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Original scientific paper

THE ROLE OF THE INTERNET OF THINGS (IOT) IN THE EDUCATION DEPARTMENT

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Abstract. *This research investigates the relationship between factors affecting the acceptance of IoT technology in the Najafabad Education Organization in the Isfahan province of Iran. One of the challenges many organizations face is assessing the level of acceptance of IoT technology before its implementation. The research methodology in terms of purpose is applied research and descriptive survey in terms of data collection method, implemented in the field. The statistical population of this research includes all educational and non-educational staff under the supervision of the Najafabad education department with 20,000 employees, which randomly selected a sample of 42 people. A questionnaire has collected the data of the present research. The applied questionnaire contains 23 questions (7 aspects) that a researcher has developed. The Structural Equation Modelling (SEM) and Partial least Squares (PLS) techniques for hypotheses test and model suitability have been used to determine the acceptance of IoT factors. Also, Smart-PLS software is applied, that well-suited to conditions such as the independent variables coordination, data abnormalities and small sample size. The highest average of IoT acceptance is associated with the perception of profitability, and the lowest average is related to social influence. The outputs of this research are that perception of Usefulness, perception of simplicity as well Reliance, have a positive influence on the reception of IoT technologies in this educational system. Nine hidden variables have been considered for this research. Based on the performed analysis and the obtained results, it can be claimed that the most influential factor in the IoT technology acceptance among the target population is building Reliance and confidence in people, and the next factor is the use easiness of IoT technology tools. A noteworthy finding in this research which almost everyone agrees on the usefulness of IoT technology.*

Key words: *Internet, IOT, Acceptance of IOT, Smart Technologies*

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1. INTRODUCTION

The Internet of Things (IoT) is a relatively novel paradigm and is rapidly developing in today's modern and wireless communication scenarios. The ambient presence of various objects, such as RFID tags, sensors, stimulators, cell phones, etc., around the people is the prime idea of this concept. These various objects can communicate with each other and collaborate to achieve a common aim by unique addressing patterns. Kevin Ashton (1999) introduced the Internet of Things phrase for the first time. Ashton declared this concept considering that every object has a digital identity, controlled and managed by computers [1-2]. IoT pointed out to a network; this network is formed by communicating objects with each other. Notably, the identity of every physical object is shown by a label. These objects not only can communicate with each other independently, and also they can exchange data [3]. The definition of Cisco of IoT can be expressed as interconnected physical objects. Moreover, Cisco uses the "Internet of everything" for physical and virtual objects [4]. IoT is formed based on the applications created by key technological empowerment. The mentioned empowerments are included Radio-Frequency Identification (RFID), wireless sensors technology, smart technologies, and nanotechnology. Changes in the physical status of connected objects can be detected and monitored by this developed Internet in the Real-Time [3]. The definition of IoT has been developed in the previous decades and consists of many fields. The potential to provide new capabilities and well economic experiences, and opportunities for different individuals and countries exist in IoT [4]. In the IoT paradigm, many objects surrounding us are settled in the network in one or more forms. Sensor network technologies are being enhanced in invisible information and communication systems embedded in individuals' surrounding environments to meet this new challenge; this leads to information generation that must be stored, processed, and provided in the integrated, efficient, and conveniently interpretable forms. Nowadays, Internet's speed is enhancing, and also the accessibility to the Internet is becoming easier and cheaper year by year. Furthermore, other devices with built-in Wi-Fi are being created, and more advanced protocols (such as NB-IoT) are being developed with higher speeds and lower energy consumption for IoT. Consequently, objects can connect to the Internet faster and cheaper. The role of the evolution of the Internet, bandwidth, and communication protocols is crucial in IoT development. According to Gartner Research Institution (2014), approximately 26 billion various devices will be connected to the Internet by 2020 [5-6]. Another research [7] is predicted that there will be approximately 50 billion connected devices to the Internet by 2020. Thereby, 5 to 6 devices are connected to the Internet per person on average. Connecting various devices and objects is novel progress on the Internet. IoT leads the fourth phase of the Internet Revolution [8]. IoT is expected to be another revolution after World Wide Web, connecting the virtual and real worlds in the near future [9]. IoT technology has influenced many scopes, especially smart cities, which dramatically impact communication between routine objects utilizing Internet features and big data analysis [10]. Activities in smart cities are accomplished by the advanced embedding of technology and data sets in infrastructures that interact with the IoT. The acceptance of IoT will have many potential benefits: improvement in operational processes, value creation, reduced cost and minimizing risk. These benefits result from transparency, tracking ability, compatibility, scalability, and flexibility that IoT creates [11].

Nowadays, educational environments cannot follow their previous traditional methods. Currently, novel technologies have led to the development and expansion of knowledge and awareness in educational environments. Novel technologies have had the most dramatic and significant impact on educational environments. The results of the development of novel technologies, especially the Internet of Things, facilitate and improve educational activities. If these technologies are ignored and not used promptly, these advances cannot be used in a timely and complete manner in educational activities. IoT has a wide range of applications; therefore, educational environments can use this technology at all levels. The role of IoT in education includes energy storage, overseeing students' health and security, optimizing classroom and educational environments, remote attendance of students, etc. Educational systems have a wide range, and previous methods of educational technologies covered a limited dimension of them. The difference between IoT technology and other previous educational technologies is that all these tools and facilities can become smart and used in educational and service activities by using various IoT tools. The following benefits are pointed out based on the studies regarding the usage of IoT in the educational class associated with behavioral and social analysis: real-time and fast feedback to teaching and learning processes, the possibility of interaction and sharing of obtained data from connected objects in class with other educational centers, automation of many time-consuming activities in the class, the possibility of sending educational tips and materials for absence people, and many other applications. Eventually, all of the mentioned benefits lead to improvement of learning processes and enhancement of the educational environment's productivity. The IoT should not be used only to facilitate daily activities but should also be used in educational environments for learning purposes. If there is sufficient knowledge of the function and effectiveness of IoT technology in educational environments, the mentioned purposes will be achieved. Otherwise, IoT technology only facilitates the activity of teachers [12]. Many developed countries have considered digital and network technologies in educational classes and study environments. The government policies of these countries are to provide access to the Internet for every student, educational center, and family, support the various innovations of digital teaching, and connect everything to the Internet. Hence, many IT experts believe that IoT is a critical issue regarding learning and teaching in the 21st century, like books in the 19th century [13]. Based on Li et al. [14], the usage of IoT in educational environments can improve teaching quality, learning, management, and enhancement of educational standards in the educational centers. Abernathy [15] indicated that the utilization of web networks and the Internet regarding education causes the reduction of costs, updating information, and development of educational methods and techniques. The IoT technology will have beneficial and effective functions if it is used to improve learning and teaching processes and be acceptable by stakeholders in educational environments [16]. Given the above, this research is analyzed the acceptance of IoT in the Najaf Abad county's (Isfahan Province) education department. The following issues are critical before the implementation of IoT to examine the challenges and barriers that may exist in planning and implementing processes from the view of experts: use of IoT in educational environments and opportunities that creates in these environments, provide the platforms for implementing this technology in Isfahan Province and entire Iran, examine the facilities and requirements of IoT acceptance among the staff of the organization. In this study, the second part outlines the research background and previous work conducted in the field of utilizing the Internet of Things (IoT) in educational environments. The third part presents the research findings, while the fourth part introduces the structural equation model. Finally, the last part discusses the conclusions and compares this research with similar studies.

2. Literature Review

Zarrin, Alimohammadi, and Seyadat [17] (2018) pointed out the positive role of IoT usage. They declared that IoT would soon enter the entire aspects of the physical world, increase productivity in all of its dimensions, and be considered an attractive perspective for countries' development and welfare. Nataliia and Elena (2015) [18] examined IoT as a symbolic power source. They revealed that IoT is an emerging power source and affects political and economic relations. In another study, Jayavardhana et al. [19] indicated that IoT is considered a key factor in different scopes and can evolve the computing and planning sources. Vermesan and Friess (2014) [20] examined IoT and strategic innovation and found that IoT is known as strategic innovation. Khedmatgozar (2015) [21] analyzed the role of IoT in knowledge management systems. Based on this study, IoT can improve the staff performance in the two sections of gathering data and entrance and exiting management in six particular scopes. Bigdeli, Nouruzi, and Magham (2018) [22] indicated that the smartization of schools positively and significantly influences students' creativity. Ghaznavi, DaeiZadeh, and Fallah(2017) [23] revealed that the desirable model of the syllabus based on smartization in Iran consists of five factors: management system, teaching and learning environment, empowerment of human resources, and hardware and software factors. Moreover, the study of H. K. Moghaddam and Mousavi (2020) [24] is another study regarding the impact of IoT. They researched building smartization and proposed structures. The utilization of these structures has positive consequences, including improving and correcting the speed and accuracy of staff's entrance and exit tracking, creating integrated mechanisms in the evolution of employees, etc.

In the study Kassab et al. (2020) [25], the impacts and challenges of the Internet of Things (IoT) and its advantages and disadvantages in the field of education were examined. It was shown that the Internet of Things can have a positive impact on various principles of learning. The research Yojna (2024) [26] discusses the benefits of Cloud IoT in education. It shows that smart classrooms can be significantly improved by integrating IoT devices with cloud computing to create interactive and personalized learning environments. The study Eriona et al. (2024) [27] examines current trends in smart classrooms and the use of IoT. It explains how classrooms are evolving by integrating sustainable IoT technologies and discusses the various benefits and challenges associated with adopting IoT in education. In Nuzula et al. (2024) [28], a brief review of the research conducted (about 176 research works) in the field of integrating the Internet of Things (IoT) into smart education (in the period from 2012 to 2024) is presented. In this research, China is introduced as a leading country and organization in this field. The paper explains how the Internet of Things can strengthen adaptive learning theories guide policymakers in formulating national education strategies and improve practices in schools and classrooms by personalizing learning experiences and interactions. In Abu et al. (2024) [29], the aim is to develop an electrical control system (for detecting student presence) for smart classrooms using IoT technology. This system is designed to effectively manage electrical resources in educational classrooms and detect and monitor student presence, which is very important for optimizing energy consumption. In Iwan et al. (2024) [30], investigated the integration of IoT technology within educational settings. Their findings demonstrated that IoT technology can significantly enhance classroom management efficiency. Furthermore, the study highlighted the crucial role of IoT in modernizing educational practices and fostering improved learning outcomes. In Saru

Dhir et al. (2024) [31], explored the enhancement of teaching and learning within smart classrooms through the implementation of Internet of Things (IoT) technology. The study's findings suggest that integrating IoT within educational settings facilitates the creation of interactive learning environments, enabling students to engage more effectively with course material. In Shayer et al. (2024) [32], successfully developed a prototype smart classroom utilizing a diverse array of technologies, including ESP32-CAM, fingerprint sensors, flame sensors, SIM8001 modules, and Arduino Nano boards. This endeavor aimed to enhance classroom management and bolster classroom security. The research presented significant findings on the implementation of an IoT-based smart classroom, with a particular emphasis on advanced learning environments and robust security protocols. In Khong et al. (2024) [33], present the development of a smart Internet of Things (IoT) system designed to analyze and enhance the classroom environment. The research emphasizes the integration of smart sensors for real-time monitoring, controlling electrical appliances, and minimizing power consumption. By leveraging user-friendly visualization tools, the system facilitates data analysis and fosters increased stakeholder engagement. This proposed solution aims to cultivate a favorable learning environment by determining optimal temperature and humidity levels, ultimately leading to improved academic outcomes and significant energy savings within educational institutions. In Mohanty et al. (2024) [34], conducted a study examining the integration of Internet of Things (IoT) technologies within smart classrooms. Their findings revealed a significant increase in student engagement levels, from 60% to 85%, fostering increased collaboration and enhanced task completion efficiency. Furthermore, the study underscored a positive correlation between IoT integration and improved academic performance, while simultaneously acknowledging challenges such as technical difficulties and instructor resistance to IoT adoption. In Md Alimul Haque et al. (2024) [35], investigate the integration of Internet of Things (IoT) technologies within e-learning systems, with a particular focus on smart classrooms. This research explores the utilization of devices such as electroencephalography (EEG) to monitor physiological responses, assess student engagement and attention during online lectures, and enable the detection of students' concentration levels. This information can then be leveraged to inform and refine teaching strategies, ultimately enhancing learning outcomes. In Sharmin Akter et al. (2023) [36], underscore the critical role of integrating diverse technologies, such as IoT and AI, in fostering a truly smart classroom environment. This integration not only facilitates automation but also significantly enhances the overall learning experience for students. The research demonstrates the efficacy of the developed smart classroom features, including a predictive student attendance model. This model leverages the geographical location data of students' mobile devices in conjunction with classroom location data to accurately track student attendance. Furthermore, the research presents a novel method for monitoring student attention by analyzing eye blink rates in relation to environmental sensor data. In the study Terzieva et al. (2022) [37], the aim is to present the role of the Internet of Things (IoT) in achieving smart environments across various fields, with special attention given to the concepts of smart schools and smart education. This study demonstrates how IoT devices can contribute to a more efficient educational process within an optimal learning environment. In the research Miloš Djordjević et al.(2020) [38] the goal is to develop an intelligent system for storing data obtained from the microclimate in a smart faculty using Internet of Things (IoT) technology and smart sensor nodes. This system enables the automatic control of environmental parameters within the school by measuring various environmental factors and regulating them without human intervention. This system is based on: a group of built-in sensors, a microcontroller with a peripheral interface (PIC) as a core, a server system, and a wireless Internet using the Global System of Mobile Telecommunications (GSM) module with General Packet Radio Service (GPRS) as a communication protocol. The significance of utilizing the Internet of Things (IoT) lies in its high efficiency and productivity within educational environments, supported by extensive previous research on its application in various educational settings. Therefore, this research aims to highlight the importance of implementing the Internet of Things in educational contexts.

3. Findings

The present study sample includes 42 people, 28 people are female (66.7%), and 14 people are male (33.3%). Most of the people used in the study are over 50 years (31%). Moreover, these people's recorded service is over 15 years (54.8%), and they have postgraduate education (59.5%). The following Table (Table 1) is shown the demographic characteristics of people used in this study.

According to Table 1, the population of females is approximate twice the male population. The largest population of this study is related to people over 50 years. Meanwhile, most of the people have over 15 years of recorded service. Moreover, most people have postgraduate.

Table 1 Demographic Characteristic of People

		Frequency	Percentage
Sex	Male	14	33.3
	Female	28	66.7
Age	Less than 30 years	8	19.0
	30-40 years	11	26.2
	40-50 years	10	23.8
	Over 50 years	13	31.0
Recorded of service	Less than five years	7	16.7
	5-10 years	10	23.8
	10-15 years	2	4.8
	Over 15 years	23	54.8
Level of education	Diploma	0	0
	Associate degree	0	0
	Bachelor degree	17	40.5
	Postgraduate	25	59.5

The descriptive statistics of study variables are reported in Table 2. The highest mean of IoT acceptance is related to usefulness perceiving (16.60±2.253). In contrast, the lowest mean is related to social influence (9.98±1.316). The skewness and kurtosis of the variables are in the range of [-2, 2]. Thereby, the distribution of the variables is normal.

Based on the results of the Kolmogorov-Smirnov test (Table 3), the significance level for all of the variables is less than 0.05. Consequently, none of the variables have a normal distribution.

Table 4 shows the stochastic test of data. The significance level of all data is more than 0.05, except for perceiving simplicity of use. Therefore, the stochastic data are acceptable, except for perceiving simplicity of use.

Table 2 Descriptive Statistics of variables

Variable	Mean	Standard Deviation	Median	Mode	Variance	Minimum Score	Maximum Score	Skewness	Kurtosis
Usefulness Perceiving	16.6	2.253	16	14	5.076	14	20	0.319	-1.313
Perceiving the Simplicity of Use	12.69	3.626	11	9	13.146	9	19	0.443	-1.381
Social Influence	9.98	1.316	10	11	1.731	8	13	0.046	-0.753
Reliance	10.45	1.533	10	10	2.351	8	13	0.073	-0.892
Pleasure Perceiving	11.95	1.545	12	11	2.388	9	14	0.811	-0.797
Perceiving the Behavior Control	10.90	1.078	11	11	1.161	9	14	0.811	-0.797
Technology Acceptance	11.19	1.954	11	10	3.816	8	14	0.070	-1.231

Table 3 Kolmogorov-Smirnov test results for assessing the normality of variables' distribution

Result of the test	Usefulness Perceiving	Perceiving the Simplicity of Use	Social Influence	Reliance	Pleasure Perceiving	Perceiving the Behavior Control	Technology Acceptance
Kolmogorov-Smirnov Statistic	0.161	0.247	0.187	0.140	0.207	0.251	0.157
Significance Level	0.008	0.000	0.001	0.038	0.000	0.000	0.010

Table 4 The results of data stochastic

Result of the test	Usefulness Perceiving	Perceiving the Simplicity of Use	Social Influence	Reliance	Pleasure Perceiving	Perceiving the Behavior Control	Technology Acceptance
Test Value (Mean)	16.60	12.69	9.98	10.45	11.95	10.90	11.19
Values greater than the Mean	23	22	16	22	20	16	23
Values Smaller than the Mean	19	20	26	20	22	26	19
Z Statistic	-1.044	-2.647	-1.098	-0.768	-0.455	-1.430	-1.359
Significance Level	0.297	0.008	0.272	0.442	0.649	0.153	0.174

Structural equation modeling and Smart PLS Software are used in this study. The mentioned software is compatible with the conditions of multicollinearity of independent variables, non-normal data, and small sample size.

4. USE OF THE STRUCTURAL EQUATION MODEL

This study uses the structural equation technique to analyze the structural relationships for data analysis. This technique is based on two patterns: measurement and structure. The measurement pattern pointed out how the measurement variables are gathered in the theoretical framework formation and considers related issues of structures' reliability and validity. Notably, The Smart PLS Software is used.

The Smart PLS Software examines two models simultaneously. The external model (measurement model) assesses the relationship among explicit variables (the external model examines the relationship between items with the related variable to that item). The internal model (structural model) evaluates the relationship between latent variables and other latent variables (examines the relationship among variables. Explicit variables are rectangular variables, which are under the components of the latent variable. The shape of the latent variables is oval. At this stage, the measurement model is presented to perform the research and examine the relationship between the aim of the research and each factor.

Indeed, estimation of validity and reliability will assess the measurement models based on considered indicators in the external models. The structural model (internal model) can be examined if the validity and reliability of measurement models are confirmed. The measurement model results are shown in the form of Cronbach'salpha coefficient index, combined reliability, and average variance extracted. Any item with a factor loading of less than 0.04 is excluded from the analysis to ensure validity. Given Fig. 1, factor loading greater than 0.4 is used for analysis. Table 5 summarizes the final results.

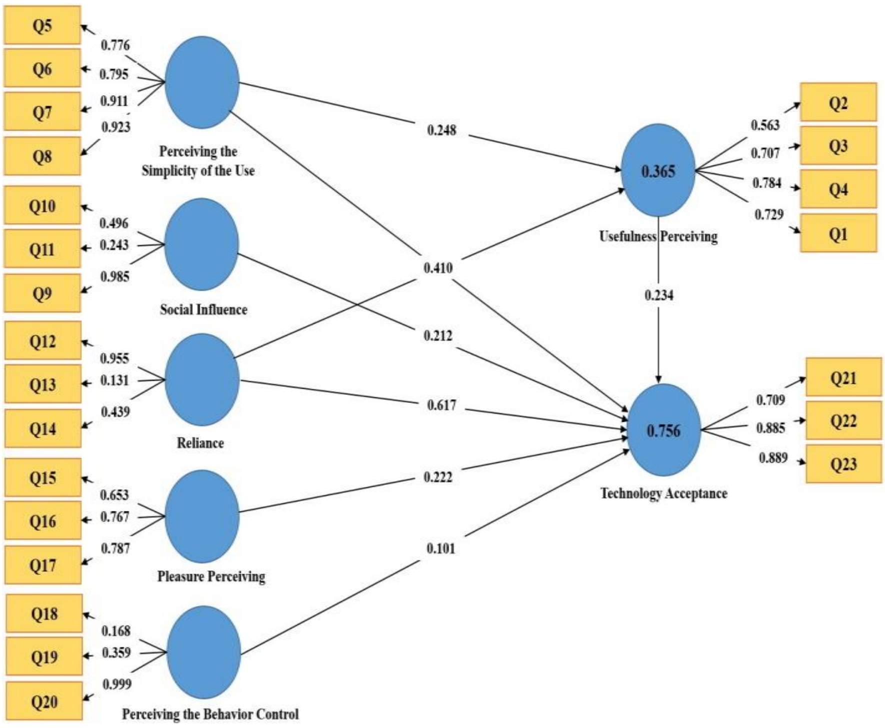

Fig. 1 Standard factor loading of the study's hypothesis test

Table 5 Results of explicitly variables' factor loading

Variable	Number of items	Factor Loading	Significance
Usefulness Perceiving	1	0.729	Accept
	2	0.563	Accept
	3	0.707	Accept
	4	0.784	Accept
Perceiving the Simplicity of Use	5	0.776	Accept
	6	0.795	Accept
	7	0.911	Accept
	8	0.923	Accept
Social Influence	9	0.985	Accept
	10	-0.496	Reject
	11	-0.243	Reject
Reliance	12	0.955	Accept
	13	0.131	Reject
	14	0.439	Accept
Pleasure Perceiving	15	0.653	Accept
	16	0.767	Accept
	17	0.787	Accept
Perceiving the Behavior Control	18	-0.168	Reject
	19	0.359	Reject
	20	0.999	Accept
Technology Acceptance	21	0.709	Accept
	22	0.885	Accept
	23	0.889	Accept

Based on Table 5, the modified model is illustrated in Fig. 2 after excluding the factor loading of less than 0.4.

As aforementioned, this study uses Cronbach's alpha index, combined reliability, and average variance extracted to evaluate the validity of structure. If the structure has the highest common variance with its markers (relative to the share of that structure with other structures) in a specific model, it is a suitable indicator for external model evaluation. The Average Variance Extracted (AVE) (the average of common variance between structure and its markers) is proposed for evaluation. This indicator shows the validity of the measurement tool, and it assumes that the latent variable has the highest common variance with determined markers compared to other latent variables. The scholars proposed the average variance extracted of 0.5 and more; the considered structure presents about 50% or more of its marker variances. Moreover, Cronbach's alpha above 0.7 is recommended for reliability acceptance. Notably, the questionnaire has moderated reliability if Cronbach's alpha is between 0.5 and 0.7. However, the combined reliability (CR) index is preferred to Cronbach's alpha index. The desirable value of CR is between 0.6 to 0.7 in the exploratory research, while this value in more advanced research is between 0.7 to 0.9. The coefficient of determination (R^2) indicates what percentage of the dependent variable changes are explained by the independent variables.

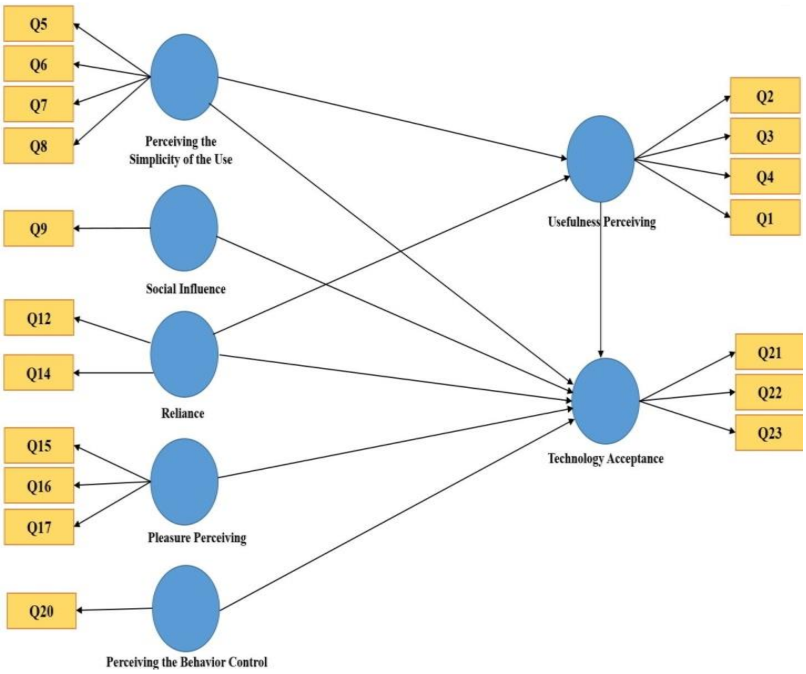

Fig. 2 The model in the form of parameter confirmation

Indeed, this coefficient indicates that, in total, what percentage of the dependent variable behavior is predicted by the independent variable. The range of R^2 is between zero to one and is evaluated with three amounts: 0.19 (weak), 0.33 (medium), and 0.67 (strong). The study will not have scientific value if its R^2 is less than 0.19. Based on Table 6, the considered data of questionnaires has high reliability. Further, the proposed structures have high validity and confirm the measurement model (Table 6).

Table 6 Evaluation of the structure validity

Variable	Cronbach's alpha	Combined reliability	Average Variance Extracted	Coefficient of determination
Usefulness Perceiving	0.703	0.788	0.485	0.353
Perceiving the Simplicity of Use	0.876	0.914	0.729	----
Social Influence	1.000	1.000	1.000	----
Reliance	0.417	0.689	0.568	----
Pleasure Perceiving	0.605	0.781	0.545	----
Perceiving the Behavior Control	1.000	1.000	1.000	----
Technology Acceptance	0.777	0.870	0.692	0.672

This study uses Structural Equation Modeling (SEM) and the Partial Least Squares (PLS) method to check the test hypothesis and fitness of the model. The internal model (structural model) measures the relationship between latent variables with other latent variables. Table 7 reports the results of the hypothesis test.

Table 7 Results of the study's test

Hypothesis	Path Coefficient	t-value	Test Result
Usefulness perceiving has a positive impact on the IoT technology acceptance.	0.234	1.322	Reject
Perceiving the simplicity of use has a positive impact on IoT technology acceptance.	0.410	1.779	Reject
Perceiving the simplicity of use has a positive impact on usefulness perceiving.	0.243	1.503	Reject
Reliance has a positive impact on IoT technology acceptance.	0.617	2.620	Accept
Reliance has a positive impact on usefulness perceiving.	0.410	1.779	Reject
Social influence has a positive impact on IoT technology acceptance.	0.212	1.616	Reject
Pleasure perceiving has a positive impact on IoT technology acceptance.	0.222	1.563	Reject
Behavioral control has a positive impact on IoT technology acceptance.	-0.101	0.737	Reject

The hypothesis at the significance level of 0.05 is confirmed if the t-value is out of the (-1.96, 1.96) range. Fig.3 and 4 show the results of this section.

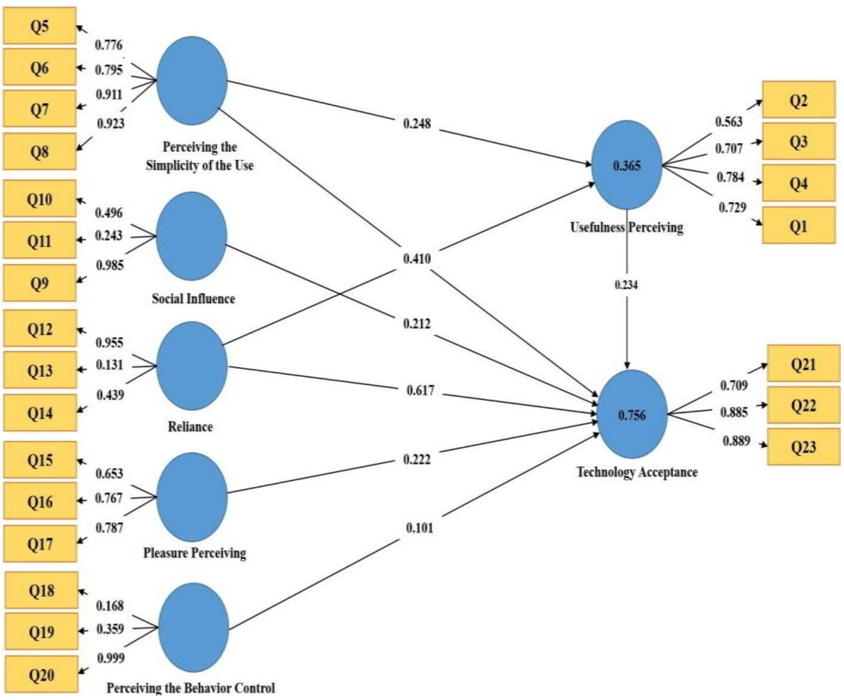

Fig. 3 Results of the structural model

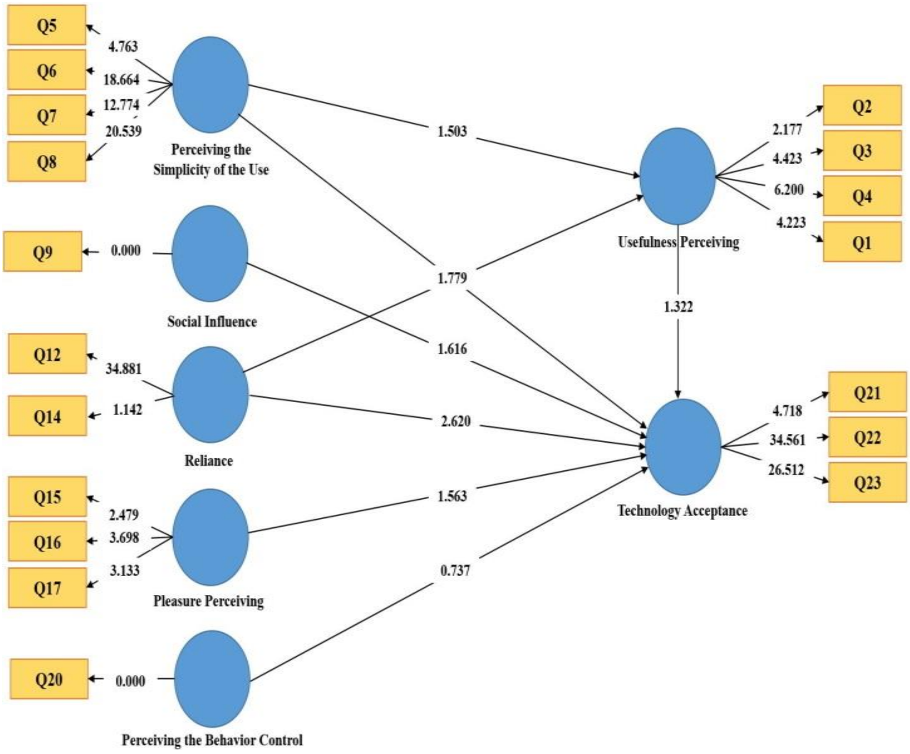

Fig. 4 The study's model in the significance of parameters

This study uses validity examination (including examination of subscription validity and redundant validity examination index) to examine the quality or validity of the model. The subscription index evaluates each block of measurement model quality. The redundant index is also called Stone-Geiser (Q2). The mentioned index measures the structural model quality for each endogenous block by considering the measurement model. If the redundant index is positive, the quality of the measurement and structural models are suitable and acceptable. The values of each indicator related to dependent and independent variables are reported in Table 8. As can be seen, indicators are positive, zero, or more than zero. Moreover, Tables 5 and 6 show the values of these indicators.

Table 8 The values of subscription validity index and redundant validity index

Variable	Subscription Validity	Redundant Validity
Usefulness Perceiving	0.162	0.100
Perceiving the Simplicity of Use	0.534	0.000
Social Influence	1.000	0.000
Reliance	0.058	0.000
Pleasure Perceiving	0.121	0.000
Behavioral Control	1.000	0.000
Technology Acceptance	0.392	0.405

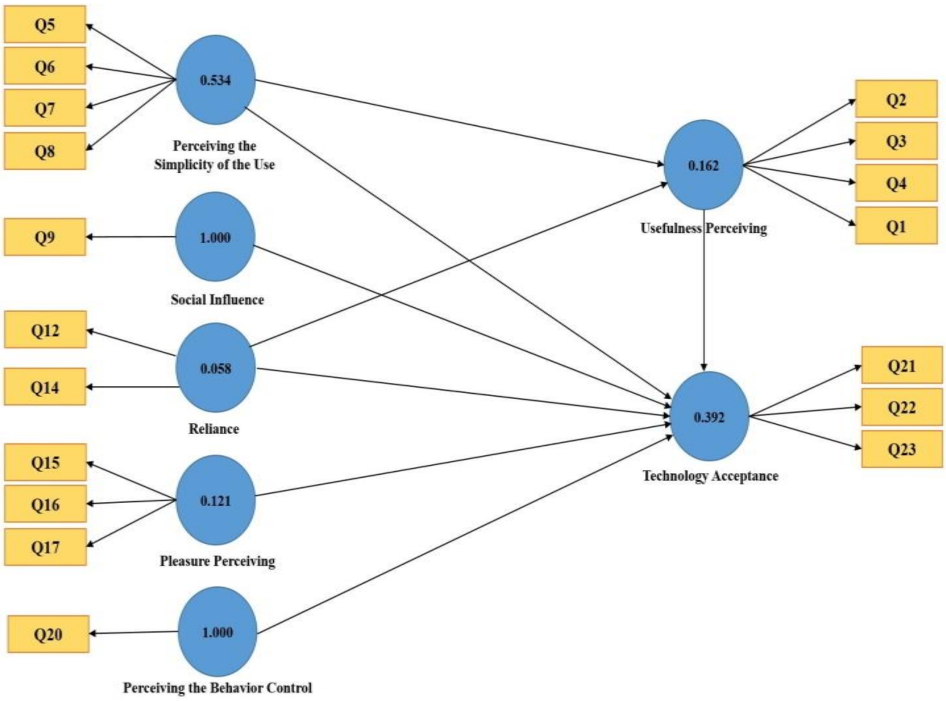

Fig. 5 Subscription validity examination index model (cv com)

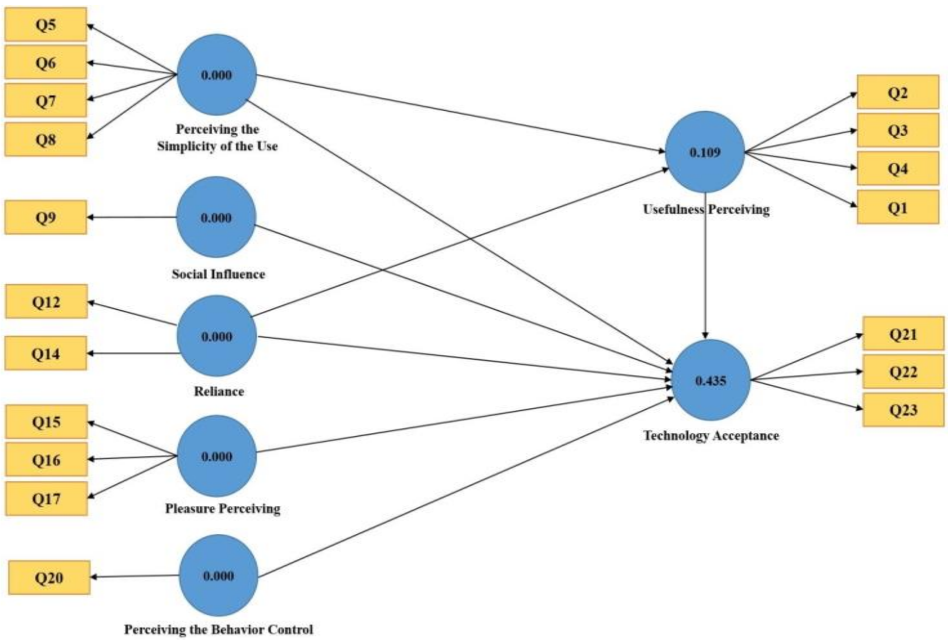

Fig. 6 Redundant validity examination index model (cv red)

5. CONCLUSION

Based on the conducted studies and global community development, if IoT applications are not used or welcomed, our current society will eventually lag behind other societies; this is an understandable and undeniable debate in education. In the current situation, most of the education of students is performed on the Internet platform. Therefore, people are forced to utilize smart devices for teaching. Thus, it is an appropriate opportunity for people to become acquainted with the novel educational system. Teachers will have more tools and more effective teaching methods. On the other hand, students' interest in learning will enhance, and they can use their time optimally. Notably, the usage of IoT technology can help to environment preserving gradually. Achieving all of the mentioned purposes needs infrastructures; providing these infrastructures is beyond the ability of students and teachers. Examination and identification of effective factors for acceptance of IoT technology in the education system of the mentioned county is the main purpose of this study. This study considered nine latent variables. The overall results based on the analysis and obtained outcomes are as follows: Among the target community, the most effective factor in the acceptance of IoT technology is the creation of reliance and assurance. In other words, people need to be confident that using this technology will protect their privacy entirely and appropriately and lead them to the desired result. Facilitating the use of this technology's tool is the next factor. In other words, people can use the positive applications and easily use them through short-run learning and study. There was a consensus among almost all people regarding the usefulness of this technology, which is a significant result. Consequently, people have perceived the usefulness of this technology and its positive impact on the process of work. Thus, this knowledge is acceptable in people's minds, and now is the time for practical use.

There are some related studies regarding the application of this technology in other sections, such as health and education. The closest research to this study is the study of Shekari and Darand (2018) [39]. Using a quantitative research method, they analyzed the most important IoT applications in the Yazd administration system (daily operational time, control of the staff's entrance and exit). The present study results are consistent with the mentioned research results and confirm the effectiveness of the IoT in the educational system. Due to issues such as the novelty of the present study, difficulties in conducting the research process were not far from the mind. It is worth noting that the researchers of this study worked hard to eliminate barriers and limitations. It is valuable to point out the results of other related studies regarding school smartization. Nodehli & RezaeKalantari (2016) [40] found that the smartization of school has a role in the learning quality dimensions (attitudes, mental habits, expansion and correction of knowledge, acquisition, and intertwining of knowledge, and the significant use of knowledge). Foroghi & Yarmohammadian(2016) [41] revealed that changes in the cultural infrastructure are required to make schools smarter so that people with lifetime learning can be trained. They also declared that the speed and accuracy of learning and designing a learning environment in accordance with the students' talent are obtained by smartization. In another study, Shahzari (2017) [42] indicated that the most impact on educational planning and evaluation is related to information and communication technology, among the other qualitative variables. Our results are consistent with their results regarding creating appropriate evaluation methods with smartization. Based on Dalir & Hosseininasab(2015) [43], the educational progress and motivation in the students of smart schools are higher than in normal schools. Moreover, the present study results are consistent with theirs regarding enhancing students' motivation. Bigdeli et al. (2018) [44] revealed that school smartization positively and significantly influences the students' creativity. The role of new information and communication technologies in facilitating and improving education quality should be considered to increase students' learning quality, abandon teacher-oriented and memory-oriented learning methods, and create methods to increase students' activity, thoughts, creativity, and responsibility. Gonzalez, Organero & Kloss (2018) [45] indicated that The IoT has features such as motivation and happiness. Also, IoT allows teachers to be taught based on the student's talents, increasing the students' learning quality. Notably, their results are consistent with the results of this study. Hosseini & Narugheh (2019) [46] indicated that Surveillance Systems (such as Closed camera television) could increase the city's social security and enhance the government's performance regarding the out-of-control environments. Cloud computing and IoT are two very distinct technologies that form part of our lives. The significant role of these two technologies on the Internet and expanding their use is expected in the future.

Eventually, we propose to expand the use of this technology application and provide the related infrastructures. The biggest challenges of the target community are difficulties in using this technology in some cases and a lack of comprehensive learning of this technology (many people learned to work with related hardware through self-education). Finally, we will briefly declare some strategies for increasing the combination of the educational system with IoT technology:

- Learning the use of new technologies to specialists of devices (such as cloud for storage and process information);
- Installation of QR and RFID codes on documents for better management and preventing their loss;
- Use of RFID labels, sensors, and standard barcodes for tracking people's requirements to more instantaneous transparency of supply chain;
- Installation of sensors in the vital organizations of the county and vital organization sections to get essential information through sensors in crisis time and decides for crisis management;
- Free learning to people regarding using of the Internet and smart devices;
- Providing the specific and applicable apps for smartphones to present required services to every organization;
- Considering free Internet sites and connecting them to the government's network for access of people to services in most parts of city and villages;
- Installation of sensors in administrative equipment and tools to faster identification of equipment failure and on-time declaration of them to the director to reduce costs and energy;
- Smartization of lighting, heating, and cooling systems of administrations using climate detection sensors;
- Use smart boards for smart education. The mentioned boards can connect every student to the board wirelessly and use it to present research, assignments, etc. Meanwhile, teachers can use it for teaching geometric shapes, video files, etc.;
- QR codes should be placed in students' textbooks so that they can scan them and watch online learning videos at any time.

Like any other study, the researcher faced limitations due to the small sample size. If a larger sample size (e.g., the entire educational staff of Isfahan province or even all educational staff in Iran) had been available, more accurate results could likely have been obtained. The findings of the present study illustrate the relationship between the factors influencing the adoption of IoT technology in the Najafabad Education Organization in Isfahan province. Therefore, generalizing these results to other educational centers in different cities and provinces should be approached with caution and a thorough understanding. Additionally, since this study was conducted on personnel working in a city in central Iran, its findings cannot be generalized to the entire education-related community across the country.

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