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Research Paper

Determining and Modeling the Factors Affecting the Promotion of Customer Satisfaction of Electricity Distribution Companies

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Abstract **The electricity industry is one of the most important and vital development of countries, as the electricity access index is one of the main components of assessing the degree of industrial competitiveness. In Iran, the electricity industry has a relatively long history and more than a century and now with a production capacity of about 80,000 MW and with the support of more than a thousand large, medium and small enterprises and localization of equipment and technical and engineering services, it is one of the leading industries in the country. According to this issue, the purpose of this study is to determine and model the factors affecting the promotion of customer satisfaction of electricity distribution companies. The method of the present study is a special type of qualitative research tradition called data theory. The sample size is determined based on the theoretical adequacy method and includes 16 expert managers of power distribution companies in 9 provinces of the country who have been selected based on the selection method and snowball, data collection tools are text, first a set of primary topics was collected during the coding process and categories were extracted from their entrails. Then, in the axial coding stage, the link between these categories was shown in the form of a coding paradigm.**

Keywords *Quality of Service, Customer Satisfaction, Electricity Industry, Tavanir*

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Introduction

Today, the real mission of organizations is to understand the needs, wants of customers, and provide solutions that lead to customer satisfaction. Market superiority can only be achieved by providing customer satisfaction, innovation and providing superior quality services. Customer satisfaction is one of the basic goals of any organization. Satisfied customers are the key to the success of the organization and in order to help achieve organizational goals, the level of customer satisfaction should be increased (Siuki, 2019). Customer satisfaction is rooted in the global quality revolution. The formalization of customer satisfaction as part of the competition for the Wom Boldridge Property Quality Award has made the Customer Satisfaction Index even more credible. Customer focus and satisfaction have a value higher than 25% in this evaluation system (Lahari, 2016). Customer satisfaction is a type of insurance against possible mistakes of the organization, which as a result of changes related to the production of services, their occurrence is inevitable. Regular customers are more forgiving in the face of such situations because they ignore the small mistakes of the organization due to previous pleasant experiences. Therefore, it is not surprising that customer satisfaction has become the most important task of organizations (Venus, 2002). By increasing customer satisfaction, behavioral consequences such as commitment, customer intent and loyalty, creating mutually beneficial relationships between service providers and users, ability to accept defects and possible service slips as well as positive word-of-mouth recommendations from customers (Arasli et al., 2005). Detailed statistics of Iran's electricity industry in 2020 show, the total number of electricity subscribers of different tariffs of Tavanir Company has reached 36,644,000 subscribers at the end of 2019 that electricity distribution companies employing 64047 personnel (consisting of 16303 formal employees and 47744 informal employees (are providing services to the mentioned subscribers (Tavanir Company, 2020). In the vision document of 2025 of Tavanir Company, upgrading

the level of satisfaction of subscribers, society and stakeholders as one of the 12 strategic goals of this company has been communicated to the subsidiaries and their employees (Tavanir Company, 2018). Also, one of the important indicators that makes Tavanir Company strive to improve the satisfaction of its subscribers is the competition with other government organizations in the annual Shahid Rajaei Festival which makes Tavanir Company work and strive to obtain higher ranks and a valuable position among other service organizations in the country. According to Quill et al. (2007), customer satisfaction will increase the customer tolerance threshold for paying more for the products and services required that in this way, the amount of benefits and the level of wages paid to the employees of the organization can be increased. In this way, in addition to providing employee job satisfaction and improving work ethic, the likelihood of customer satisfaction is also increased. In this situation, the interests of employees, customers and owners of the organization are provided. Therefore, the win-win situation prevails (Quill et al., 2007) considering that the annual electricity sales in electricity distribution companies under Tavanir Company during 2019 has reached 221430 million kW (Tavanir Company, 2020), and the issue of collecting the price of sold energy (with an annual estimate of 2,000,000 221,440,000 Rials) has always been one of the great challenges and concerns. And Tavanir Company can increase the satisfaction of its subscribers to improve the situation of receiving receivables and thus increase the financial capacity to develop the quality and quantity of electricity distribution networks and improve the satisfaction of its employees.

Background

The concept of customer satisfaction was first introduced in 1954 by Peter Drucker and entered directly and indirectly into marketing management studies; the first customer satisfaction model was introduced in 1980 by Richard Oliver and was the basis for the

development of other models, this model is known as the "expectations - mismatch" paradigm (Hairati, 2007). The Swedish Customer Satisfaction Index was introduced in 1989 as the first national customer satisfaction index. On the other hand, in 1992, the customer satisfaction index was introduced in Germany, the Customer Satisfaction Index in the United States was developed in 1993 by Fornell (the foundation of the Swedish Satisfaction Index), Customer Satisfaction Index in Europe was first developed by the Quality Organization and the Institute for Quality Management in Europe and was first introduced in 1999 in 11 European countries. We can also refer to simultaneous actions in countries such as Denmark, Austria, France, the Netherlands, Switzerland, Taiwan, New Zealand, South Korea, Malaysia and Hong Kong (Sedghi et al., 2009). Customer satisfaction is the result of comparing the customer's expected performance before purchase or perceived performance and cost paid (Jamal and Nasser, 2002). If an organization wants to have satisfied customers, it must measure satisfaction. Because what cannot be measured cannot be controlled and managed. In fact, it can be said that customer satisfaction as a strategic goal is achieved when its level should be measured frequently and an attempt should be made to discover the causes of possible dissatisfaction. These repeated measurements provide information about how well the processes as well as the staff are working (Ho and Su 1998.The first recorded customer complaint in human history dates back to 1750 BC; the text of the tablet shows that the customer is dissatisfied due to the poor quality of the product, late delivery and the seller's promise. 3000 years after this complaint, in 1852, Marshall Field showed the famous phrase "always right with the customer" in his store, companies must act responsibly and intelligently towards their customers (Sarai, 2019). Ignoring customer complaints leads to the loss of loyal customers, communication with the customer by recording and recording all customer complaints and correct and timely reflection to the managers of the organization can become mineral rich in valuable information (Jacques Horowitz, 2001). The complaint received is a great opportunity

to regain customer trust as well as continuous improvement (Bushoff, 1997). According to a well-known theory in marketing science, the immediate consequence of increasing customer satisfaction is a reduction in the number of customer complaints and an increase in customer loyalty (Gregoris, 2003). Droussos et al. (2020) conducted a study entitled Customer Satisfaction Assessment in Energy Markets Using the Multi-Criteria Method: The Case of the Electricity Market in Greece. The purpose of this study is to examine the satisfaction of residential customers of electricity providers in Greece with various factors such as products, services, customer service and pricing policy. The results of the study showed that residential customers were completely satisfied. In particular, the average global customer satisfaction index was about 52%.Using the results of this study, electricity providers will have the opportunity to tailor their future products and services to retain their industrial customers; Edward and Pierre (2019) in research "Provide a conceptual model for measuring customer satisfaction with power distribution services. In this research, the researcher seeks to identify a set of performance indicators to measure the satisfaction of electricity customers with electricity distribution services by examining the subject studies. The findings of this study are presented in two parts A) Identify and introduce 20 important indicators among all the terms mentioned in electricity customer satisfaction studies and B) Using the method proposed by Nellie, Gary Gory and Platts (1997). They provide a conceptual model that includes the necessary aspects to measure the satisfaction of household electricity customers. Shin and Managi (2017) in research: "Retail electricity market liberalization: Consumer Satisfaction and Behavior in Changing (Supplier) of Electricity in Japan "In this study, the goal of policymakers is to create free markets and deregulation, increase economic productivity, reduce prices and ultimately" better serve the interests of consumers. If free markets are created, the consumer, having the right to choose the electricity supplier, plays an important role in shaping the results of deregulation; while the

purpose of freeing the market is not to increase the power of change of supplier by the consumer, but having this authority will bring him more benefits. A survey of Japanese household electricity consumers comparing their satisfaction before release and after release shows that giving the right to change the right choice of electricity Supplier Company increases the level of customer satisfaction. The results of this survey also examine a wide range of factors and parameters influencing the selection of a supplier and discuss the consequences of them. Carvalo (2017) in his study "Reporting the stimuli of service (electricity) satisfaction in transition economies" states: Since 1990, the electricity sector in the countries of the former Soviet Union has evolved from central planning to independent regulation (decentralization). There is a great deal of heterogeneity in the progress of reforms in transition countries and there are consequences for the quality of services in urban services as well as the attitude of the population of these countries towards such services. In this paper, household incentives reported for the quality of electricity services in 27 countries are reconstructed using cross-sectional survey data by the European Bank and the development of life in the second transit research has been analyzed in terms of improving regulations and infrastructure. Based on the results of this study, it is estimated: The main drivers of consumer satisfaction depend on the quality of electricity, economic conditions of households and characteristics such as age and there is no solid evidence for the effect of the electricity reform situation on households. However, customers in countries with a completely independent law report higher satisfaction than in countries without independent regulations. Jungrovo et al. (2015) in the study "What do customers expect from improved home electricity distribution services? Evidence of a pilot choice." This study was conducted on household electricity customers in South Korea, it has been upgraded following a quantitative analysis of customer preferences and identifying their marginal willingness to pay more for electricity services. The results of this study show that customers consider two factors when

choosing an electricity supplier company; Electricity price; Combination of electricity generation source, this means that what is the percentage of electricity generated from non-renewable energy and what is the percentage of electricity generated from renewable energy. The results also show that customers are willing to pay 2.2% more than the current average bill in exchange for a significant increase in the share of renewable energy in electricity generation (Which, of course, has no economic justification for the electricity producer), in addition, customers are willing to pay $ 6.15 more for each blackout per year and $ 0.06 more per minute of blackouts per year. Ershadi and Chersenj (2018) in the research "Design of service quality evaluation model in customer service departments of Greater Tehran Electricity Distribution Company based on SERVQUAL and NAP model", they have analyzed the quality of services in the offices of the Greater Tehran Power Distribution Company. The results showed that in terms of the statistical population of the subscribers, the response criterion has the highest sensitivity and the criterion of tangible factors has the lowest sensitivity. In the following, three improvement plans have been reviewed and according to the opinions of experts and the mentioned criteria, their various dimensions have been examined through the network analysis process; Using this method, while considering all the criteria and goals, facilitates the selection of the best design. Finally, the design evaluation super matrix was calculated and the best design was selected. Izadi and Hosseini (2018) in research: "Study of the effect of e-commerce sales of the branch on customer satisfaction and profit with the mediating role of customer relationship management in the regional electricity company of Fars province" that statistical population of the study included all clients of Fars Regional Electricity Company in 2017, the results of which have shown that E-commerce has the highest relationship with customer relationship management with direct effect of 0.33 branch with respect to value (t = 7.13). Khorakian et al. (2016) in a study entitled "Investigating the effect of using customer relationship management system on

customer satisfaction of Mashhad Power Distribution Company" Which was done by distributing a questionnaire among a statistical population of 200 people, the results showed, information technology as a moderating variable has a positive effect on the variables of trust and service quality, which ultimately has led to increased customer satisfaction (Iranian Journal of Energy, Winter 2016). Farhadkhani and Heidari, in a strategic document to increase the level of satisfaction of the customers of the country's electricity industry, based on the research of Wahab and Suhaimi (2012); Zarakas, Hansrudip (2013), UK Power Networks Company (2014), CUTS; The most important factors for the satisfaction of electricity subscribers are the reasonable price of electricity, reduction of blackouts and continuity of electricity supply, proper quality of electricity, proper response and treatment of subscribers, and reduction of environmental pollutants in the electricity industry. Khalilzadeh and Sedaghati (2015) in research "Identifying and prioritizing the factors affecting the level of satisfaction of electricity subscribers with the case study approach of Tehran", this study seeks to determine the most important factors of customer satisfaction with the quality of services of the Greater Tehran Power Distribution Company by FuZZy ANP method and identify and prioritize them. The results showed that the quality of electricity consumption and its cost are more important than other factors. Ghasemizadeh et al. (2013) in research, "Study of customer relationship management relationship on the satisfaction of customers in the agricultural sector of Hormozgan Power Distribution Company" which has been implemented in the period of 10 months of 1992. The statistical population was the subscribers of the agricultural sector of the company. The results show that there is a positive and significant relationship between customer relationship management and customer satisfaction of agricultural tariffs in Hormozgan Power Distribution Company. Moghimi et al. (2011) in the research "Management and implementation of electricity emergency system (121) at the national level". In this study, they showed that the management and

implementation of the electricity emergency system (121) at the national level and the positive and effective points of the existence of 121 electricity emergency centers as a suitable center to respond to the requests of electricity subscribers, especially in the rapid elimination of blackouts and the importance of this system in improving and upgrading effective and efficient monitoring. They also showed that the power emergency centers or the 121 system is a big step towards improving the satisfaction of electricity customers, by controlling outages with low voltage network program and medium voltage network, regulating the operation of eliminating unwanted blackouts, identifying problematic and critical points in the network, regulating how to eliminate blackouts and effective monitoring of the operation activities of electricity distribution companies. Aerabi et al. (2011) in the research "Design and implementation of CSM executive model to measure the satisfaction of subscribers and applicants of Yazd Regional Electricity Company". In this study, customers were divided into subscribers and applicants. Based on this, the program "Design and implementation of CSM executive model in order to measure the satisfaction of subscribers and applicants of Yazd Regional Electricity Company" was defined as an improvement program in the strategic plan and the necessary measures were taken to do so. This mechanism contains a method for measuring the effect of feedback on the results of the company's activities, after formulating and implementing the mechanism, the level of customer satisfaction increased by 10.3% compared to the previous period, which was measured according to traditional methods. In general, this mechanism (CSM) contains features such as: A) Separation of the executive model of measuring the satisfaction of electricity subscribers and applicants from other stakeholders of the company according to the type and importance of this part of the company's stakeholders, B) Measuring the satisfaction of electricity applicants as an important part of customers, C) Distinction of the method of measuring the satisfaction of subscribers and applicants according to their characteristics and conditions, D) Determining the

periodicity of implementation of the model designed for each segment of customers according to their conditions and characteristics.

Method

This research is a qualitative method and its purpose is descriptive / applied. The strategy used is foundation data theory. The rationale for using the Foundation's data strategy goes back to its use, on the one hand, so far, a comprehensive study has not been conducted that covers the satisfaction of electricity subscribers of different tariffs (household, public, agricultural, industrial and other uses) in different parts of the country, and on the other hand, the data theory method is efficient for modeling and theorizing in the field of emerging concepts and events; The statistical population of this study includes 16 expert managers of power distribution companies from 9 provinces from different regions of the country (north, south, west, east, center and Tehran) which are selected based on the selection method and snowball. To participate in an interview that aims to increase the satisfaction of electricity subscribers of different tariffs of Tavanir Company. Based on Strauss & Corbyn's proposal, five criteria were selected for selecting interviewees: Based on Strauss & Corbyn's proposal, five criteria were selected for selecting interviewees: 1. Being key 2. Identifying by others 3. Theoretical understanding of the subject 4. Diversity 5. Agreeing to participate (Flint 1998; Stewart 2006). In this research, the criteria of expertise are; have a master's or doctoral degree; have at least 20 years of experience in power distribution companies; having at least 2 years of experience in one of the organizational positions under one of the titles of managing director, vice president or customer service management, vice president or management or public relations office manager; The sampling method used in this study is theoretically or purposefully non-probabilistic. With the recommendation of university professors and according to the subject of the study, this method has been used to select samples. In this study, interviews with selected reporters were conducted in a deep and semi-

structured manner, the interview questionnaire consists of 10 open-ended questions taken from the main research questions and the interviewees answered them openly, each interview lasted between 50 and 90 minutes, at the beginning, the text of the interview was transcribed on paper and by examining the sentence by sentence and identifying the commonalities between the initial data, based on the open coding method, they were coded.

Findings

The findings of this study are the result of interviews with expert managers of power distribution companies in different provinces of the country which includes 273 primary codes, 59 concepts, and 19 subcategories, 5 main categories and a central category, which is extracted based on the data theorizing method.

Open Coding

This coding was done during interviews with 16 experts from 9 power distribution companies in different provinces of the country, thus, the respondents to the questions related to each of the dimensions of the paradigm model explained the process and conditions of the model of improving the satisfaction of Tavanir electricity subscribers and the initial codes were extracted from the sentences and views of these people, in the step, the codes that the interviewees emphasized were considered as the final codes along with the codes that were important from the researcher's point of view.

Axial Coding

In the axial coding process, the researcher is constantly moving between inductive and deductive thinking, in this study, a total of 273 final extracted codes are classified into 59 categories of 19 categories, the following six tables show the concepts and categories related to the main components of the model.

Main Phenomenon: Phenomenon means the main event to which a set of actions is related. The main phenomenon studied in this research is to

improve the satisfaction of Tavanir electricity subscribers. Concepts and categories related to the phenomenon are shown in Table 1.

Table 1
Concepts and Categories Related to the Phenomenon

Main category	Subcategory	Concept
Main phenomenon	Improving the satisfaction of Tavanir electricity subscribers	Definitive reduction, power outages and power fluctuations
		Improve customer responsiveness
		Improving the quantity and quality of street lighting
		Rationalized energy prices
		Reduce subscribers' face-to-face visits

Causal conditions: Causal conditions refer to events or incidents that lead to the occurrence or development of a phenomenon. Concepts and categories related to causal conditions are shown in Table 2.

Table 2
Concepts and Categories Related to Causal Conditions

Main category	Subcategory	Concept
Causal conditions	Power outages and fluctuations	Power outage
		Power fluctuations
		Duration of blackout
	Communication barriers	Failure to answer phone calls
		Improper response to calls
		Lack of conclusions from face-to-face references
	Economic constraints	Lack of financial resources for network development
		Inadequacy of electricity tariff rates
	Restrictions of rules	Lack of electricity laws and regulations
		Lack of supportive approach to electricity subscribers
	Lighting of passages	Lighting coverage in different areas
		Continuity of street lighting
		Lighting quality of passages

Background conditions: Represents a specific set of features related to the phenomenon that generally refers to the location of events and related events. Concepts and categories related to contextual conditions are shown in Table 3.

Table 3
Concepts and Categories Related to Contextual Conditions

Main category	Subcategory	Concept
Background conditions	Human, cultural and social factors	Age, gender and education
		Access and ability to use electrical service hardware and software
	Geographical and climatic	Matching electricity costs to hot areas
		Adapting services to hard-to-reach areas
	Technology	Benefit from technology in accelerating service delivery
		Benefit from technology to eliminate seasonal fuels
		Benefit from technology to reduce face-to-face visits
		Benefit from technology to diversify services

Intervention conditions: effective general conditions that act as facilitators or barriers to strategies. In other words, disruptive fashion conditions indicate events that change the intensity of causal conditions. Concepts and categories related to intervention conditions are shown in Table 4.

Table 4
Concepts and Categories Related to Intervention Conditions

Main category	Subcategory	Concept
Intervention conditions	Counter reading	Reading time of the reading officer to the place
		Respectful and professional behavior of the reading officer
		Proper officer clothing and equipment
		Neatness of office environment

Main category	Subcategory	Concept
	Organizational order	Order and tidiness of the staff
		Order and tidiness of the electricity network
	Environment	No damage to the environment during the construction of the electricity network
		No damage to the environment during the operation of the electricity network
		Principled disposal of electricity distribution waste

Strategies: actions, plans and actions that help to implement the main phenomenon. According to selected expert managers. Concepts and categories related to strategies are shown in Table 5.

Table 5
Concepts and Categories Related to Strategies

Main category	Subcategory	Concept
Strategies	Empowering managers and employees	Review recruitment and employment conditions
		Customer skills training
		Increase job satisfaction of managers and employees
	Review goals and processes	Customer oriented approach
		Reduce face-to-face visits
		Clear expression of services that can be provided
		Keeping up with technical, economic and social developments
	Economic strategies	Innovation in corporate revenue generation methods
		Creating competition between electricity distribution companies
		Variety in the methods of selling branching and energy
		Review of outsourcing activities
	Personalization of services	Adaptation to geographical conditions
		Adapt to the type of electricity used
		Adaptation to the economic conditions of the subscribers

Consequences: are the results or outputs of actions and reactions (strategies). Concepts and categories related to the consequences are shown in Table 6.

Table 6
Categories Related to Consequences

Main category	Subcategory	Concept
Consequences	Improving the satisfaction of electricity subscribers	Definitive reduction, blackouts and power fluctuations
		Improve responsiveness to electricity subscribers
		Improving the quantity and quality of street lighting
		Rationalization of electricity prices
		Reduce face-to-face visits
	Improving the economic efficiency of power distribution companies	Improving the income of electricity companies
		Reduce the costs of electricity companies
		Reduce power losses
		Improving the process of collecting electricity prices
	Reduce environmental degradation	Reduce environmental degradation during the construction of the electricity network
		Reduce environmental degradation during the operation of the electricity network
		Principled disposal of electricity distribution waste
		Reduce environmental degradation by reducing traffic

Selective Coding

In the selective coding stage, the relationship of the central category (main phenomenon) with other categories is identified. At this stage, the main and sub-classes were intertwined to develop theoretical concepts in order to provide a model to improve the satisfaction of Tavanir electricity subscribers.

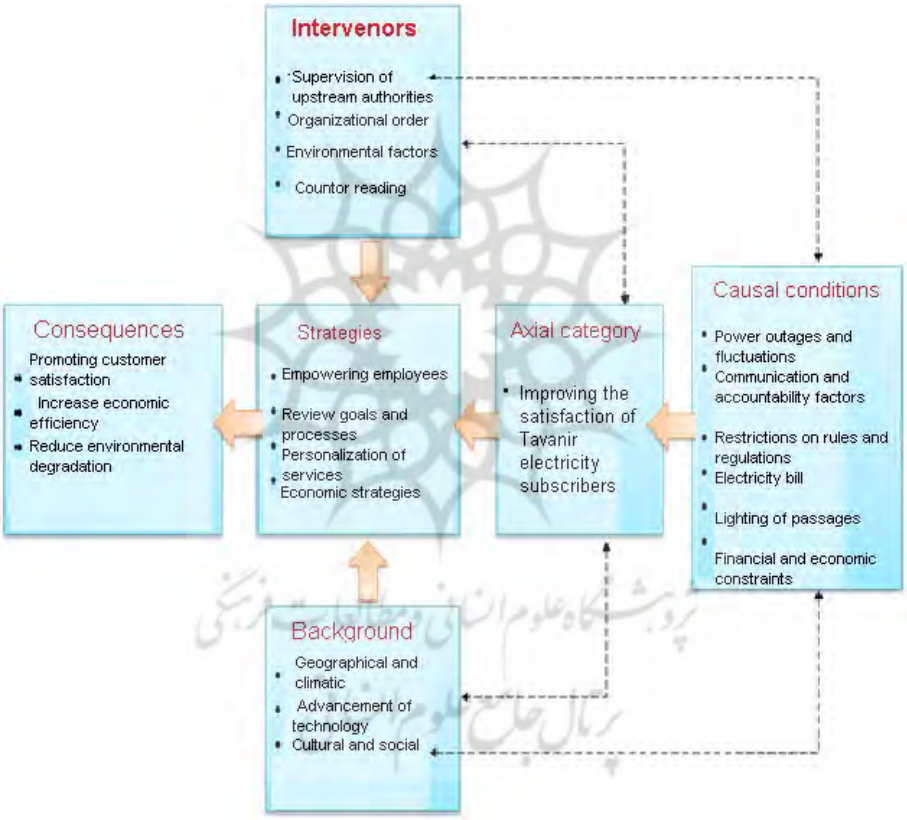

Figure1

Satisfaction of Tavanir Electricity Subscribers

Conclusions

Pivotal phenomenon or categories: Promoting customer satisfaction of Tavanir Company as a pivotal phenomenon is at the heart of other categories in the paradigm model Causal conditions or categories: Causal

conditions in this study include power outages and fluctuations, barriers to communication and accountability, limitation of laws and regulations, electricity bills, street lighting, financial constraints and economic conditions. Strategic categories: Strategies include empowering managers and employees, reviewing goals and improving work plans and processes, personalizing services and new economic strategies. Intervention categories: Intervention or mediation categories in this study include the implementation of the organization's grooming system (5s), environmental factors and the method of reading the electricity counter.

Environmental conditions: These categories represent a chain of contextual conditions that affect strategy. Environmental conditions in this study include geographical and climatic conditions, the extent of benefiting from technological advances, economic, cultural and social contexts.

Outcome categories: Expected outcomes or outcomes resulting from the implementation of the strategies of this research include improving the satisfaction of Tavanir electricity subscribers, increasing economic efficiency in the field of electricity distribution and reducing environmental damage.

How the strategies of the model presented in this research are effective, as a variable that is realized by implementing the predicted consequences and results of the model, they can also be analyzed based on cause and effect relationships. Figure 2 shows the effect of strategy review goals and process improvement and its consequences Figure 2 Effect of goal review strategy and process modification

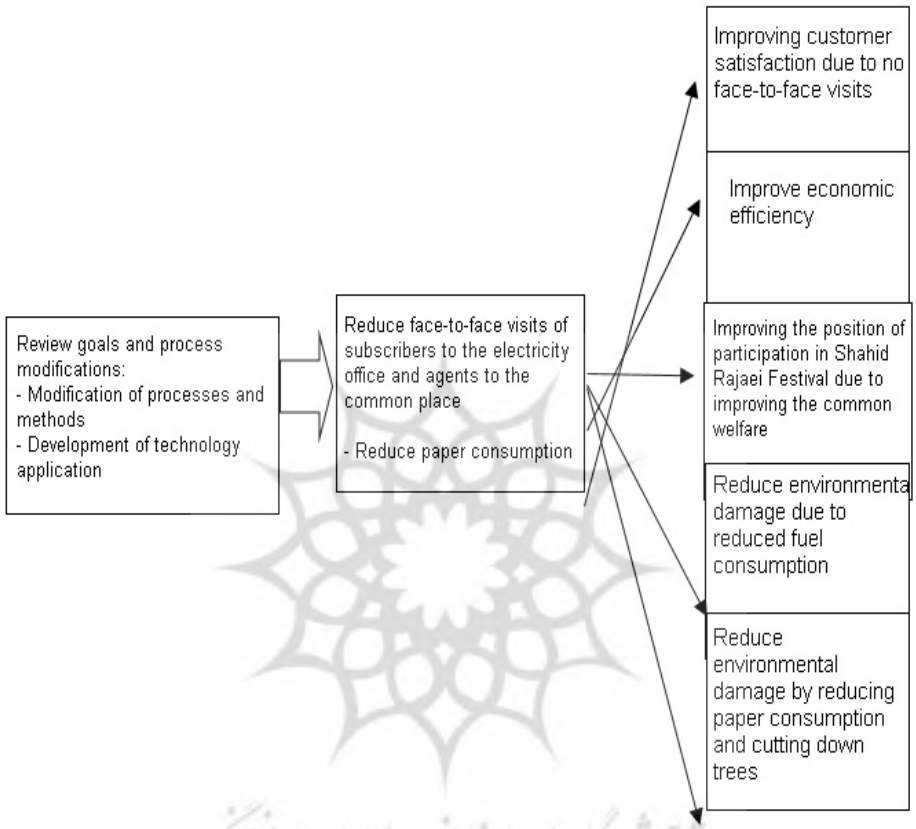

Figure 2
The Effect of Strategy Review Goals and Process Improvement

According to the results of this study, suggestions are provided to improve the satisfaction of electricity subscribers: Research findings indicate the priority of improving communication with customers from the perspective of qualified electricity managers, therefore, it is necessary to implement the empowerment programs and managers and employees, knowledge, skills and motivation to improve communication with customers and effective accountability. Research findings show differences and multiplicity in the demands, concerns, geographical and

climatic conditions, financial and economic potential and cultural and social status of subscribers; Therefore, it is necessary for Tavanir Company to modify its goals, programs and work processes with a customer-oriented approach in order to pay attention to these differences and observe the principle of service personalization (in marketing science). Most customer satisfaction improvement programs require new financial resources, Focusing on reviewing and improving methods, emphasis on replacing advanced hardware and software technology and eliminating some of the costs of traffic and physical use with the extensive use of systems such as reading and control from the center, conducting technical, economic and engineering studies of value and creating new revenues, while reducing the cost of services for subscribers, new financial resources to strengthen and expand the infrastructure of electricity distribution networks to minimize blackouts and power fluctuations, provide quality and quantity of street lighting, rationalize electricity costs and reduce face-to-face visits. It is suggested that Tavanir Company as the specialized parent company and supervisory body of power distribution companies, along with technical indicators such as the amount of branch sales and electricity, the length of the network of energy losses and ... customer satisfaction measurement index and its improvement process should be the criterion for evaluating the performance of these companies.

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