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Identifying the Factors Affecting Readiness to Accept Internet of Things Technologies in Insurance Industry

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Abstract

The advent of the Internet has provided easy access and relatively cost-effective communication between companies and their customers and provided an opportunity for the use of information technology to support customer service. Internet of things (IoT) is a network system in both wired and wireless connectivities that includes many hardware and software units, such as production management, energy management, agricultural irrigation, e-commerce, logistic management, medical and health services, aerospace research, home automation and construction, infrastructure management, large-scale shipping and loading. Given the fact that the Internet of Things has been widely studied and is increasing, it is necessary that the factors affecting the application and more acceptance of this technology be investigated. To this end, the purpose of this study was to identify the factors affecting the readiness for accepting technologies of Internet of Things with a qualitative approach. This research, using the grounded theory, presents a model for determining the level of readiness for the acceptance of the Internet of Things. Through interviews, we collected the views of senior managers of communication and information technologies in the country, who directly deal with the technology and the Internet of Things, this product. Maxqda was used to encode and extract the codes. The results of axial coding are observed. 63 initial codes were identified in the form of six main categories: social aspect, cultural aspect, human aspect, technological aspect, financial aspect, managerial aspect, rules and regulations of the state.

Keywords: *e-commerce, internet of things, technology acceptance, foundation data theory*

1. Introduction

The advent of the Internet has provided easy access and relatively cost-effective communication between the company and its customers and provided an opportunity for the use of information technology to support customer services. IT has been as a powerful tool for improving government services. IT and the Internet have provided new government facilities for the government and administrators in order to provide customers and their business activities with services (Daniela and Abdollah, 2014).

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As a result, traditional commerce does not meet modern needs. Hence, the adoption of new methods is required in this regard, small businesses should use new e-commerce methods to work in the global economy. Hence, the new e-commerce methods play an important role in commercial success of companies. To increase the productivity of e-commerce, it is necessary that business awareness and infrastructures be facilitated. Business awareness leads to breaking the monopoly of information and using opportunities to increase productivity. As a result, it provides a way to provide social justice. Also, e-commerce infrastructures lead to improved data exchange, paperless electronic transactions, and increased exchanges. Today, the Internet has become one of the essential components of people's lives around the world, and the Internet has created many job opportunities in the business. Due to the effect of information technology in the economy and society, it has created the greatest applied technological innovations in commercial and economic operations and has created interdisciplinary activities. Undoubtedly, the exploitation of information technology in e-commerce requires infrastructures and factors. It should be noted that e-commerce has made significant changes in business activities. This e-commerce has changed the relationship between customers and suppliers and has improved communications (Choshin and Ghaffari, 2017)[†].

) اینترنت اشیاءIoT(Internet of Things (IoT) is a network system in both wired and wireless connections that includes many hardware and software units, such as production management, energy management, agricultural irrigation, e-commerce, logistics management, medical and health services, aerospace research, automation of home and construction, infrastructure management, large-scale transportation and loading (Vermansen & Friess, 2013). Internet of Things has quickly expanded its way to modern wireless communication scenarios. The basic idea of it is that all objects and things that are around us can interact with one another and with their neighbors through a single addressing plan to achieve common goals (Atzori et al., 2010).

one of the advantages of the Internet of Things (IoT) is the collection and exchange of data efficiently. In addition, IoT provides cost-effective ways to save energy and help protect the environment. In other words, IoT enables the security stream to advance through connection of physical and virtual devices based on consistent and evolving information and communication technologies. It includes various protocols of fields and applications. The purpose of the IoT (Internet of Things) is to convert traditional products into connected products using the opportunity to exchange data and communicate with one another to monitor and control goals. (Li N.E., 2015).

Now, the Internet of Things has dropped out of childhood and provided innovative applications and services for businesses, individuals and governments. Hence, researchers and international research organizations have introduced it as the next revolution in information and communication technology (Perera et al., 2014; Miorandi et al., 2012)[‡]. Previous studies focused mainly on technical issues related to IoT, such as, architectural elements, feature-based signature, and wireless sensor network. However, less attention has been paid to IoT users and their perceptions of technology. In addition, previous studies use the Technology Acceptance Model (TAM) to evaluate users. Nonetheless, the Unified Theory of Acceptance and Use of Technology (UTAUT) has been proven to be more powerful and capable, which explains the diversity of technology acceptance better than TAM and anything else. In 2014, by Alharbi et al., the theoretical model of TAM and its effect on business technology was studied and the IOT technical aspects were more focused on than consumer behavior and attitudes (Farahmand et al., 2017).

Technology acceptance and the intention to accept technology have been used in various fields such as information system. In this regard, TAM models, Technology Readiness Index (TRI) and Innovation Diffusion Theory (IDT) have been widely studied, but there are limited studies on the acceptance of the Internet of Things and the underlying factors affecting it, and there is a study gap that requires further consideration of the underlying factors affecting the acceptance of the Internet of Things (Karahoca et al., 2017). According to studies on the Internet of Things, it can be seen

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that various factors can affect the acceptance of this technology by users of organizations. In this regard, based on the TAM and UTAUT model, they examined the acceptance of health services based the Internet of the Things. The results of the research showed that the perceived features of users affect the acceptance of this technology. Based on the technology acceptance model, studies have shown that factors such as trust, social influence, perceived behavioral control, structural factors affect the tendency of users of the Internet of things technology (Karahoca et al., 2017). Given the fact that the Internet of things has been widely studied and considered and is increasing, it is necessary that the factors affecting the application and acceptance of this technology be examined (Gao et al., 2017).

By the year 2030, about 15 billion objects are predicted to be equipped with this new technology. The Internet of Things is nowadays used in the field of autonomous cars, communication of cars with each other, as well as following traffic signs, which saves fuel consumption due to the proper use of time. Internet of Things, this technology of the day in the world is facing many challenges in its growth and development. Every new innovation in this area brings its own issues and complexities. For example, with the explosion of information produced by the Internet of Things machineries, companies face many challenges in the field of security, maintaining consumer privacy and data, storage management, server technologies and data center networks.

Paying attention to electronic communications can be a factor in the success and failure to pay attention to this idea can lead to government breakdown. Therefore, Iran cannot be separated from this and the identification of barriers to implementing this system by the academic community can be of great help in implementing and advancing the goals of the Internet of Things. Today's organizations, using the features and facilities of information and communication technology, have been able to create unique value for their customers. To this end, identifying the factors affecting the readiness of accepting the Internet of Things is necessary. For this purpose, this research identifies the factors affecting the readiness for accepting the Internet of Things technologies with qualitative approach and seeks to answer the following questions: How is the proper model for determining the level of readiness for accepting the Internet of Things technologies? In the next section of this paper, the research literature is presented, and then, methodology and data analysis are expressed.

2. Literature

The emergence and increasing use of things that are connected to the Internet in many areas and have improved quality of our live has been developing very rapidly in recent years, and the use of these things is seen in all aspects of our lives. The Internet of Things, by making it possible to communicate between things and share information between them, has practically allowed the things around us to think instead of us, to make decisions and to work together to improve the quality of human life. The Internet of Things has succeeded in eliminating the traditional concept of things and turning them into smart things with complicated computing technologies, embedded technology in things and communication technologies, as well as sensor networks and Internet protocols. Over time, with the increasing expansion of the concept of the Internet of Things, the standardization of its architecture has become an impartible and fundamental principles in the IoT, and has created a competitive environment for companies to offer their products (Pundir et al., 2016).

In early 1982, at the Carnegie Mellon University, a modified coke machine was manufactured that could report the temperature as well as the inventory. It is supposed to be the first Internet related to things or the Internet of Things. IoT stream by Peter T. Lewis was invented in one of his lectures at the U.S Federal Communications Commission (FCC) in 1985. In 1991, Mark Weiser, as senior researcher in the United States and the father of ubiquitous computing, wrote a scientific paper on ubiquitous computing and the concept of academic salon generating the Internet of things. In 1994, Reza Rajajei, an engineer from Echelon Company in Palo Alto, California, defines the IoT as small mobile packages in proportion to a large set of heads to integrate and automate

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everything, including the entire equipment of a factory (Vermansen & Friess, 2013). From 1994 to 1996, companies such as Microsoft, Novell, NEST provided some network solutions for the IoT. In 1991, Kevin Ashton was a pioneering and astounding British technology from the Auto-ID Center at MIT. In this option, Radio Frequency Identification (RFID) could make the IoT common and famous. In 2013, the IoT evolved into a variety of technologies, such as wireless communications, Micro-Electro-Mechanical Systems (MEMS) and embedded systems. This territory collaborates to create an effective stream in the IoT. In 2020, the IoT is expected to monitor over 50 million things (Vermansen & Friess, 2013). Figure 2-1 shows the increase in the number of IoT-connected devices (Vermansen & Friess, 2013).

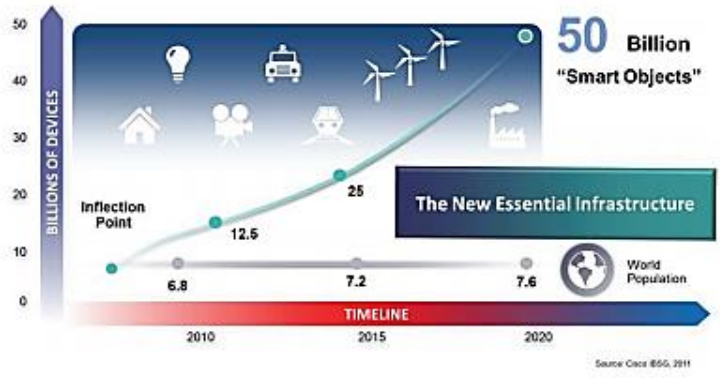

Figure 1. IoT-connected Devices

During the time, IoT is expected to have a significant effect on domestic and commercial applications, improving the quality of life, and the growth of global economy. To realize this, emerging technologies and innovations have been created that are mentioned in the previous section, and these technologies play a key role in establishing a fit between market needs and customers. Figure 2 shows the general concept of IoT and its applications in different domains and the interaction of each one with another (Al-Fugaha et al., 2015).

Figure 2. A General Image of Various Applications of IoT and Its Markets

According to the analytical report (Mason 2013), there have been three key changes in the world that have driven us from machine-to-machine communications to the Internet of Things: changes in the global business, the social world, and to the Internet of Things. This transition has led to M2M in the world of communications. These three key changes require the evolution of communications between the two categories of technology for different customer segments, as shown in Figure 2. In fact, M2M has industrial focus, and the IOT is focused on consumer. The

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M2M route moves towards the industrialized Internet and is focused more on business to business communication (B2B), while the IOT is more focused on business to customer communications (B2C) (Van Leemput, 2014).

New business opportunities will be created with the help of the Internet of Things. Because the development of applications and business models is facilitated by intelligent objects of the Internet of Things (Bohn et al., 2005). Successful business models always need sufficient information. The data collected automatically helps to exchange information between devices to solve problems, and new services be embedded and new income models be developed (Fleisch, 2010).

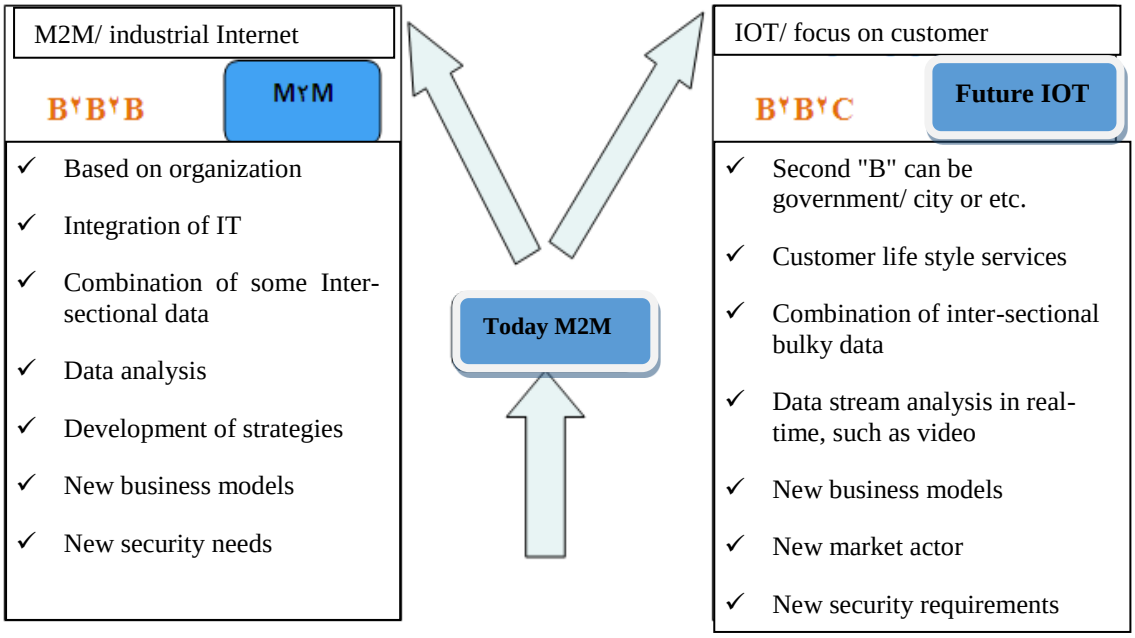

Figure 3. Transition from M2M to IOT (Beecham Research, 2015)

2.1. Acceptance of the Internet of Things

In spite of the several potential and actual benefits of IT in the organization, one of the issues and challenges that government organizations face is the acceptance and use of new information technology. In this regard, a key question is how to ensure that users accept and accept new information technology in their work processes (Sargent et al., 2012).

Researchers have already introduced a variety of concepts for the acceptance of technology and information technology, however Photino (2011) states that there is virtually no clear definition of the acceptance of information technology in previous studies. According to Karahana et al. (2002), there are differences between the opinions of the staff during the initial acceptance and the final acceptance. (Tang, 1999), (Cowan and Zandre, 1987), researchers in information systems state that acceptance of information technology and the acceptance of technological innovation are practically of the same type. Therefore, it can be stated that the acceptance of information technology is multidimensional and requires a comprehensive definition, in particular in organizations (Ahmadvand et al., 2015).

The development and use of information technology in different fields is the result of the IT capabilities that has been welcomed a lot today in the business world. The third millennium human is trying to accelerate the development and use of information technology in various sectors of the social system in order to get away from the traditional model and create a new model in proportion to the requirements of the information age. In this regard, organizations have turned to new technologies for providing services to customers as a way to control costs, attract new customers

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and fulfill customers' expectations, and have put them use of these technologies on their agenda as a strategic imperative (Joseph & Stone, 2003, 1990). In recent decades, various models in the field of technology acceptance have been proposed. The main and underlying concept of all models of technology acceptance by the user is presented in Figure (3).

The Internet of Things (IOT) is a network consisting of intelligent and connected devices that are addressable uniquely and communicate in real time through standard IP-based communication protocols. Connected things can be diverse from things such as LED intelligent lighting and smart locks to innovative things such as intelligent healthcare and intelligent logistics management. Also, smart sensors of "things" can be simple sensors such as RFID and biometrics compared to ultrasonic sensors with capability of measurement for detecting motion and measurement for electricity, water

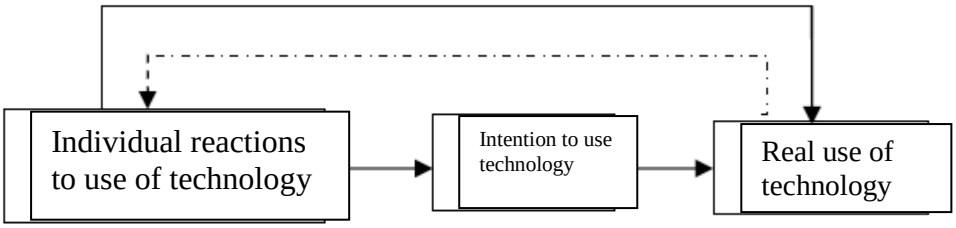

Figure 3. Underlying factors in models of technology acceptance by user (Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, 2003, 427)

and gas. SARAC et al. (2010) have conducted an overview research on RFID in supply chain management.Wojcik (2016) proposed a potential for the Internet of Things in libraries. According to them, new age technologies such as augmented reality, 3D printing and wearable technology can help consumers by creating new services based on the growing needs at the current age. Although new technology, such as the Internet of Things, has its advantages, they also raise the infrastructure security challenge (Li et al., 2016).

Today, the challenge is to understand how much the main theories explain the use, acceptance and behavior, and compare the three theories of TAM, TRA, and TPB in the context of the Internet of Things. Attitude structure is introduced as a reference to BI, and PEOU and PU as predecessors are introduced to the use of TAM 2, TAM 3 and UTAUT models (Venkatesh and Bala, 2008; Venkatesh et al. 2003; Venkatesh and Davis, 2000).

The Theory of Reasoned Action (TRA) states that the purpose of behavior to use (BI) a product or system depends on the individual's attitude towards behavior and behavioral norms related to behavior. BI predicts more real behavior (Ajzen and Fishbein, 1973; Hansen et al., 2004; Karahanna et al., 1999; Licker and Cindy, 1997; Venkatesh et al., 2003). Attitude toward Behavior (ATB) is as an individual assessment of a particular behavior and is measured by behavioral beliefs about results and attributes (Madden et al., 1992). The mental norm (SN) is a domain where behavior is affected by the beliefs and actions of parents, spouse, friends, teachers, and other influential individuals (Madden et al., 1992). Behavioral intention (BI) is the person's readiness to perform an action and is an introduction to real behavior (Mathieson, 1991). The Theory of Reasoned Action has been used to study user participation and user engagement in a variety of fields such as consumer behavior, work behavior, and sociological behavior (Barki and Hartwick, 1994; Currall and Judge, 1995).

Bendavid et al. (2009) assessed the impact of RFID technology on a five-layer supply chain in the service sector. According to their studies, RFID creates integration and collaboration in the supply chain, thereby enhancing the efficiency in the evolution process. The IOT opens the way for connecting human, machine, and operations through a global network of smart things. While there are applications such as smart homes, smartwatches, and smart fridges on the customer's side, business optimization (BPO) using smart labels and smart things is the topic that seems to lead the

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adoption of the IOT and intelligent tracking guidance and monitoring of systems towards supply and offer (Del Giudice, 2016). The IOT manages market competition using a combination of smart equipment, expert systems and communications technology (2013 Gubbi et al.). It is assumed that RFID in consumer environments will lead to loss of privacy, but if consumers feel that its provided value is much higher than the risks they perceive, they will accept it (Eckfeldt, 2005). For example, the main proposition of the Uber core relies on the real-time geographic location of drivers and passengers, which creates the value of the new service in the supply as well as on the consumer side. RFID technology is currently being used in many areas such as healthcare, supply chain management, smart homes and urban planning, retail management, inventory management and supplies, transportation and warehouse management (Gao and Bai, 2014). RFID technology can cause productivity in many industries, while it causes many benefits to consumers (Sarac et al., 2010).

The Technology Acceptance Model (TAM) (Davis, 1989) examines the impact of perceived usefulness and perceived ease of use in technology acceptance. The acceptance of many technological innovations by TAM (Wixom and Todd, 2005; Venton & Brun, 2001) has been studied and evaluated. Its application in psychological and behavioral areas in the field of the Theory of Reasoned Action (TRA) has been studied (Ajzen and Fishbein, 1973). The use in the field of marketing, advertising and public relations mainly in the Theory of Planned Behavior (TPB) has been studied (Taylor and Todd, 1995; Pavlou and Fygenson, 2006; Ferdous, 2010). Also, it has been used for studying professional social behaviors, applied nutritional interventions and environmental psychology (Conner et al., 2003; Albarracin et al., 2001; Ajzen and Driver, 1992). However, few studies have explored the acceptance of the Internet of Things from the perspective of many theories, namely, Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and Technology of Acceptance Model (TAM). Our research is one of these efforts to examine the acceptance of the Internet of Things in India. This research is a step forward for extensive research on a wide range of applications of the Internet of Things such as healthcare, welfare and elderly support, intelligent cities and intelligent supply chains, and so on.

In this regard, Francisco et al. (2016) examined the collaborative structure of the IoT-based behavioral models. This article considers the requirements for components of a wide range of computational tasks in a set of devices in a user environment with limited computing resources. This method takes into account the structure of the social dimension of the IoT using the computing resources available on the user side without damaging the activities of other embedded IoT devices. This framework mainly includes a model of computational load, a planning mechanism, and an additional approach for transferring between existing devices. Feasibility study tests show the approach and compare different executive options. Park et al. (2017), in studying comprehensive approaches to acceptance of the Internet of Things by user in a smart home environment, showed that three positive stimuli of compatibility, communication and control, and a negative impediment, cost, are key determinants of the technology acceptance behavior of the users. This study can be used as a basis for future research on improving IoT technologies in a smart home environment, taking into account user experiences. Mital et al. (2017), in a study on using the Internet of Things in India, tested rival models using a structured equation modeling technique. in which using the Internet of Things was examined from viewpoints of many theories with the titles of the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and Technology Acceptance Model (TAM). The results showed that the Internet of Things created applied areas for the Internet of Things, health, welfare, and support for the elderly and the urban supply chain. Karahoca et al. (2017), in study on the tendency to accept the Internet of Things in the healthcare sector, showed that perceived benefits, perceived structural ease and perceived image play an important role in the intention to use the Internet of Things. Banafa (2017), in examining three major challenges in dealing with the Internet of Things, showed that the acceptance of the Internet of Things faces three major challenges of customer, business and industry. Lu et al. (2018), in a systematic study on literature of the Internet on Things from a user and organization perspective, have showed that protecting the privacy and security of individuals' property plays an important role in the

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exploitation of the Internet of Things, as well as facilitating technology infrastructure and supporting and equipping technology can increase the efficiency and effectiveness of the Internet of Things and improve the level of acceptance and application of it in organizations. Ammirato et al. (2019) examined a method to support the acceptance of IoT innovation and its application in the security of Italian banking branches. The Business Process Reengineering (BPR) stages were investigated to create a suitable organizational framework for accepting IoT. The results of the research showed that the work environment, the level of work support affect the development and acceptance of the Internet of Things.

In internal studies, Farahmand et al. (2017) presented a model for using the TAM technology acceptance on the Internet of Things, which shows that the application of the Internet of Things for buyers in business applications needs to be more focused. This model is based on the TAM technology acceptance model and also connects to a group of output variables with perceived usefulness and perceived ease of use.

The current and future protocols and applications of the IoT are, in practice, a diverse set of different technologies to support complex automation, which will then bringa a major challenge for managing the security of devices in real-world environments. By entering the IoT era, it is predicted that the volume of input and output information of networks will multiply, and new unexpected information will be added to this volume. Over the past decade, significant research efforts have been devoted to the study of business entities and their role in the field of telecommunications (Kaleelazhicathu, 2004; Stonoska-Selobova, 2010) and the domain of the Internet of Things (Yorich, 2011). Many roles of actors in the domain of the Internet of Things are similar to the telecommunications business roles and relationships, since telecommunications are likely to play an important role in the field of IOT, hence, many roles in the area of telecommunications can also be applied to the roles of the Internet of Things domain. However, maybe a number of roles in the Internet of Things domain such as application service providers, application platform providers, and some other similar roles in telecommunications are not defined. In fact, the roles of the telecommunications area are a subset of the roles of the Internet of Things domain. The following figure illustrates the identified roles of various IOT studies in a general mapping of the roles of the IOC ecosystem. The definitions of these roles are described in the following table. The roles are largely organized according to the dimension of service providing, in which several groups of roles related to that are identified, including devices, communications, and related service groups.

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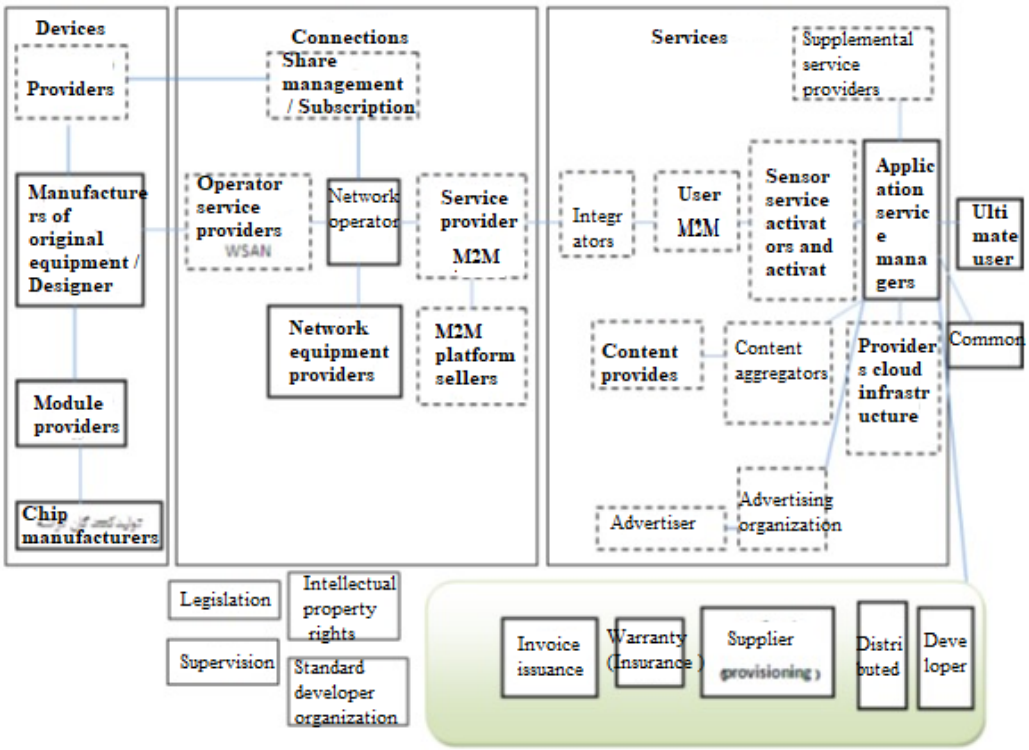

Figure 5. Role in the Internet of Things ecosystem

Based on the research literature and background, the following criteria have been extracted.

Table 1. Summary of Research Background

Table 1. Summary of research background	Amirkhani et al.	Elahi et al.	Jannesari et al.	Khorasani	Saeidi et al.	Farahmand et al.	Farahmand et al.	Yang et al.	Gao et al. (2014)	Anas et al.	Fathi et al.	Park et al. (2017)	Forestiero (2017)	Mital et al.	Carousa et al.	Kabanda &	Choshin &	Lu et al. (2018)
Intra-organizational factor	■	■								■				■		■	■	
Environmental factor	■									■						■	■	
Technological factor	■	■									■			■			■	
Underlying factor	■													■		■	■	
Support factor of managers	■									■	■					■	■	

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Individual factor																	
Social factor																	
Availability of services																	
Security and confidentiality																	
Risk																	
Perceived compatibility																	
Understand of simplicity																	
Understanding of behavioral control																	
Understanding of pleasure (enjoyment)																	
Social influence																	
Trust																	
Understanding of usefulness																	
Ease of use																	
Unreliability																	
Perceived quality																	
Perceived pleasure																	
Proper knowledge																	
Competition level																	
Innovation influence																	
IT skills																	

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Return on investment																	

3. Research Design

In this research, in order to investigate variables of the research and identify the factors affecting the readiness for acceptance of the Internet of Things technologies with qualitative approach, related variables and models are identified. This research is exploratory in terms of purpose, fundamental in terms of orientation. The type of research is qualitative and the strategy used is also the grounded theory. Since the purpose of this research is exploration and it has used a hybrid approach to explain a model for streaming the strategy in organizations, its goals are mainly achieved through exploratory and qualitative studies. Hence, efforts have been made to analyze the process of implementing strategy in organizations within the framework of a qualitative research design of the grounded theory and with regard to the underlying conditions of organizations. Glaser and Strauss introduced the grounded theory strategy to the scientific community for the first time (Danaeifard, 2011). According to Strauss and Corbin, the grounded theory is what is inductively derived from a phenomenological study and illustrates that phenomenon. In other words, the grounded theory approach is a qualitative research method that uses a series of systematic procedures to create a theory based on the induction about a phenomenon. Experts consider the application of the grounded theory as desirable in the following cases:

1) There is no theory to explain a process;

2) The existing models are not based on the process;

3) The existing models are created and tested based on samples and populations other than the population and the sample considered by the researcher;

4) The existing theories are incomplete and do not consider the potentially valuable variables in the researcher's view (Karsul, 33: 2012).

In order to achieve the goals of this research, the grounded theory has been used; because the present research has been led to the use of the grounded theory approach by a set of conditions such as: a) the purpose of the research, which is based on the development of an existential theory for explaining the process of streaming the strategy in the organization; b) the limited knowledge of a hybrid approach to explaining the streaming of strategy; and c) attempting to explain the considered model in a particular domain (readiness to accept the Internet of Things technologies). In other words, in order to overcome the shortcomings of past research, using a qualitative approach and using the grounded theory approach, the present research develops a comprehensive model including causal factors, intermediary factors, background factors to identify the factors affecting the readiness for acceptance of the Internet of Things technologies with qualitative approach.

4. Sample Size and Sampling Method

In this research, the targeted sampling method, which is a non-random sampling method, is used to select a sample. The concept of targeted sampling, which is used in qualitative research, means that a scanner chooses individuals and place of study for study, which can be effective in understanding the research problem and the axial phenomenon of the study (Karsul, 54: 2012) Also, in this research, theoretical sampling was used for sampling adequacy. Theoretical sampling is the process of data collection to generate the theory by which the analyst collects, codifies and

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analyzes his data simultaneously and decides what data to collect and where to collect in the future in order to improve his theory until it emerges. Where to collect data. The criterion for judging the time to stop the theoretical sampling is the theoretical adequacy of the categories or theory (Zarezadeh, 62: 1394). That is, the sampling is continued until the next sample does not add a complementary content to the constituent components of the theory.

Table 1. Participants' characteristics in the interviews

Interview number	Combination of participants in interviews	Scientific rank (degree of education)	Average work experience
5	7 scientific members of university	Ph.D. - Master	23 years
	2 top executives and members of the board of directors of insurance companies	Ph.D. - Master	19 years
	1 of the experts and senior experts in the insurance industry	Bachelor - Master	16 years

5. Data Collection Method and Instrument

In this study, deep interviewing was used as the main instrument for data collection. This interview is a form of unstructured interview that actually creates the richest data and often provides some amazing evidence. Deep interviewing is one of the well-known methods used in collecting data increasingly (Iran Nezhad Parizi, 55: 1999). Deep interview is a two-way targeted conversation between an experienced trained interviewer and an interviewee and aims to deeply infer rich details and important materials that can be used for analysis. Concerning the determination of the validity of the theory, since, according to many scholars, a good grounded theory is a theory that is extracted from data deductively; it is the function of interaction and theoretical rethink; according to its own assessment criteria, it has been judged adequately (December, 89: 2016). In this research, in order to validate the categories and their relationships, the researcher has tried to correct the theory with repeated returns to the research data, that is, the continuous interaction between what is understood and what is to be understood, in order for the theory to have the necessary conceptual distinction and be specific, in addition to conceptual density. Then, with the aim of improving the model and increasing its validity, the model was presented in a meeting with a number of key interviewees and after obtaining their views and applying some modifications, the proposed model was obtained. In this method, Maxqda software will be used to analyze the qualitative data and theorize.

6. Data Analysis

As stated, the grounded theory is one of the qualitative research strategies, through which the theory is formed based on the main concepts derived from the data, and the ultimate goal of this strategy is to provide comprehensive theoretical explanations of a particular phenomenon that is obtained inductively form the study of that phenomenon (Irandoost, 124: 2013). Generally, the strategy converts data from information sources into a set of codes, common codes into categories, and then converts categories into some kind of theory. The phenomenon under study can be a problem, for example, in an organization or even in a text (Acoumus, 212: 2003). If the phenomenon is a perceived problem, the researcher extracts the data from the interviewees, and then, by classifying and codifying them, ultimately obtains his own theory regarding the problem. Regarding the texts, by designing a problem, the researcher himself studies texts (books, journals and various text sources) and codifies and classifies them by extracting relevant data from the relevant texts, and finally, presents his theory.

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The main technique for data analysis in the research approach of grounded theory is coding, which is carried out during a three-step process:

1. **Open coding:** It is an analytical process through which the concepts are identified and its features and dimensions are discovered in the data. At this stage, the grounded theory forms the primary categories of information about the phenomenon under study by the division of information. In this way, the researcher establishes the categories based on the data collected through interviews, observations of events or notes.

2. **Axial coding:** It is the process of relating categories to sub-categories and linking categories at the level of dimensions and features. At this stage, the categories, dimensions and features obtained from open coding are formulated and placed in their place so that increasing knowledge is created about relationships. Accordingly, at the axial coding stage, the grounded theory selects a category of the previous stage as a central category or phenomenon, and relates other categories, which are "causal conditions", "underlying conditions", "intervening conditions", "strategies" and "outcomes" to it and illustrates it in the form of a "coding model" diagram. In this study, the Strauss and Corbin (2008) paradigm model has been used as the research design for the grounded theory that is based on the identification of the axial phenomenon, causal conditions, underlying and intervening factors, strategies and outcomes and the relationship between them. The steps in the method of the grounded theory approach based on the Strauss and Corbin paradigm model are as follows:

- Casual conditions: these conditions create and form the axial class or phenomenon. These conditions are formed by a set of classes with their characteristics
- Axial category: is a subjective aspect of the phenomenon that is the basis of the process;
- Strategies: Strategies actions or interactions that are derived from the axial phenomenon;
- Underlying conditions (dominant context): the specific conditions affecting strategies are referred to context. It is usually difficult to detect these factors related to the underlying conditions from the factors of causal conditions. However, the distinction between the underlying conditions and causal conditions is that the underlying conditions consist of a set of classified concepts of variables, while the causal conditions are a set of active variables. Sometimes, very relevant variables are categorized under the causal conditions and variables with less relevance are categorized under the dominant (underlying) contexts (Karsul, 2007).
- Intervening conditions: underlying conditions or a general environment affecting strategies. These conditions constitute a set of intermediate variables. Intervening conditions are structural conditions that facilitate or restrict the intervention of other factors and have a scientific and general background.
- Results and Outcomes: The classes represent the results and outcomes created as the result of the adoption of strategies.

3. **Selective coding:** At this stage, the theorist attempts to write a theory of relations between the categories in the axial coding model. In other words, at this stage, the findings of the previous stages (open and axial coding) are received, and after choosing the axial category, other categories are systematically related to it, then these relationships are proved and the categories that need farther improvement and development are completed (Rahmaniya, 2009).

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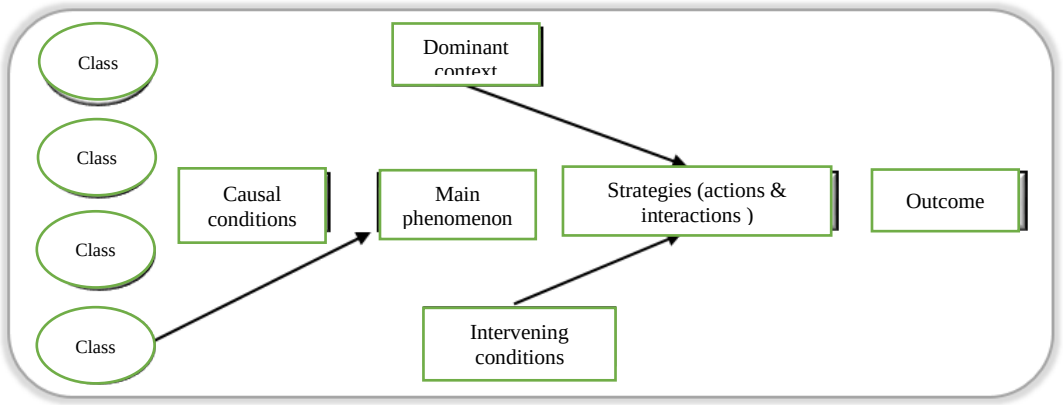

Figure 6. Paradigm model in the grounded theory (Karsul, 401: 2005)

7. Research Findings

In the grounded theory, the method of analysis is such that each part of the data is analyzed in parallel immediately after collection of that part. Then, the investigator receives guidelines from analysis of the initial data for access to subsequent data. These guidelines can be derived from undeveloped categories, information gaps, or individuals who have enough insight into the phenomenon. After obtaining these guidelines, the researcher enters the research environment to collect other data. This process in the process of collecting and analyzing data continues until the researcher reaches the saturation of classes (Danaiefard and Eslami, 2011). In the grounded theory, the analysis consists of three types of coding that are:

7.1. Open Coding

The open coding method in this study is a row-to-row analysis method. For this method, the data obtained from each interview were analyzed and the concepts related to the research were identified and included in more general categories with the title of the categories. Subsequent samples were selected to develop the obtained categories, including the discovery of dimensions, the features of the categories and the achievement of uniformity among the responses. The results of the open coding of collected data using the interviewing instrument showed that the 63 open codes have been identified out of 204 concepts.

7.2. Axial Coding

In axial coding, separate categories are juxtaposed in a meaningful framework, and the relationships between them, especially the relationship of the axial category to other categories, are determined. In this research, the Strauss and Corbin paradigm model were used for axial coding.

In this regard, all generated codes are re-reviewed and compared to the texts so that nothing is pretermitted. The results of axial coding are observed. 63 initial codes are categorized into six categories as follows:

1. Social, cultural dimension
2. Human dimension
3. Technological dimension
4. Financial dimension
5. Managerial dimension
6. Government rules and regulations
7.

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7.3. Selective Coding

Selective coding is the process of integrating and refining the theory (Strauss and Corbin, 1998). Finally, at the selective coding stage, according to the results of previous coding steps, the main category was selected and systematically related to other categories, validated communications and categories requiring further refinement and development were improved. It should be noted that the above steps are carried out in the reciprocating process. Therefore, the selective coding steps are not clearly distinct from one another and are done through an interactive process, with open and axial coding. To integrate and present the final model for acceptance of the Internet of Things technologies, after identifying the axial category and linking other categories in the form of a systematic paradigm for the grounded theory, the designed model was refined and the main factors were developed and the final model of the research was obtained as follows (Figure 1).

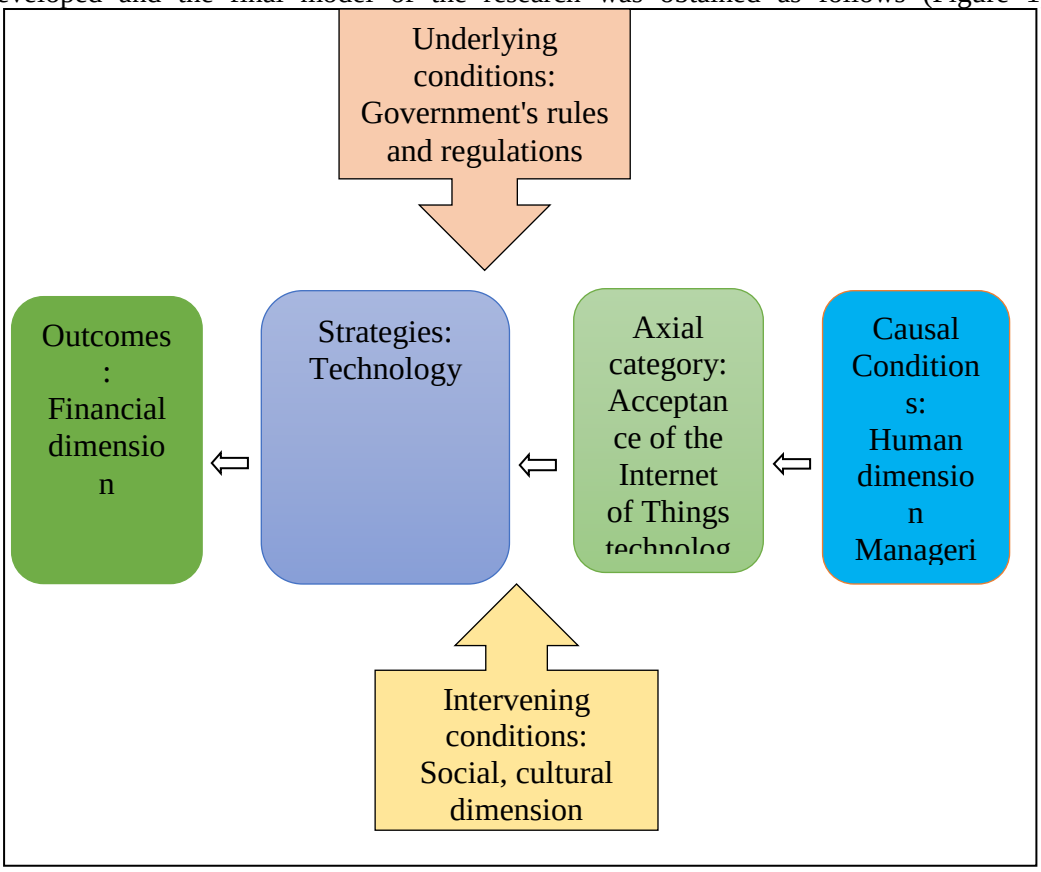

Figure 6. Paradigm Model for Determining the Level of Readiness to Accept the Internet of Things Technologies

Since in the selective coding, the process of narrating the story, the discovery of the research axial category and linking it to other categories are done in the form of a paradigmatic model (Azkia and Jajarmi, p. 227), explaining this process (providing a model for determining the level of readiness to accept the Internet of things technologies) is described in detail below:

Axial category is the main phenomenon of the research, providing a model for determining the level of readiness for accepting the Internet of Things technologies, which is the basis and axis of the process that all other main categories are related to it, and according to the findings of the research, factors affecting this phenomenon and the strategies obtained from it and in following the results and outcomes of these strategies can be mentioned. With the rapid advancement in communication infrastructures and technologies, the Internet of Things (IoT) has become an

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important part in the Information and Communication Technology (ICT) industry. Various fields have used the concept of IoT for their traditional services and product for easier use by consumers.

Causal conditions include items of categories that directly affect the axial phenomenon or somewhat create and develop this phenomenon, which can often be found by systematically looking at the data and reviewing the events. The research focuses on the human dimension and the managerial dimension.

Underlying conditions are generally specific factors that organizations cannot control, but our strategies are affected by that context. Concerning these factors, during interviews, the vast majority pointed out the government's rules and regulations which shows how these factors facilitate the strategies adopted by us.

Strategies are the same actions that are presented in response to the axial phenomenon or category, and are selected in a targeted manner and the axial phenomenon can be fulfilled using them. Strategies to consider the readiness for accepting the Internet of Things technologies are very important. The interviewees referred to the technological dimension more than others.

Intervening conditions that modify the causal conditions and affect the strategies. Social, cultural dimension has been emphasized during the interviews.

Outcomes and results come from adopting strategies that, in a successful state, realizing them leads to the realization of the axial category. As a result, the interviewees in this research referred to the financial dimension.

8. Conclusion and Recommendations

Since the Internet of Things (IOT) phenomenon is an emerging phenomenon, there is no comprehensive overview of the Internet of Things, and this can provide business opportunities for entrepreneurs and existing companies. The Internet of Things is introduced as a broad social and technical phenomenon and covers various technical, physical, social and economic elements. In this regard, there are various approaches to using the Internet of Things to create business models. In this research, the factors affecting the readiness for acceptance of the Internet of things technologies with a qualitative approach have been identified. The results of axial coding are observed. 63 initial codes are identified in the form of six main categories: social dimension, cultural dimension, human dimension, technological dimension, financial dimension, managerial dimension, government rules and regulations. In this regard, Ansa et al. (2015) showed that the internal and external organizational factors, especially the readiness, strategies, perceptions of managers and external pressures by partners, affect the acceptance of e-commerce. Fathi et al. (2016) showed that proper knowledge, competition level, innovation proportion, support of organizational senior management, information security, information technology skills, information technology infrastructures, and investment returns play an important role in this regard. Karahoca et al. (2017) showed that perceived benefits, perceived structural ease and perceived image play an important role in the intention to use the Internet of Things. Lu et al. (2018) showed that protecting the privacy and security of individuals' property plays an important role in the exploitation of the Internet of Things, as well as facilitating technology infrastructure and supporting and equipping technology can increase the efficiency and effectiveness of the Internet of Things and improve the level of acceptance and application of it in organizations.

Studies have reported some of the difficulties faced by organizations in this regard including technical issues, security and privacy issues, the need for making culture and the rejection of new technologies. Some managers and authorities resist the acceptance of new technologies in the organization due to uncertainty about efficiency, failure to take risks, resistance to changes in the normal routine of organizational processes, or the weakness of technical knowledge, in this case, the elimination of weaknesses in order to better utilize the of Internet of Things technology in the organization is very necessary. One of the suggested solutions in this regard is the creation of the required context for facilitating the entry and launch of new technologies in the country, deregulation, except for limited cases in the use of the Internet of Things technology , the necessity

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of using data mining tools in the current situation, the emphasis on privatization in the field of information technology in the country and public education to users to minimize the damage ahead of the use of the Internet of Things technology.

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