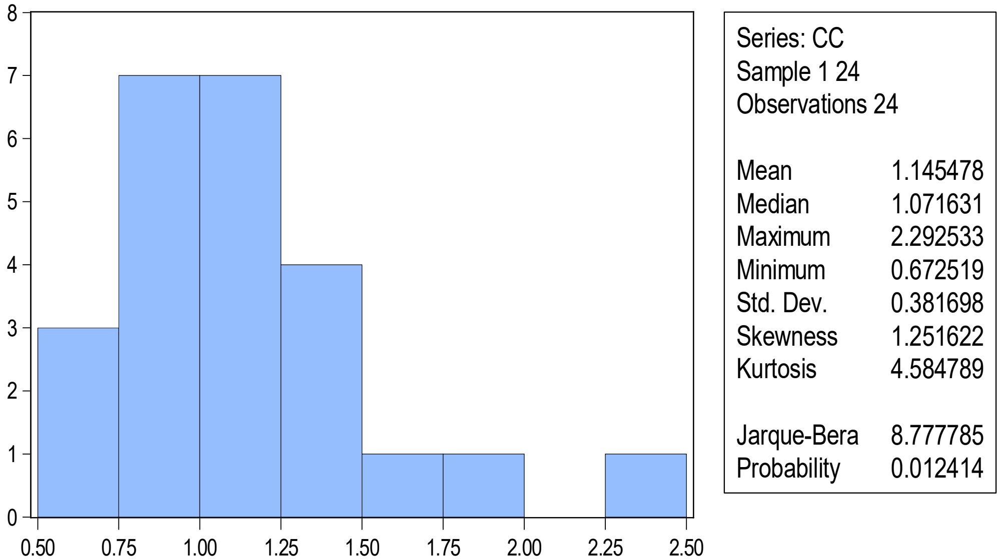
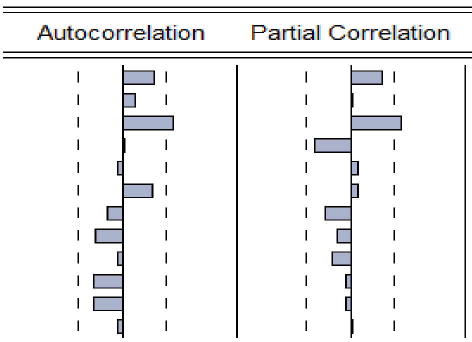


Figure no.7: Estimated data status in MATLAB for heating systems variable

According to figure 7, it can be said that the value of Jack's statistic for the heating system variable was equal to 8.777 and is at the level of more than 0.05, so we can say that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:34
Sample: 1 24
Included observations: 24



	AC	PAC	Q-Stat	Prob
1	0.293	0.293	2.3313	0.127
2	0.109	0.026	2.6703	0.263
3	0.463	0.465	9.0470	0.029
4	0.027	-0.313	9.0702	0.059
5	-0.039	0.072	9.1193	0.104
6	0.271	0.077	11.663	0.070
7	-0.136	-0.232	12.342	0.090
8	-0.245	-0.121	14.678	0.066
9	-0.038	-0.169	14.739	0.098
10	-0.264	-0.035	17.844	0.058
11	-0.268	-0.040	21.298	0.030
12	-0.034	0.029	21.359	0.045

Figure no.8: Significant level results from autocorrelation calculations for the heating system variable

According to figure 8, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the heating system variable were less than 0.05, and it can be said that these data can be used as a reliability for the calculations Fuzzy used.

Null Hypothesis: D(CC) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.482178	0.0160
Test critical values:	1% level	-2.685718	
	5% level	-1.959071	
	10% level	-1.607456	

*MacKinnon (1996) one-sided p-values.

Figure no.9: Dickey Fuller test values Reliability for heating systems

According to figure 9, it can be said that the significance level of the Dickey-Fuller test for the heating system variable is less than 0.05, and therefore matrix data have sufficient reliability for calculations and reliability.

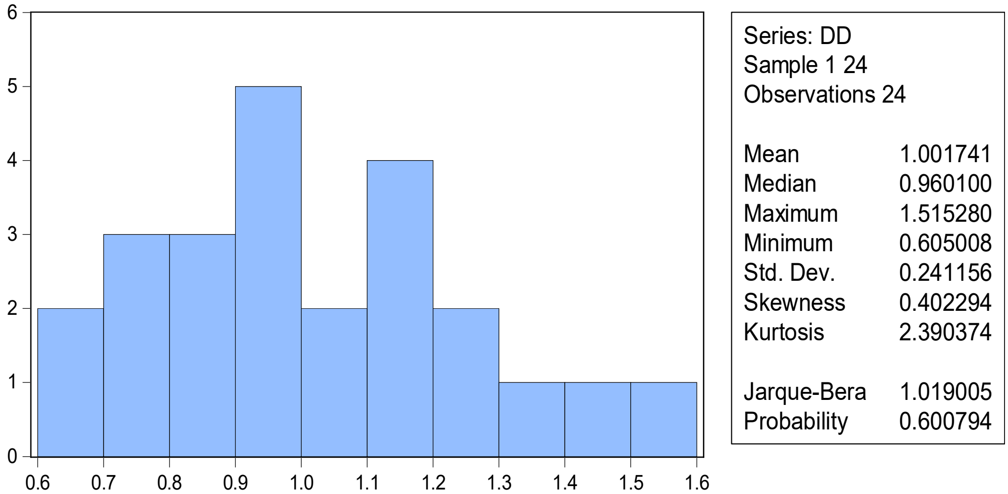


Figure no.10: Estimated data status in MATLAB for intelligent air conditioning variable

According to figure 10, it can be said that the value of Jack's statistic for the intelligent air conditioning variable was equal to 1.019 and is at the level of more than 0.05, so it can be said that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:34
Sample: 1 24
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.023	0.023	0.0145	0.904
		2	-0.152	-0.153	0.6716	0.715
		3	0.515	0.535	8.5489	0.036
		4	-0.261	-0.509	10.673	0.030
		5	-0.350	-0.038	14.702	0.012
		6	0.282	-0.048	17.458	0.008
		7	-0.232	-0.010	19.437	0.007
		8	-0.180	0.119	20.702	0.008
		9	0.478	0.260	30.200	0.000
		10	-0.054	-0.086	30.327	0.001
		11	-0.145	-0.050	31.332	0.001
		12	0.229	-0.359	34.064	0.001

Figure no.11: Significant level results from autocorrelation calculations for the intelligent air circulation ventilation variable

According to figure 11, it can be said that in general, the significant levels related to the autocorrelation calculations in the research data for the intelligent air conditioning variable were less than 0.05, and it can be said that these data can be used as a reliable Used fuzzy calculations.

Null Hypothesis: D(DD) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on Modified HQ, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.652682	0.0001
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

*MacKinnon (1996) one-sided p-values.

Figure no.12: Dickey Fuller test values Reliability for intelligent air conditioning ventilation

According to figure 12, it can be said that the significance level of Dickey-Fuller test for intelligent air conditioning variable is less than 0.05, and therefore matrix data have sufficient reliability for calculations and reliability.

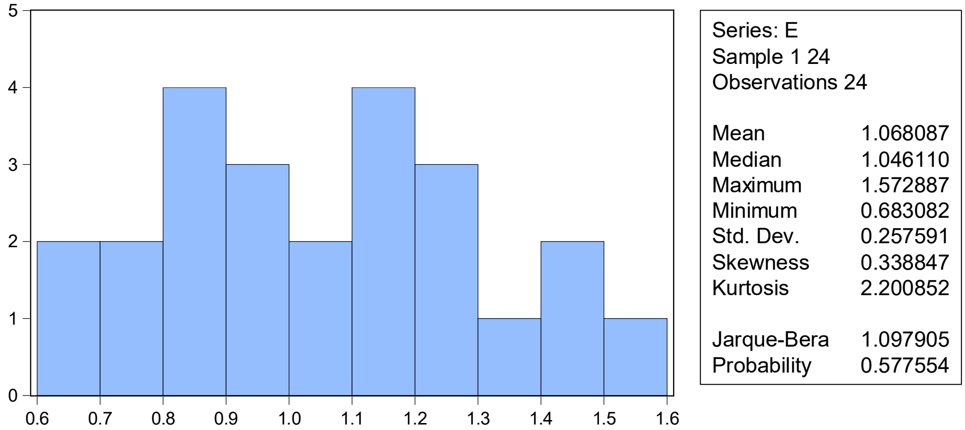
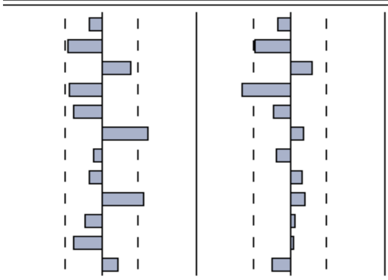


Figure no.13: Estimated data status in MATLAB for the security and safety variable

According to figure 13, it can be said that the value of Jack's statistic for the security and safety variable was equal to 1.097 and is at the level of more than 0.05, so it can be said that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:35
Sample: 1 24
Included observations: 24



Lag	AC	PAC	Q-Stat	Prob
1	-0.126	-0.126	0.4321	0.511
2	-0.365	-0.387	4.2157	0.122
3	0.324	0.253	7.3381	0.062
4	-0.348	-0.531	11.108	0.025
5	-0.305	-0.186	14.164	0.015
6	0.512	0.147	23.251	0.001
7	-0.097	-0.155	23.596	0.001
8	-0.130	0.124	24.259	0.002
9	0.461	0.163	33.101	0.000
10	-0.188	0.058	34.682	0.000
11	-0.295	0.039	38.872	0.000
12	0.180	-0.189	40.557	0.000

Figure no.14: Results of the significant level resulting from the autocorrelation calculations for the security and safety variable

According to figure 14, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the security and safety variable were less than 0.05, and it can be said that these data can be used as a reliable source for Used fuzzy calculations.

Null Hypothesis: D(E) has a unit root
Exogenous: None
Lag Length: 4 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.054990	0.0000
Test critical values:	1% level	-2.699769	
	5% level	-1.961409	
	10% level	-1.606610	

*MacKinnon (1996) one-sided p-values.

Figure no.15: Dickey Fuller test values for reliability and safety

According to figure 15, it can be said that the significance level of Dickey-Fuller test for the security and safety variable is less than 0.05, and therefore matrix data have sufficient reliability for calculations and reliability.

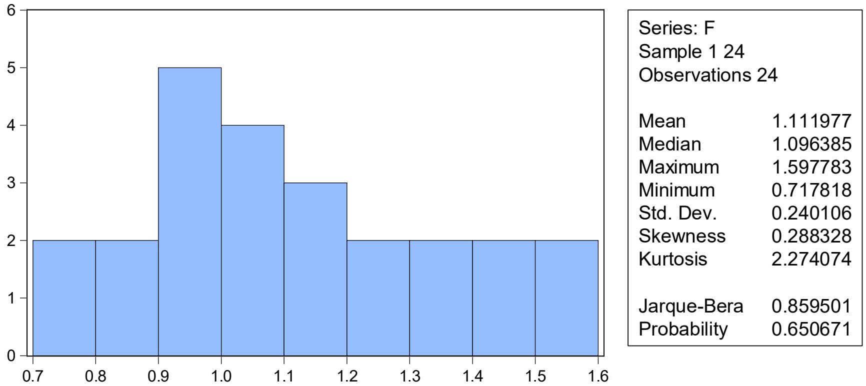
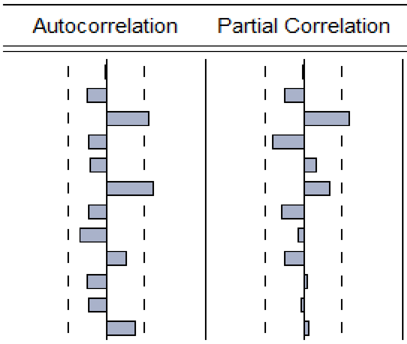


Figure no.16: Status of estimated data in MATLAB for power consumption reduction variable

According to figure 16, we can say that the value of Jack's statistic for the variable of power consumption reduction was equal to 0.859 and is at the level of more than 0.05, so we can say that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:35
Sample: 1 24
Included observations: 24



	AC	PAC	Q-Stat	Prob
1	-0.012	-0.012	0.0041	0.949
2	-0.200	-0.200	1.1398	0.566
3	0.454	0.468	7.2665	0.064
4	-0.173	-0.322	8.1968	0.085
5	-0.165	0.127	9.0907	0.106
6	0.499	0.274	17.719	0.007
7	-0.184	-0.226	18.959	0.008
8	-0.279	-0.061	21.990	0.005
9	0.212	-0.201	23.868	0.005
10	-0.190	0.039	25.483	0.005
11	-0.172	-0.026	26.906	0.005
12	0.297	0.058	31.495	0.002

Figure no.17: Results of the significant level resulting from the autocorrelation calculations for the variable of power consumption reduction

According to figure 17, it can be said that in general, the significant levels related to the autocorrelation calculations in the research data for the variable of power consumption reduction was less than 0.05, and it can be said that these data can be used as a reliability for calculations Fuzzy used.

Null Hypothesis: D(F,2) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on HQ, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.171837	0.0000
Test critical values:	1% level	-3.886751	
	5% level	-3.052169	
	10% level	-2.666593	

*MacKinnon (1996) one-sided p-values.

Figure no.18: Dickey Fuller test values reliability to reduce power consumption

According to figure 18, it can be said that the significance level of Dickey-Fuller test for the variable of reducing power consumption is less than 0.05, and therefore matrix data have sufficient reliability for calculations and reliability.

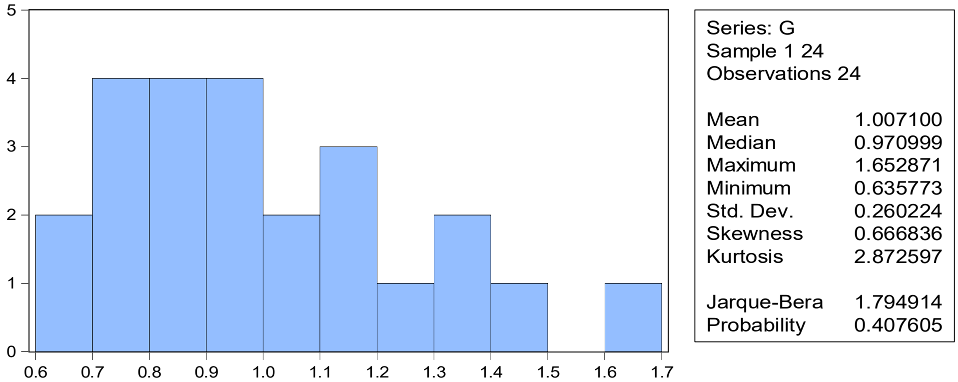


Figure no.19: Estimated data status in MATLAB for the critical event management variable

According to figure 19, we can say that the value of Jack's statistic for the critical event management variable was equal to 1.794 and is at the level of more than 0.05, so it can be said that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:39
Sample: 1 24
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.118	0.118	0.3750	0.540
		2	-0.106	-0.121	0.6927	0.707
		3	0.357	0.397	4.4886	0.213
		4	-0.268	-0.485	6.7255	0.151
		5	-0.369	-0.110	11.204	0.047
		6	0.082	-0.084	11.438	0.076
		7	-0.332	-0.243	15.492	0.030
		8	-0.238	0.014	17.697	0.024
		9	0.393	0.268	24.137	0.004
		10	-0.142	-0.327	25.038	0.005
		11	-0.211	-0.135	27.174	0.004
		12	0.210	-0.325	29.475	0.003

Figure no.20: Significant level results from autocorrelation calculations for the critical event management variable

According to figure 20, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the critical event management variable were less than 0.05, and it can be said that these data can be used as a reliability for the calculations Fuzzy used.

Null Hypothesis: D(G,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on HQ, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.42675	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Figure no.21: Dickey Fuller test values reliability for critical event management

According to figure 21, it can be said that the significance level of Dickey-Fuller test for the critical event management variable is less than 0.05, and therefore matrix data have sufficient reliability for calculations and reliability.

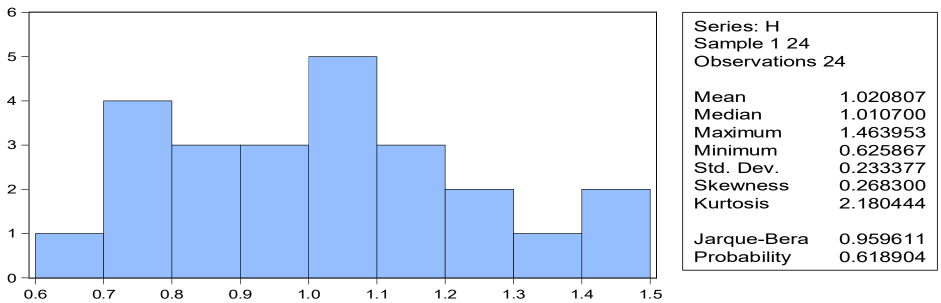
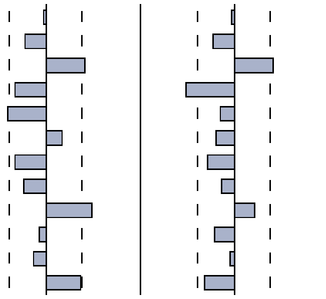


Figure no.22: Estimated data status in MATLAB for inspection equipment automation variable

According to figure 22, it can be said that the value of Jack's statistic for the automation variable of inspection equipment was equal to 0.9596 and is at the level of more than 0.05, so it can be said that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:39
Sample: 1 24
Included observations: 24



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.029	-0.029	0.0229	0.880
		2	-0.233	-0.234	1.5609	0.458
		3	0.430	0.439	7.0428	0.071
		4	-0.332	-0.523	10.491	0.033
		5	-0.419	-0.149	16.249	0.006
		6	0.183	-0.204	17.414	0.008
		7	-0.333	-0.289	21.490	0.003
		8	-0.241	-0.123	23.750	0.003
		9	0.500	0.231	34.158	0.000
		10	-0.081	-0.216	34.451	0.000
		11	-0.131	-0.045	35.271	0.000
		12	0.383	-0.320	42.890	0.000

Figure no.23: Significant level results from autocorrelation calculations for the inspection equipment automation variable

According to figure 23, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the automation variable of inspection equipment were less than 0.05, and it can be said that these data can be used as reliable for calculations. Fuzzy used.

Null Hypothesis: D(H,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on HQ, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-14.48004	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Figure no.24: Dickey Fuller test values reliability for inspection equipment automation

According to figure 24, it can be said that the significance level of Dickey Fuller test for office equipment automation variable is less than 0.05 and therefore matrix data have sufficient reliability for calculations and reliability.

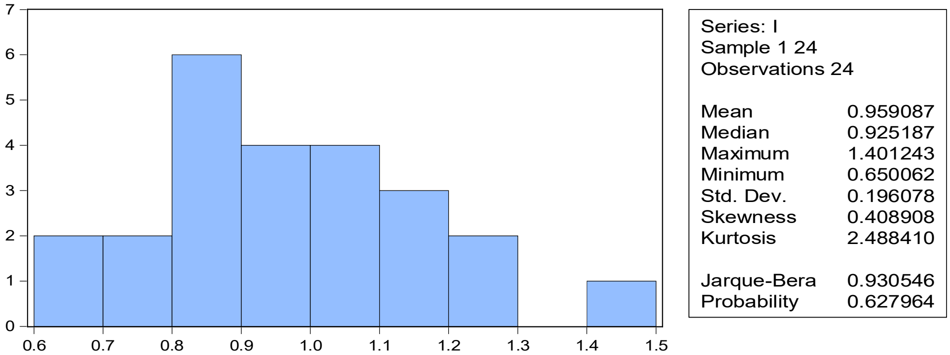


Figure no.25: Estimated data status in MATLAB for equipment consumption management variable

According to figure 25, it can be said that the value of JB's statistic for the equipment consumption management variable was equal to 0.9305 and is at the level of more than 0.05, so it can be said that the data collected in the pairwise comparison matrix had a normal distribution.

Date: 11/15/19 Time: 15:40
Sample: 1 24
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.183	-0.183	0.9062	0.341
		2	-0.318	-0.364	3.7746	0.151
		3	0.630	0.577	15.556	0.001
		4	-0.266	-0.367	17.761	0.001
		5	-0.327	0.041	21.275	0.001
		6	0.499	0.002	29.901	0.000
		7	-0.266	-0.133	32.506	0.000
		8	-0.266	0.044	35.257	0.000
		9	0.556	0.209	48.125	0.000
		10	-0.141	0.079	49.006	0.000
		11	-0.261	-0.028	52.273	0.000
		12	0.290	-0.365	56.632	0.000

Figure no.26: Significant level results from autocorrelation calculations for equipment consumption management variable

According to figure 26, it can be said that in total, the significant levels related to the autocorrelation calculations in the research data for the equipment consumption management variable were less than 0.05, and it can be said that these data can be used as a reliability for the calculations. Fuzzy used.

Null Hypothesis: D(I,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on HQ, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-23.97941	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Figure no.27: Dickey Fuller test values reliability for equipment consumption management

According to figure 27, it can be said that the significance level of Dickey-Fuller test for the equipment consumption management variable is less than 0.05, and therefore matrix data have sufficient reliability for calculations and reliability.

Estimation of fuzzy calculations

The first step for estimating fuzzy calculations is to compute the fuzzy comparison matrix. This matrix is used to create a pairwise comparison scale, and a pairwise comparison matrix is constructed for each level in the hierarchy. Then, the subsets of each row in the matrix are calculated to have a new set. Triangular fuzzy general values (Li, mi, ui) for the Mi criterion are obtained by calculating Li / Σ li, mi / Σ mi, ui / Σ ui,) i= 1,2,…, n (membership functions, which It means the average weight of the corresponding options in the corresponding matrix, using these values are calculated for each criterion.They are normalized and the final weight of the importance of each criterion is obtained. According to Table 4, which shows the fuzzy comparison matrix. The degree of preference of S_i over S_k can be calculated for the matrix relationship between the research variables. These calculations make it possible to finally make a fuzzy prioritization of the research results in a fuzzy approach using a high matrix in the MATLAB space.

Table no.4: Degrees of preference of S_i over S_k

Equipment consumption management	Inspection equipment automation	Critical event management	Reduce power consumption	Provide security and safety	Smart air circulation ventilation	Heating systems	Power consumption management	Components
0.9192383	0.4325795	0.8596898	0.738993	0.7989818	0.8702893	0.7157744	0.7758617	Maintenance of industrial machinery
1	1	1	0.969217	1	1	0.9409432	1	Power consumption management
1	1	1	1	1	1	1	1	Heating systems
1	0.5179813	0.98956	0.8742087	0.9283341	0.8478648	0.9073418	1	Smart air circulation ventilation
1	1	1	0.9498921	1	0.9225552	0.9804924	1	Provide security and safety
1	1	1	1	1	0.9700123	1	1	Reduce power consumption
1	0.5211638	0.8833348	0.9378352	1	0.8564379	0.91669	1	Critical event management
1	1	0.8964192	0.950258	1	0.8693078	0.9293561	1	Inspection equipment automation
0.9275718	0.4937465	0.8221033	0.8788608	0.9510389	0.7967053	0.8569029	1	Equipment consumption management

According to Table 5, it can be said that the degree of preference set for the relationship between the components of the fuzzy matrix has finally been confirmed and can examine the values of the relationship and the preference of each variable over the other variable. So that the degree of maintenance of industrial machinery over power consumption management was equal to 0.775. Also, the degree of maintenance of industrial machinery over heating systems was equal to 0.715. It should be noted that the closer these values are to the number one, the higher the priority.

Table no.5: Degrees of preference of research variables

Degree of preference	Examined variables
0.4325795	Maintenance of industrial machinery
0.9409432	Power consumption management
1	Heating systems
0.5179813	Smart air circulation ventilation
0.9225552	Provide security and safety
0.9700123	Reduce power consumption
0.5211638	Critical event management
0.8693078	Inspection equipment automation
0.4937465	Equipment consumption management

In the next step, the priorities will be estimated in MATLAB software and the final values will be estimated as the results of grading the priorities of the research variables, which are shown in Table 6.

Table no.6: Prioritization of Variables

Prioritize variables	Examined variables
0.0649	Maintenance of industrial machinery
0.1411	Power consumption management
0.1500	Heating systems
0.0777	Smart air circulation ventilation
0.1383	Provide security and safety
0.1455	Reduce power consumption
0.0782	Critical event management
0.1304	Inspection equipment automation
0.0740	Equipment consumption management

Answers to research hypotheses

According to the first hypothesis of the research, which states that management and consumption approaches on the repair and maintenance of machines based on the Internet of Things in the central bank system has priority. The findings of the study showed that by prioritizing the components affecting the health of industrial equipment, a proper prioritization can be provided in the approaches to consumption and equipment repairs, and these approaches can be seen using the data collected through the Internet of

Things. Based on fuzzy calculations, it can be shown that the required priorities in this field were calculated in the following table in MATLAB environment.

Table no.7: Estimated priorities in FAHP calculations in MATLAB software

Prioritize variables	Examined variables	Row
0.1500	Heating systems	1
0.1455	Reduce power consumption	2
0.1411	Power consumption management	3
0.1383	Provide security and safety	4
0.1304	Inspection equipment automation	5
0.0782	Critical event management	6
0.0777	Smart air circulation ventilation	7
0.0740	Equipment consumption management	8

According to Table 7, it can be said that the priorities presented for creating the most optimal state of health of electronic equipment should be such that it ultimately creates the most optimal heating system, management and power consumption and providing security firewalls for data transmission Lead to cloud servers. According to the second hypothesis of the research, which states that the prioritization of the components of repair and maintenance of industrial machines based on the Internet of Things in the Central Bank is based on the existing improvements in the Central Bank, the findings showed that using ranking calculations with Fuzzy approach as well as estimation algorithms in MATLAB software environment can be an optimal solution for estimation for final data, whose validity and testability have already been tested by Dickey Fuller reliability test as well as significant residual autocorrelation judgment test. Was tested and the nature of the data was confirmed by the Jarque-Bera test.

5. Conclusions

The purpose of this study was to explain the solutions and applications of the Internet of Things in the repair and maintenance of industrial machinery. For this purpose, this study considered 8 indicators. These indicators were: power consumption management, heating systems, intelligent air conditioning, security and safety, power consumption reduction, critical event management, office equipment automation and equipment consumption management. Based on this model, in this study, Fuzzy approach was used in MATLAB software. In order to determine appropriate solutions and provide appropriate solutions for the maintenance of industrial machinery with respect to IoT applications, the priority of each variable was examined. According to the results, it can be said that heating systems are in the best condition to examine the use of the Internet of Things. Based on this, it can be said that the IoT in the first report should base its monitoring on the rate of heating of the device, in other words, the space heating system in which industrial workshops and equipment operate should be designed in such a way that in the first level report Determine the average temperature in its reliable value. This is important because when the air temperature in the physical environment increases, the pressure on industrial equipment to a level higher than what is set will be the first element of heat production.

Heat generation will put more pressure on the equipment and internal components of the industry and will eventually lead to their further depreciation and sudden destruction. This IoT basis should first be able to examine the heating system created in the physical space of the industrial environment as well as the heating system created in the device itself, using monitoring bases as well as its own computational algorithms. Adjust the Internet of Things so that it can provide repair engineers with the necessary reports based on changes in the upper and lower limits of ambient temperature and device temperature. This is consistent with the study conducted by Khanboubi et al. (2019). This study showed that when we use the Internet of Things in equipment, this tool can be used as a monitoring approach. Algorithms written for monitoring equipment in industry as well as telecommunication equipment and technology can be such as to refer to the technician errors due to changes in ambient temperature as well as errors due to temperature increase or decrease of temperature from top to bottom. In other words, IoT in this case can improve machine maintenance services in the digital world and in the industrial world.

In the second priority of the proposed solution for the use of maintenance of industrial machinery, the Internet of Things should invest in reducing electricity consumption. The reason for this is that the optimization of the economic costs of an industrial unit can be introduced digitally. It can provide the most common approach to using the equipment that is introduced to it. This has been proven in the studies of Hassan et al. (2019). In other words, it can be shown that when technicians want to prioritize the optimization of maintenance of industrial machinery, it is better to do so based on electricity consumption management; Because one of the approaches seen in industrial equipment is that when the equipment is depreciated, what changes in their power consumption will change. In other words, it can be said that the equipment may have the same efficiency with more electricity or even with less electricity consumption. Therefore, the Internet of Things can recognize the fluctuations caused by electricity consumption of industrial equipment and finally provide specific patterns of limits related to the health of the device, and through this can create a suitable solution and speed up their maintenance. In other words, creating sensors on the device that can periodically and even send parts related to energy consumption to an IoT device, and also the existence of computational algorithms on that IoT device that can increase its monitoring power can be the basis. This was confirmed by a study conducted by Varadharajan and Bansal (2019) to identify the best time to repair devices. In their study, the researchers showed that by implementing the reduction of electricity consumption in the industrial sector using the Internet of Things, data analysis such as sensors, controllers, and data analysis software can be used.

The third priority can also be the management of electricity consumption in relation to the Internet of Things, and automated meters, bulk or cloud data processors using the Internet of Things can determine the status of devices in factories before they fail. Produce a breakdown in the product, anticipate and take the necessary measures to eliminate the anticipated defect. Also, manufactured products can be monitored and tagged instantly and full time by cameras and sensors, and the Internet of Things can improve it, so that the product manufacturing organization can focus on repairing and maintaining machinery. Be effective. Also, in this regard, the power consumption of the device can be optimized using the Internet of Things, especially until the right time for repairs, in this case, the Internet of Things and data analysis as a lever to manage and stay in competition with power management. It will be usable. The findings of this study are consistent with a study conducted by Sharma and Al-Muharrami (2018). According to the results of these researchers, industry managers have begun to make changes in the organization and move their organization to use the Internet of Things to manage power consumption in their industrial equipment. These changes included data simulation, training repair engineers to interpret and analyze data, and hiring data mining teams to output changes in device power consumption. In this case, industrial organizations have shown a greater tendency to use the Internet of Things in creating their power consumption management. In fact, IoT engineers are trying to use sensors to detect and optimize power consumption.

There is still time in the industry by creating security firewalls on IoT-related sensor equipment. The IoT seems to need strong networked firewalls to maintain its security, which regularly monitors the sensors of industrial devices, in which case the information is detected by sensors that actually work the five senses. Security of equipment and their data transfer is used. When we eat salty food, its information is sent to the brain by taste sensors and processed. By processing the information of the brain, it is concluded that eating this food is harmful to the health of the body, and at the command of the brain, the eating operation is stopped immediately. The terms described about the Internet we use today are not true, but they are perfectly consistent with the concept of the Internet of Things.

Conditions in which information is collected by sensors and an appropriate command is issued. These findings are consistent with the study of Trnka et al. (2017). The findings of these researchers showed that the use of networks related to security firewalls is related to product delivery and familiarity of repair technicians with the type of data transfer and its security in the network. IoT can improve, optimize the equipment repair process. Moreover, automation of inspection equipment installed by digital monitors in the Internet of Things can increase the network's ability to improve information reading conditions and thus increase the health of the equipment, which can be a sign of the ability of the Internet.

Objects in communicating at all times with equipment and constant monitoring of their health at work. The findings of this study are consistent with the research of Markoska and Ivanochko (2018). Their findings show that the use of the Internet of Things will lead to more accurate and appropriate forecasting and decision making with respect to its use for office equipment automation. In industrial companies or organizations that use industrial equipment, the use of the Internet of Things can accurately track the status of production orders by industrial equipment and share this information with its customers through the automation of inspection equipment. They can also use the available data to accurately predict the time and manner of delivery of their shipments to customers. In this case, the advent of the Internet of Things as a tool to create industrial automation in any part of the industry will completely transform it. Despite this technology, planning will be accompanied by many changes in many industrial fields.

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