

Towards a Conceptual Model of Customer Satisfaction for Manufacturing Organizations and Presenting a Three-Phases Approach

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Abstract

The purpose of this research is to deepening the conventional superficial view to the customer satisfaction, providing three-phase approach to measure customer satisfaction within the process of customer satisfaction management, and then designing a conceptual model for the manufacturing organizations. The study is of kind of mixed method research. The proposed model in this study is designed after reviewing the literature and analysis of more than 35 models and frameworks and interviews with experts and professors; then to validate and modify the model, the two-round Delphi technique and quantitative methods including scrolling is utilized. The results of this research include developing a conceptual model with 5 dimensions and 25 components for assessing customer satisfaction in manufacturing organizations. Also, the study showed that the current practices of survey (questionnaire) do not have enough efficiency to measure customer satisfaction. The proposed three-phase approach of the present research is consisted of three phase: the initial phase (questionnaire), the

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middle phase (expert panels), and the final phase (field visits) which complement each other and they are provided within the customer satisfaction management process. The main pillars of customer satisfaction in the final model developed in this study are consisted of 5 dimensions of quality and innovation, service and support, cost and utility, customer loyalty and corporate image. This model is applicable for manufacturing organizations (product-oriented), which are mainly placed in the group of large organizations. The research new approach towards measuring and managing customer satisfaction leads to the idea of recreating the intellectual system and the dominant notion in the field of customer satisfaction in manufacturing organizations. The proposed approach can improve the assessing style and method of customer satisfaction management from traditional paradigm of reactive and unilateral relationship (passive single-way) to the richer paradigm of bilateral and active relationship (proactive two-ways). In fact, this study is conducted to shift and change the focus from the customer satisfaction numeric index to the customer active participation in improving the quality of products.

Keywords: Customer Satisfaction, Customer Satisfaction Index, Manufacturing Organizations, Customer Relationship Management, Customer Satisfaction Management.

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Introduction

Among the potential performance drivers, customer satisfaction has attracted the most attention from both practitioners and researchers. This is not surprising. Senior executives from 148 financial services firms ranked customer relations as the most important driver of firm's long-term success (Ittner and Larcker, 2001).

Satisfaction is a degree of meeting the needs at the end of a purchase (Oliver, 1999). The satisfaction is an evaluation about how much the retailer could meet or exceed customer expectations (Levy and Weitz, 2007). Customer satisfaction is a function of pre-sale expectations and post-purchase perceived performance (Fornell, 1992).

Customer satisfaction is a business term to assess how much a product or service provided by a company is able to meet customer satisfaction (Nemati et al., 2010).

In order to achieve customer satisfaction, companies need to create an environment and a culture to find ways to serve customer needs and expectations (Zeng et al., 2007).

The different definitions have been proposed with the different approaches and considerations to measure customer satisfaction up to now. Some of these definitions and interpretations are shown in Table1.

Table 1 Customer Satisfaction definitions

| Customer Satisfaction Definitions | References | Year |
|--|--------------------------|------|
| He felt that the higher the level of customer satisfaction the more likely the customer was to make more repeat purchases and purchase other products. | Cardozo | 1965 |
| Pointed out that customer satisfaction is an accumulating concept, and summarized the satisfaction level of a certain product or service and the satisfaction level of different areas of an organization. He also pointed out that customer satisfaction is a holistic evaluation reaction that represents the sum of the customer's objective reaction to the different properties of products | Czepiel and Rosenberg | 1974 |
| The concept of customer satisfaction was part of the marketing and practical field for around a century; then in the 1970s it started to become a separate topic for research and surveying | Churchill & Carol | 1982 |
| Customer satisfaction is the main factor that influences customer behavior. | Woodside, Frey, and Daly | 1989 |
| Believed that customer satisfaction can directly predict overall perception and that it is a company's asset that can bring repeated consumer behavior, and therefore "customer satisfaction" can be used as an economic benefit index. | Fornell | 1992 |
| Customer satisfaction reflects a consumer's total experience in the purchasing of a product or service, and that it is an overall evaluation built up over time. | Anderson et al. | 1994 |
| Customer satisfaction is away to evaluate the difference of a customer's expectations and actual perceptions of a certain product, and that its indexes include product price, service efficiency, service attitude, overall company performance, and optimal level of company familiarity. | Ostrom and Iacobucci | 1995 |
| Used the willingness of a customer to make further purchases, basic behavior (the most recent time of purchase, number, and price), and derivative behavior (open recommendation, word of mouth, introduction of customers, etc.) as a way to measure customer satisfaction. | Jones and Sasser | 1995 |
| Satisfaction is a post-choice evaluative judgment of a specific transaction, which can be viewed directly as an overall feeling, best specified as a function of perceived quality | Bastos and Gallego | 2008 |
| In the present global scenario, customer satisfaction (CS) is the primary and most important factor in the survival and growth of any organization from industry, academia or R&D institutions. | Sarkar and Batabyal | 2011 |

In this study, we are looking to measure customer satisfaction with a focus on manufacturing organizations (product-oriented). According to the conducted studies, there are many problems in the field of measuring, improving and managing customer satisfaction and particularly, the customer satisfaction with the products of the manufacturing companies. So in this study, the three-phase approach is provided to deepen the dominant view in the field. Our main goal is to change the unilateral relationship (passive single-way) between manufacturer and customer to a bilateral and active relationship (proactive two-ways). In this new approach, getting a number for customer satisfaction is not a main goal as before and instead of high sensitivity to the percentage of customer satisfaction, deep and long-term relationship with our customers is important.

In this paper, a new creative approach (including three-phase) is provided to measure customer satisfaction and then a process is designed to manage customer satisfaction that the mentioned three-phase approach is apart fit.

The rest of the article is organized as follows:

- Reviewing the research literature
- Research Method/Methodology
- Developing a conceptual model of customer satisfaction
- Providing the three-phase approach
- Findings, discussion and analysis
- Summary and conclusions

Literature Review

In this section, the approaches and models of customer satisfaction at micro and macro levels has been examined.

Customer satisfaction in the micro and macro levels

Customer satisfaction studies at the micro level have addressed the issues related to the enterprise and consumer/client. At the individual consumer level, research are focused on the nature, records, moderators, and outcomes of the customer satisfaction, and studied variables are generally in the individual motivational level or behavioral structures. Empirical studies investigate the relationship between customer satisfaction and customer loyalty (Anderson & Sullivan, 1993; Morgan & Rego, 2006; Shankar, Smith, & Rangaswamy, 2003; Taylor & Baker, 1994).

Customer satisfaction and repurchase (Bolton, Lemon, & Bramlett, 2006; Seiders et al., 2005; Voss, Godfrey, & Seiders, 2010) and customer satisfaction and share of wallet, have been often used as another measure of customer loyalty (Baumann, Burton, &

Elliott, 2005; Cooil, Keiningham, Aksoy, & Hsu, 2007; Keiningham, Perkins-Munn, Aksoy, & Estrin, 2005).

In general, efforts to increase the customer satisfaction lead to enhance the customer's purchase and financial results for the company (Yeung, M. C.H. et al. 2013).

Customer satisfaction literature at the micro level showed how consumers/customers respond to satisfactory and unsatisfactory experiences and how companies can be fit from the creation of customer satisfactory experience. At the macro level of economy, it can be argued that customer satisfaction is a stimulant and driver of consumer spending. From the perspective of consumers, people tend to spend their income in ways that brings them the maximum satisfaction. The level of satisfaction that consumers have received from previous consumption affect the expected satisfaction of the future purchases (Johnson, Anderson, and Fornell, 1995) and leads to increase spending in future periods, (Homburg, Koschate, &Hoyer, 2005) and will ultimately lead to more sales (Li, Sun, and Wilcox, 2005).

In addition, the higher number of satisfied consumers causes increasing the other consumers' confidence and encouraging them to purchase more through the positive verbal and word of mouth advertising (Danaher and Rust, 1996).

The monitoring methods of customer satisfaction in the industry level show that the customer satisfaction is not only the agenda of private companies, but also is associated with the whole industry. From a macroeconomic perspective, it can be argued that productivity measures the quantity of economic output, while customer satisfaction measures the quality of the economic output. (Fornell, Ittner, et al., 1996)

Clearly, if the output quality will be compromised, the consumption cannot be sustainable. More importantly, because the total consumption by households constitutes a significant proportion of gross domestic product (GDP), so an increase in consumer spending due to an increase in satisfaction levels can have a direct impact on the economy as a whole. . So for politicians, customer satisfaction is considered as the "potentially useful tool for evaluating and improving the economic health of the country, both in terms of national competitiveness and the welfare of citizens". (Fornell et al., 1996)

The first national customer satisfaction index was the Swedish Customer Satisfaction Barometer (SCSB) which is developed in the 1989. This index was the basis for the development of national indices of the other countries (Fornell, 1992; Anderson et al., 1994), such as developing the German Customer Barometer (GCB) in 1992 (Meyer and Dornach, 1996), the American Customer Satisfaction Index (ACSI) in 1994 (Fornell et al., 1996), the Norwegian Customer Satisfaction Barometer (NCSB) in 1996 (Andreassen and Lindestad, 1998), European Customer Satisfaction Index (ECSI) in 1999 which has been inspired by the Swedish and American indices (Kristensen et al., 1999), Hong Kong Consumer Satisfaction Index (HKCSI) in 1998-2000 (Calleros et al., 2012), the Danish Customer Satisfaction Index (DCSI) in 1999 (Martensen et al. , 2000), the Turkish Customer Satisfaction Index (TCSI) (Turkyılmaz and Ozkan, 2007), the Taiwanese Customer Satisfaction Index (TCSI) (Chiu et al. 2011), the Chinese Customer Satisfaction Index (CCSI) (Huang et al., 2011), the Jordanian Customer Satisfaction Index (JCSI) in

2011 (Al-Nasser et al., 2011), the Mexican User Satisfaction Index (IMSU) in 2012 (Calleros et al., 2012). Also the national customer satisfaction indices have been developed in other countries such as New Zealand, Austria, South Korea, Chile, France, Netherlands, Malaysia¹, and Switzerland². The criteria of the most important national customer satisfaction models have been compared in the following table.

Table 2 Comparison Criteria of National Customer Satisfaction Indexes

| NCSI | SCSB | ACSI | NCSB | SWICS | ECSI | MCSI | TCSI Turkey | TCSI Taiwan | JCSI | IMSU |
|---------------------------|------|------|------|-------|------|------|-------------|-------------|------|------|
| Year Criteria | 1989 | 1994 | 1996 | 1998 | 1999 | 2000 | 2004 | 2005 | 2011 | 2012 |
| Customer Expectations | | | | | | | | | | |
| Customer Loyalty | | | | | | | | | | |
| Customer Complaints | | | | | | | | | | |
| Perceived Product Quality | | | | | | | | | | |
| Perceived Service Quality | | | | | | | | | | |
| Perceived Value | | | | | | | | | | |
| Corporate Image | | | | | | | | | | |
| Customer Relations | | | | | | | | | | |
| Quality Drivers | | | | | | | | | | |
| Price Index | | | | | | | | | | |
| Calculation Commitment | | | | | | | | | | |
| Affective Commitment | | | | | | | | | | |
| Perceived Quality | | | | | | | | | | |
| Trust | | | | | | | | | | |
| Switching Costs | | | | | | | | | | |

¹The Malaysian Customer Satisfaction Index (MCSI)

²Swiss Customer Satisfaction Index (SWICS)

Customer satisfaction measurement models

Many firms use customer satisfaction measurements to evaluate the performance of goods, services and employees and try to link them to customer attitudes and behavior (Peterson and Wilson, 1992; Johnson and Gustafsson, 2000).

For this purpose, a lot of models and frameworks of customer satisfaction in the various fields and industries have been presented by researchers; some of the most important research is presented in the following table together with their purpose and scope/criteria of their use.

Table 3 models and frameworks to measure customer satisfaction

| N | Author | Year | Scope/Criteria |
|---|---------------------|------|---|
| 1 | Ruyter, et al. | 1996 | assessing service Quality of the orders and receiving goods (list of 33 questions) |
| 2 | Caruana and Pitt | 1997 | Determining the organization tendency to provide zero error services (a 14-item list of best practices related to performance in service delivery such as new product design, managers performance, operational teams, distribution, finance and marketing) |
| 3 | Soderlund | 1998 | Examining Customer satisfaction of the supplied services by the organization (list of 9 questions about the consequences of customer satisfaction, including word-of-mouth, feedback to the supplier and finally, loyalty) |
| 4 | Lee and Cunningham | 2001 | Evaluation of customer loyalty (list of 23 questions about issues such as tangibles, reliability, responsiveness, assurance and empathy) |
| 5 | Homburg and Rudolph | 2001 | Customer satisfaction in the industrial markets (satisfaction of 7 components namely: products, sales people, product-related information, order handling, technical services, internal personnel, complaint handling) |
| 6 | Eggert and Ulaga | 2002 | Investigating the perceived value by the customer (a list of 15 questions, such as customer perceived value, customer satisfaction, repurchase intention, search for alternatives and word-of-mouth) |
| 7 | Caruana | 2002 | Customer dissatisfaction (the questionnaire used consisted of 37 items split between three instruments that each measured service loyalty, service quality and customer satisfaction respectively) |
| 8 | Kau and Loh | 2006 | Investigating the Customer attitudes toward organization performance (the list of 40 questions including the |

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|----|---------------------|------|--|
| | | | dimensions of justice: procedural justice, explanation and effort, empathy and politeness, distributive justice and dimensions of behavioral outcomes: word of mouth, customer loyalty, trust) |
| 9 | Turkilmaz and Ozkan | 2007 | Factors affecting the customer satisfaction index in this model are as follows: image (consisted of 6 components), customer expectations (consisted of 4 components), perceived quality (consisted of 5 components), perceived value (consisted of 2 components), and customer satisfaction index (consisted of 3 components) which affect customer loyalty (consisted of 3 components) along with the image. |
| 10 | Qibin, et al. | 2007 | Investigating the Factors driving and influencing customer satisfaction (consisted of 8 dimensions and 26 indicators). These dimensions are: shopping convenience, shopping environment, store infrastructure, personal services, in-store goods, goods price, ads, post purchase service) |
| 11 | Eboli and Mazzulla | 2009 | The introduction of the new index of customer satisfaction for evaluating the transport services quality (this index is composed of 11 dimensions and 26 factors. The dimensions include: route characteristics, service characteristics, service reliability, comfort, cleanliness, fare, information, safety and security, personnel, customer services and environment) |
| 12 | Yongju and Yongsung | 2010 | Investigating the relationship between service quality, customer satisfaction and customer loyalty. In this model, service quality has been considered based on five components of product diversity, tangibles, responsiveness, interaction and stability that eventually these factors have a positive effect on customer satisfaction and the customer loyalty will increase by increasing the customer satisfaction. |
| 13 | Munteanu, et al. | 2010 | Analysis of customer satisfaction in the context of higher education (consisted of 9 qualitative dimensions that include long term professional horizon, Supplemental education, course content, communication gates, timing and feedback, pressure and stress, support services, thesis preparation and “dark side” (inappropriate behaviors)) |

| | | | |
|----|-------------------------|------|---|
| 14 | Alhemoud | 2010 | Investigating customer satisfaction in Kuwait banking system (the survey consists of 26 questions, the most important questions are related to the availability, safety, fast and efficient services, service quality, image and reputation, communication channels, time and price.) |
| 15 | Robinot and Giannelloni | 2010 | Customer satisfaction survey in hotels (a list of 29 questions about hotel services such as Convenience, pleasant, cleanness, decoration, the fair price of the received services, recreational facilities and competent staff) |
| 16 | Valera-Neira, et al. | 2010 | Describing customer satisfaction by controlling complaints (introduction of seven are as in this regard include: recovery expectations, satisfaction with complaint handling, perceived justice in service recovery, emotions experienced after complaint handling, emotions experienced after complaint handling and magnitude of the failure) |
| 17 | Hui and Zheng | 2010 | Measuring the customer satisfaction of facility management services in the housing sector using structural equation modeling approach. (The questionnaire contains 22 questions in the areas of service quality, management quality and ultimately overall customer satisfaction) |
| 18 | Padma, et al. | 2010 | Service quality and its impact on customer satisfaction in India hospitals. This research was conducted in two parts, the first part for patients and the second part to patient attendant. (The study was conducted using eight components: infrastructure, personnel quality, process of clinical care, administrative procedures, safety indicators, hospitals image, social responsibility and trustworthiness of hospital) |
| 19 | Kiran | 2010 | Investigating the service quality and customer satisfaction in the academic library. (this study is conducted in Malaysia using 5 dimensions including: responsiveness, reliability, assurance, tangibles, empathy) |
| 20 | Hume and Mort | 2010 | The result of appraisal emotion, core service quality, peripheral service quality, perceived value and customer satisfaction on repurchase intention (designing conceptual model for repurchase intention and the factors affecting it, investigating the relationship |

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|----|---------------------|------|--|
| | | | between variables and determining the important coefficients and routs between them. |
| 21 | Deng, et al. | 2010 | The Empirical study on mobile instant messaging in China to understand customer satisfaction and loyalty. (This model includes factors that directly affect the satisfaction including: trust, perceived service quality and perceived value-which is includes functional value, emotional value, social value and monetary value, and the factors that directly affect loyalty are customer satisfaction, trust and perceived switching cost |
| 22 | Chiu, et al. | 2011 | Fitness tests of the TCSI model using the maximum profit from customer satisfaction and loyalty index in the automobile industry' s of Taiwan and obtaining the general satisfaction degree of the Taiwan automobile industry. (The survey was conducted using the questionnaire which is designed based on the TCSI model. This model contains 6 dimensions of image, customer expectations, perceived quality, perceived value, customer satisfaction and customer loyalty, and 22 components (questions)) |
| 23 | Sarker and Batabyal | 2011 | Designing the conceptual framework to evaluating customer satisfaction in research organizations. (the framework in consisted of the 7 qualitative parameter including: quality of services rendered by the institute, adherence to delivery schedule, cooperation extended to the customer, achieving objective as per agreement, adherence to work plan, output accomplishment and performance improvement, usability of innovation and output of the project) |
| 24 | Awan, et al. | 2011 | Service quality and customer satisfaction in the banking sector. (A comparative study of conventional and Islamic banks in Pakistan. The model consists of three dimensions of functional quality, overall service and customer satisfaction, and each dimension has components that questionnaire consisted of 26 questions is designed by and the survey has been done through this.) |
| 25 | Omar, et al. | 2011 | Investigating customer satisfaction in the Chinese online shoppers. (Customer satisfaction is measured with 6 dimensions and 23 indicators, each dimensions includes several parameters/variables. These dimensions |

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|----|------------------------------|------|--|
| | | | includes: convenience (10 variables), product performance (4 variables), consumer services (3 variables), website sensory stimulation (2 variables), website social interaction functions (2 variables) and security concerns (2 variables)) |
| 26 | Kim and Lee | 2011 | Customer satisfaction through the carriers of cost reduction. (The model includes perceived service quality (tangibles, reliability, responsiveness, assurance, empathy), customer satisfaction, and behavioral intentions (word-of-mouth communications, purchase intentions, price sensitivity, and complaining behavior)) |
| 27 | Simon and Petnji Yaya | 2012 | Improving innovation and customer satisfaction through the integration of systems in order to help organizations to manage and enhance these elements and their performance (the conceptual model consists of three parts: Beneficial characteristics from integration (better use of the systems, system performance, organizational strategic, and internal cohesion), Customer satisfaction, and Innovation (process, organization, and marketing). |
| 28 | Yap, et al. | 2012 | Satisfaction and trust in customer loyalty (the proposed model dimensions: service quality (8 questions), complaint handling (3 questions), trust (4 items), satisfaction (3 questions) and loyalty (5 questions) |
| 29 | Hüttinger, et al. | 2012 | Drivers of customer attractiveness, supplier satisfaction and preferred customer |
| 30 | Jeon and Choi | 2012 | The relationship between employee satisfaction and customer satisfaction (the customer satisfaction dimensions in the model are: the interaction quality, outcome quality, customer satisfaction, trust, and loyalty) |
| 31 | San-Martin and López-Catalán | 2013 | Customer satisfaction in mobile sales (the model has the dimensions of: trust, impulsiveness, involvement and innovativeness in new technologies, satisfaction and consists of 22 questions.) |
| 32 | Fatima and Razzaque | 2013 | The role of customer engagement in satisfaction and compatibility relational benefits (social benefit, confidence benefit, special treatment benefit), customer involvement, rapport and satisfaction |
| 33 | Wong and Dioko | 2013 | Adjustment role of customer expectations in customer satisfaction model (perceived value, perceived |

| | | | |
|----|---------------------|------|---|
| | | | performance, customer expectations, customer satisfaction, loyalty intention, and complaint) |
| 34 | Pappas, et al. | 2014 | The moderating effects of Online shopping experience on customer satisfaction and repurchase intentions (effort expectancy, performance expectancy, self-efficacy, trust, experience (moderator variable), satisfaction, and intention to repurchase) |
| 35 | Srivastava and Kaul | 2014 | Social interaction, convenience and customer satisfaction: The Mediating Role of Customer Experience (the model contains 4 dimensions and 14 components. The dimensions are: social interaction, convenience, customer experience, and customer satisfaction) |
| 36 | Zakaria, et al. | 2014 | Investigating the relationship between loyalty program, customer satisfaction and customer loyalty in the retail industry (loyalty program is the independent variable and the customer satisfaction and customer loyalty are the dependent variables.) |

By examining the research conducted about customer satisfaction, and looking at the models and frameworks that have been proposed in various fields, we can say that the most important research challenges in this field include:

- Most of the research that has been done to measure customer satisfaction have focused on identifying the components and indicators and are less concerned about the practices and processes of managing customer satisfaction.
- Not enough attention has been paid to the influence of industry and products/services nature in the process of evaluating the customer satisfaction.
- Most of the models are designed with unilateral attitude towards customer and do not pay attention to the gradual growth of the knowledge and capabilities of customers in the markets, especially in manufacturing organizations.

Nowadays, due to the growing trend of customers' awareness and capabilities, especially in the case of business to business customers (B2B) of the manufacturing organizations, traditional and conventional ways of measuring customer satisfaction have not the required effectiveness for organizations. Exploratory interviews in this study with more than a hundred CEO, customer relationship deputies, after-sales service specialists, quality assurance and product quality experts and different corporate customers showed that the most important issues and problems facing the organizations in this area are as follows:

- managers' and marketing/customer research sector view in companies and organizations, as well as the researchers approach is excessively focused on

achieving a number for customer satisfaction, while this number is nothing but a general sense of customers' satisfaction or dissatisfaction and is solely represents a percentage for overall customer satisfaction.

- It is possible that the customer satisfaction numbers fluctuates in different periods and so the actual increase or decrease in customer satisfaction cannot be concluded based on it.
- Due to changes in day-to-day customers' demands and needs in today's dynamic environment, the dominant paradigm in the design of the existing model, which is based on unilateral communication with customers, does not work because the customers do not want to be only as consumers.

So, if the customer satisfaction is considered as a concept based on the interaction/bilateral relationship between the seller and the buyer, and as the extent of fulfillment of customer expectations by the manufacturer, it is necessary to change our approach to measure customer satisfaction as well as our view at to the relationship with customer.

Despite the limitations exist in the previous studies; this study has attempted to examine all aspects of customer satisfaction in the manufacturing organizations. For this purpose, in this study, by examining the previous models, by studying factors affecting customer satisfaction, discussion and analysis, as well as exploratory meetings with some managers, experts and manufacturing organizations customers, a primary model is proposed for customer satisfaction in the manufacturing organizations (Table 4).

Table 4 the dimensions of the primary model of customer satisfaction in manufacturing organizations

| The primary model of customer satisfaction in manufacturing organizations | | | | | |
|---|------------------|-------------------|---------------------|---------------------|------------------------|
| Corporate image | Customer loyalty | Price and utility | Delivery scheduling | Service and support | Quality and innovation |

In the next section, development process of the proposed model and the methodology is described.

Research Methodology

In the previous sections, the concept of customer satisfaction and customer satisfaction measurement models were introduced in the micro and macro levels. In addition, the primary model of customer satisfaction for the manufacturing organizations was presented.

Field studies and development process of the primary and ultimate model is conducted with the help of the experts and customers of 15 manufacturing organization as well as the academics (University professors). The Managers and experts of these organizations

and some of their clients were involved in the research. A summary of the steps and process details are presented below.

The first stage: designing the primary model

In the first stage, identifying the key dimensions of customer satisfaction is performed using three inputs:

Reviewing literature, exploratory meetings with the manufacturing executives and experts from 15 organizations and exploratory meetings with the organizations customers (B2B customers)

- Exploratory meetings with producers (executives and experts of the organizations) and customers:
 - Two 1.5 hours sessions of in-depth, open and unstructured interviews were held with each of the representatives of producers and customers with qualitative approach.
 - Using different opinions, especially the product users and reviewing the literature, the output of this stage was the development of research primary model (table 4).

The Second stage: reviewing the primary model and developing the research model

In this study, the exploratory Delphi technique was used to validate the model. The Delphi technique was developed in the 1950s by Olaf Helmer and associates at the Rand Corporation for defense technology forecasting (Dalkey, 1969)

as shown in Figure 1, the technique is an iterative multistage group facilitation process, designed to collect data through questionnaires, synthesize, explain, and resented size in a way that expert opinion and personal experience are formed into group consensus on important issues (Hasson, Keeney, & McKenna, 2000; Lambrecht, 2007).

At this stage, with the two rounds Delphi method, the primary model is reviewed and the research model is developed. The Invitations were sent to the 70 experts (university professors in the areas of technology management, Marketing, industrial engineering, and MBA and organizations experts in the fields of quality management, quality assurance, sales, customer relationship management, and after-sales service) and finally 30 people (18 people from organizations and 12 people of university professor) were volunteered to participate in this research.

- How to select experts in Delphi method:

Organization experts: based on merit, including undergraduate education and above relevant, at least 15 years of related work experience, and from management layers in each layers of operational (first-line managers), middle and senior (top managers).

University professors (academics): at least assistant professor, related areas of expertise and teaching managing courses (marketing, technology, MBA) and industrial engineering, having relevant research.

Delphi technique (first round): (output: Table 6)

- identification / validation of dimensions
- determining the importance / priority of the dimensions

Delphi technique (second round): (output: Table 7)

- identification / validation of the components
- determine the importance / priority of the components

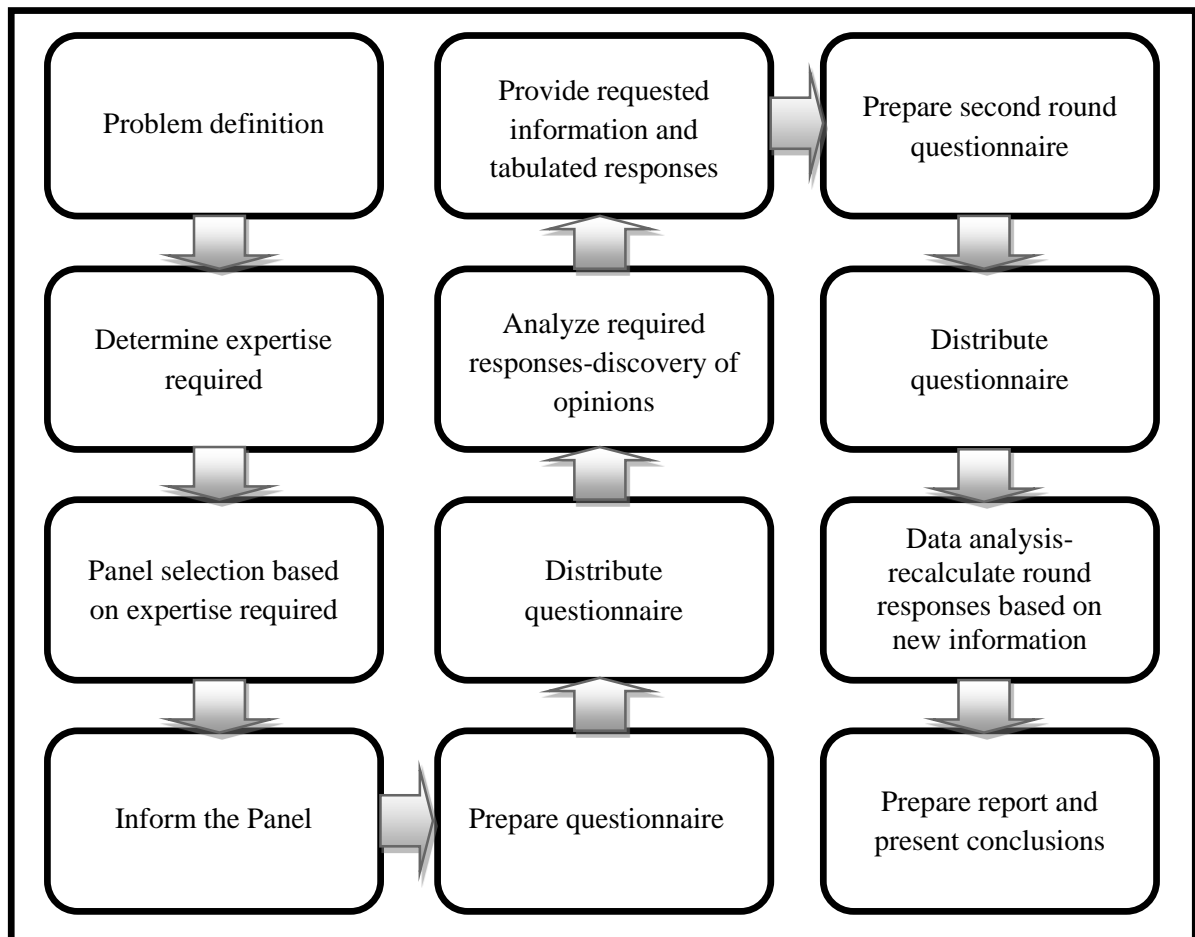


Figure 1 Delphi Process Flowchart (Busch, 2013)

The Likert scale was used to analyze the questions, including 5-point scale ranging from 1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree and 5.Strongly Agree.

Ratings used to assess each dimension and each component is calculated as shown in Table 5.

Table 5 Rating used to assess dimensions or indicators

| No. | Criteria | Assigned Rating |
|-----|--|-----------------|
| 1 | If the amount of the population mean is greater than or equal to 4, dimension or indicator has a strong effect. | +++ |
| 2 | If the amount of the population mean is greater than or equal to 3 and less than 4, ($3 \leq \text{mean} < 4$) dimension or indicator has a medium effect. | ++ |
| 3 | If the amount of the population mean is less than 3, dimension or indicator has a weak effect. | + |

Some characteristics of the participating organizations in the study include:

- Large Businesses and organizations
- Product-oriented organizations (manufacturing organizations)
 - having non-consumable goods (Durable - average 10 years) diverse, sometimes complex and high-tech
- Type of business market: B2B
- Production systems: Diverse, from mass production to customized production
- Competitive conditions: a range from pure monopoly to Monopolistic competition

By reviewing the literature on the customer satisfaction measurement and examining the components of the extant models in the previous studies, as well as interviews and teamwork with some experts and researchers, the proper quality components related to customer satisfaction were classified in six dimensions, so that each of them has several components. These dimensions includes: 1) Quality and innovation, 2) Service and support 3) Delivery scheduling 4) Price and utility of 5) Customer loyalty 6) Corporate image. After identification of customer satisfaction dimensions, in the first round of the Delphi technique, the model dimensions were validated and their priority and importance is determined. Then using experts opinion, the third dimension (Delivery scheduling) were removed due to poor impact; in the second round of the Delphi technique, the remaining components of five dimensions have been validated. Finally, the 3 components (Physical features of the product (packaging, beauty and dimensions - Providing documents at time of product delivery - Active, preventive and honest behavior) were excluded due to poor sensitivity and thus the final model with 5 dimensions and 25 components is developed.

Table 6 Validation of the proposed model dimensions

| the proposed model dimensions | Number of experts | Mean | Standard deviation | Importance /priority |
|-------------------------------|-------------------|------|--------------------|----------------------|
| Quality and innovation | 30 | 4.47 | 0.629 | +++ |
| Service and support | 30 | 4.43 | 0.568 | +++ |
| Delivery scheduling | 30 | 2.80 | 0.997 | + |
| Price and utility | 30 | 3.43 | 0.817 | ++ |
| Customer loyalty | 30 | 4.03 | 0.850 | +++ |
| Corporate image | 30 | 3.73 | 0.980 | ++ |

Table 7 Validation of the proposed model components

| Components of the proposed model | No. of experts | Mean | Standard deviation | Importance/priority |
|--|----------------|------|--------------------|---------------------|
| 1.Stability of product quality parameters | 30 | 4.57 | 0.568 | +++ |
| 2.Matching product quality with specified characteristics | 30 | 4.43 | 0.568 | +++ |
| 3.Physical features of the product (packaging, beauty and dimensions) | 30 | 2.93 | 0.944 | + |
| 4.Physical characteristics of the product(design, ergonomics, repair ability) | 30 | 4.00 | 0.788 | +++ |
| 5.Electrical, electronical, mechanical and electromechanical features of the product | 30 | 3.47 | 0.776 | ++ |
| 6.Product safety and risks during usage | 30 | 4.33 | 0.606 | +++ |
| 7.Product innovation | 30 | 4.37 | 0.615 | +++ |
| 8.Incorporating customer views in design and production | 30 | 4.40 | 0.675 | +++ |
| 9.Observing the environmental aspects | 30 | 3.43 | 0.568 | ++ |
| 10.Transport and storage | 30 | 3.93 | 0.828 | ++ |
| 11.Installation and set up | 30 | 4.37 | 0.615 | +++ |
| 12.Maintenance and repair | 30 | 3.80 | 0.610 | ++ |
| 13.Training the utilization and employing the product | 30 | 3.87 | 0.860 | ++ |
| 14.Providing documents at time of product delivery | 30 | 2.93 | 0.868 | + |

| | | | | |
|---|----|------|-------|-----|
| 15.Capacity development, support and empowerment of maintenance/repair personnel | 30 | 4.17 | 0.592 | +++ |
| 16.Conducting constructive periodical visits of Products | 30 | 3.73 | 0.691 | ++ |
| 17.Satisfaction with extending operational life and end of the product life (release) | 30 | 4.03 | 0.718 | +++ |
| 18.How to handle complaints and criticism | 30 | 4.33 | 0.606 | +++ |
| 19.Satisfaction of the product price value | 30 | 4.53 | 0.681 | +++ |
| 20.Product manufacturer adherence to the agreed price level | 30 | 4.30 | 0.596 | +++ |
| 21.Willingness to repurchase the product | 30 | 4.40 | 0.621 | +++ |
| 22. Willingness to buy other products | 30 | 4.20 | 0.610 | +++ |
| 23. Willingness to introduce and recommend the products to the others | 30 | 4.37 | 0.669 | +++ |
| 24.Proper Communication and interaction | 30 | 4.33 | 0.711 | +++ |
| 25.Responsiveness and flexibility of the organization | 30 | 4.17 | 0.531 | +++ |
| 26.Active, preventive and honest behavior | 30 | 2.97 | 1.326 | + |
| 27.Protecting customer information and intellectual property | 30 | 3.93 | 0.907 | ++ |
| 28.Observe ethical principles, confidence building and transparency in relations | 30 | 4.07 | 0.640 | +++ |

Table 6 shows the Mean and standard deviation values of the model dimensions, and Table 7 shows the mean and standard deviations values of the model components. As can be seen in Table 6,7, the third has the average value less than 3 and it should be removed because of the weak impact of the experts opinion, and the third, fourteenth and twenty-sixth components have also the average value less than 3 and are they have weak effectiveness and should be removed as well.

After surveying the experts about the dimensions and components, removing third dimension and 3 components (3, 14 and 26), the modified model has 5 dimensions and 25 components. The one-dimensional Kolmogorov-Smirnov test (KS) is used for data normality test of data, one-sample Kolmogorov-Smirnov test addresses comparing the observed cumulative distribution function with theoretical cumulative distribution

function (expected) at an ordinal variable. In other words, in this case, the distribution of a trait in a given sample compares with the distribution assumed for that community.

The results for testing dimensions show that the significant level (sig) of all data is less than 0.05; it means that the distribution is not normal. So there is difference between the observed and theoretical cumulative distribution function. This difference can have three modes: 1. the absolute difference, 2- the positive difference 3- the negative difference. The absolute difference represents the largest absolute difference between the observed cumulative distribution function and assumed cumulative distribution function which is the normal distribution. The Kolmogorov-Smirnov test statistic (z) is also calculated based on the same amount of absolute difference. Test results for significant components also show that the significant level for all components is less than 0.05.

Then one-sample t-test was used to determine the importance of the components. This test is used when we want to compare the average of a sample from the society with a normal / common state or a standard or a supposed and expected number. In other words, in this test, it is assumed that a sample with n size and the mean equal to m have selected from a society and we want to know whether we can suppose the sample as a random sample of the population with the average amount of μ . In this test, the data should be normally distributed or a large number of samples (greater than or equal to 30) should be selected so that it can be considered as normal distribution. In this study, the number of experts (sample) is 30; then t-test can be used in this case. According to Tables 6 and 7, the average of all dimensions and components is greater than of the intermediate indicators (namely 3) and in other words, all the dimensions and components (5 dimensions and 25 components) have a great importance from the perspective of experts.

The main basis for interpretation of t test is considering the difference between actual and assumed average (the number 3 in here) with respect to the value of t at the error level less than 0.05. Mean difference for all dimensions and elements is positive and more than 0.433 and this indicates the relatively high importance of dimensions and components from the experts' point of view. Also according to the upper and lower limit of the confidence interval (interval estimation) in the test, because the lower and upper limits for all components are positive, it can be said that the average for all components is larger than the tested value and the difference is meaningful.

Developing conceptual model of customer satisfaction for manufacturing organizations

After studying literature and with the help of experts' opinion in the various fields, the conceptual model of customer satisfaction for manufacturing organizations including of 5 dimensions and 25 components is developed which is presented in Figure 2.

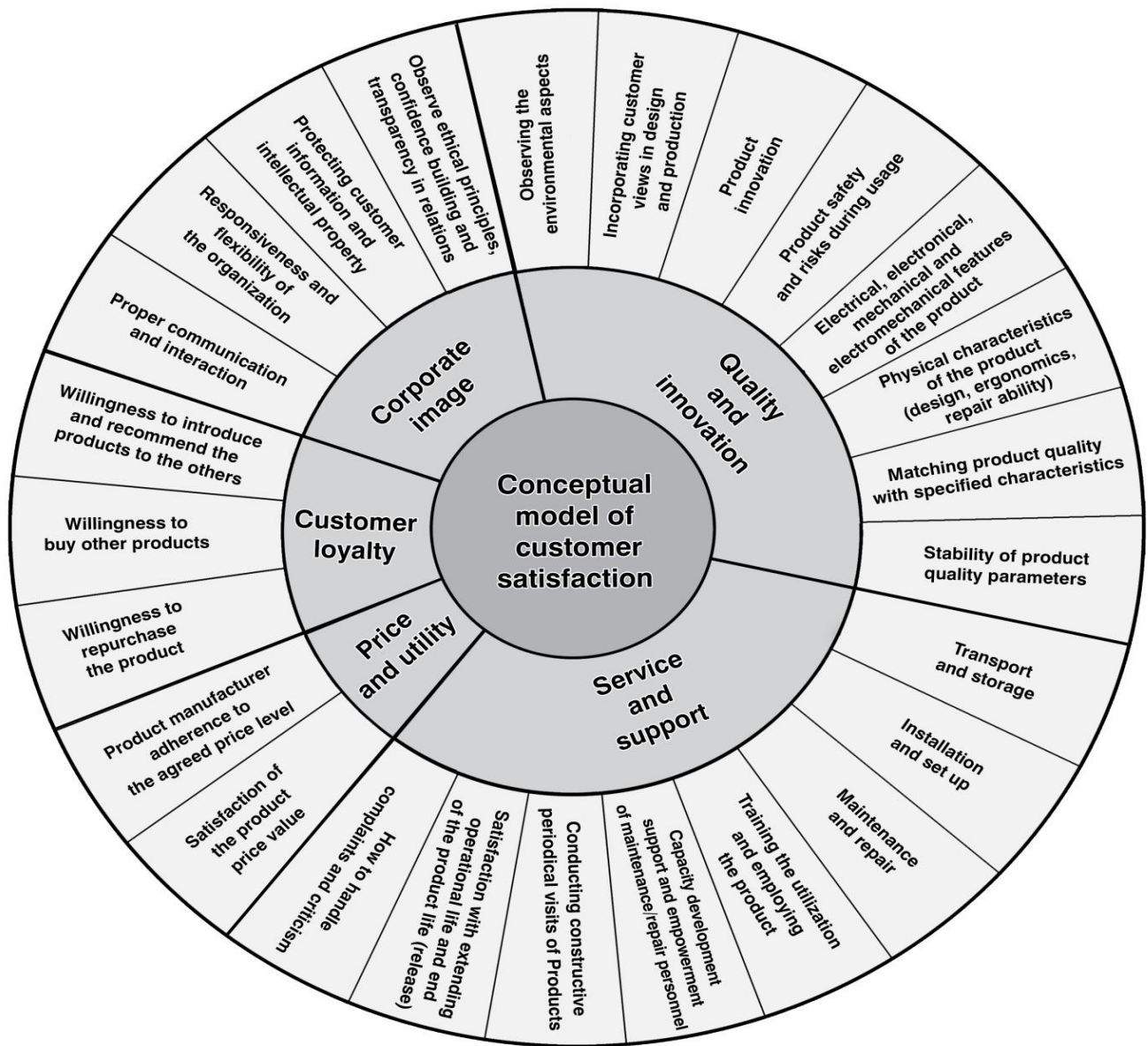


Figure 2 Conceptual model of Customer Satisfaction

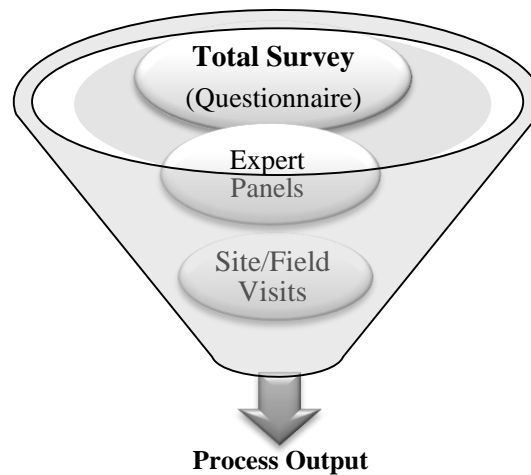


Figure 3 Rational screening process proposed hybrid approach

Providing the three-phase approach to measure and improve customer satisfaction through CSM process

Today, the traditional way to measure customer satisfaction which are largely based on passive and single-way relationship between the organization and customer, has not required level of responsiveness for the dynamic environment and changing needs of the customers. So in order to survive in the competitive arena, there is a need to change practices and the process of the customer satisfaction management and we should move towards proactive and two-ways (mutual) communication to satisfy the customer loyalty. In this regard, the leading organizations in providing products/services seek to contribute to the clients in various stages of production and design and have proceeded towards Co-creation. In this study, three-phase approach is presented to measure customer satisfaction through process of customer satisfaction management.

This approach leads to recreating the intellectual system and the prevailing idea (pattern) in the area of measuring customer satisfaction and increasing the efficiency and effectiveness of the process of managing customer satisfaction. This approach also results in a rational and systematic screening issues/challenges and problems and assists in the process efficiency and effectiveness by focusing the resources on key and strategic issues (Figure 3).

As noted earlier, a three-phase approach is provided in this study with an interactive approach (bilateral), in the form of customer satisfaction management process. This process is primarily addressed prioritizing the strategic products, segmenting customers, identifying the target customers, and providing a mechanism for customer satisfaction measurement process, and in addition to identify the level and depth of the customer dissatisfaction, it is trying to resolve key issues and thus achieve maximum customer satisfaction using prioritizing problems/challenges and dissatisfactions.

Segmenting customers at the entrance of the proposed process is performed based on the criteria such as the following:

- Organizational level of customers in terms of being staff or operational (line and staff)
- Morphological variation of customers (e.g. the main areas of activity / mission)
- Activity areas and geographical distribution
- Products life cycle in the customer organization

Given that most of customers, especially B2B customers are not willing to fill out a questionnaire to measure customer satisfaction because of the unpleasant experience of keeping track of previous grievances by the manufacturer, our proposed process includes a three-phase approach to measure customer satisfaction. These phases are complementary and have a strategic view to screening the customer's problems and challenges. Three-phase approach proposed in this study includes: the initial phase (Questionnaire), the middle phase (Expert Panels), and final phase (Field Visits). All phases (stages) of the managing customer satisfaction process are described in Table 8.

Table 8 process of managing customer satisfaction based on the three-phase approach

| Process Input | The first phase | The second phase | The third phase | Process Output |
|--|--|--|--|---|
| | Input: Questionnaire | Input: Expertise panels | Input: Field visits | |
| Prioritizing products (strategically) | Output: Extraction, classification and separation of problems and challenges in a wide range including general and fairly important issues and major problems (strategic) | Output: Identifying the main and possible roots of the problem focusing on important issues, finding a quick solution to the major and non-strategic issues and | Output: Analyzing Strategic and critical issues and offering improvement suggestions for moving towards the desired state | Identifying issues and challenges |
| Customer segmentation | | | | Categorizing challenges |
| Identifying and determining the scope of target customers (selecting the customers' scope) | | | | Prioritize challenges |
| Mechanism for customer satisfaction measurement process | | | | Explaining the key challenges and critical issues |
| | | | | Prioritize the improvable areas |
| | | | | Defining improvement projects |
| | | | | Implementing the improvement program and reflecting the results and achievements to the customers |

Therefore in the first phase, So much information can be collected in different geographical areas with a very low cost and within a very short time, but the accuracy and detail level is limited. In fact, in this phase, the problem causes remains hidden and the appeared problems are identified in the effect level. (Speed: moderately high; Accuracy: moderately low; Cost: moderately low)

After the first phase and data collection, the problems are classified and the more important issues which need to track and focus are separated. In this phase, the expert panels are utilized to identify the possible origins of the main problems. The stage is performed in the presence of with professionals, experts and representatives of organization/producer and client. At this stage, some problems are solvable using the necessary provisions and the reasons for customer dissatisfaction and providing their ideas about the particularly important issues are discussed to some extent. (Speed: moderate; Accuracy: good; Cost: moderate)

In the third phase, the issues will be examined which are very important and have vital strategic role in the business of organization so that it is essential to be present in the stage / operations field to solve them. Although this stage imposes high costs on the organization and is largely time-consuming, but due to the importance of the identified issues and their determinative role especially for the large manufacturing organizations, performing this stage is inevitable. (Speed: low; Accuracy: high; Cost: high)

It should be noted that these three phases are complementary and in each round of customer satisfaction measurement, a portfolio of these three-phase comes into force.

Findings, Discussion and Analysis

The most important findings and the related analysis are as follows:

- Managing CS measurement and improvement is considered as a full cycle of improvement and business excellence from the customers' perspective. Therefore, the main and ultimate purpose is not measuring the customer satisfaction, but also it is improving the proposed value to customers in terms of products/services. So it is important to pay attention to all stages of the customer satisfaction management cycle to achieve this goal. These steps include:

1. Prioritizing products strategically and determine customer markets
2. Identifying and determining the scope of target customers (selecting the customers' scope).
3. Collecting data (comments, complaints, feedback and suggestions)
4. Extraction, classification and separation problems and challenges in a wide range including public and unimportant issues, fairly important issues and major problems (strategic)
5. Explaining the key challenges and critical issues

6. Data analysis and prioritizing areas for improvement

7. The roots of the problems and develop a plan to improve

8. Implementing the improvement plan and reflecting the results and achievements to the customers

- Customer Satisfaction Index is dependent on many factors and has leaps and bounds in different situations. So to achieve satisfaction, retention and loyalty, the customer's active participation in the product life cycle should be utilized. This mutual relationship results in improvement and qualitative upgrading of products/services and the customer satisfaction will improve by approaching to customer needs and expectations.

- In hierarchical organizations, achieving the higher levels objectives consists achieving several low-level for each of them. So the numbers associated with customer satisfaction index in the lower levels combined in different ways up to achieve a higher level of customer satisfaction index and finally an index for the whole organization. This combination process leads to absurd results and the losing the analytical invaluable data that has been the result of field studies. For such organizations, it is recommended that the customer satisfaction index is considered separately in lower levels of customer satisfaction scopes on a map of the customer satisfaction index.

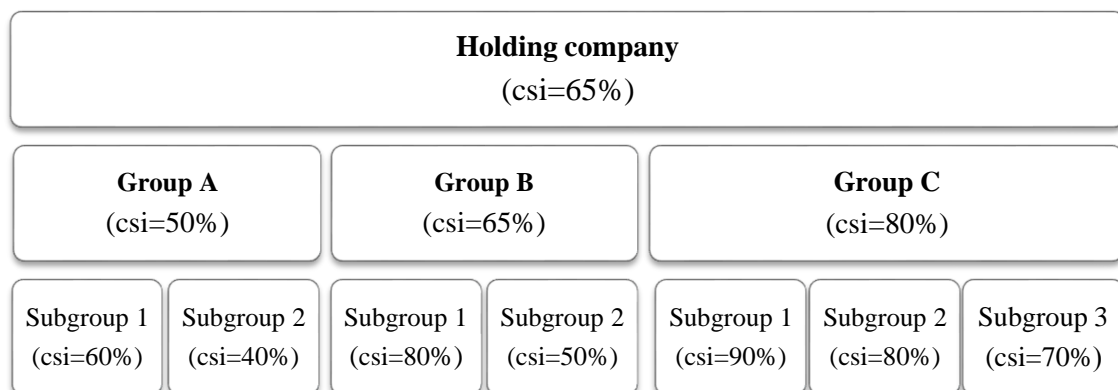


Figure 4 Map of customer satisfaction index for example holding company

- At the entrance stage of the proposed process, the prioritizing matrix can be drawn for the products and customers for the purpose of easiness. In this matrix, the products and customers are classified based on the amount of consumption, sales, company strategy, geographic areas, and other factors.

- After the first phase of the proposed process, the issues and challenges can be classified in three levels (not important, important and strategic) or, if necessary, they can be classified in more detail in five levels (unnecessary, slightly important, fairly important, not very important, and critical/essential).

- Designing a questionnaire to enter the first phase of the three-phase approach is very important and should be able to collect a lot of information with high quality. Integrity,

efficiency, and quality of large-format questionnaire in the first phase, increase the efficiency and progress in the middle phase.

- Due to some cultural characteristics of the developing countries, it should be ensured that the customers have understood the importance and seriousness of the job before starting the process. Customers are not usually optimistic about filling out the questionnaires and outcomes effectiveness in the process of design and production. This negative mentality makes a lot of customers do not complete the questionnaire and even if they accept, they answer questions carelessly and only to Disclaim.

- Reconciliation and fitness between strategic issues and expectations raised by customers and ease of solving problems or realizing the customers' expectations by the manufacturer are necessary. We recommend the use of strategic-easiness matrix (Fig. 5). The main application of this matrix is in the middle phase of the proposed approach.

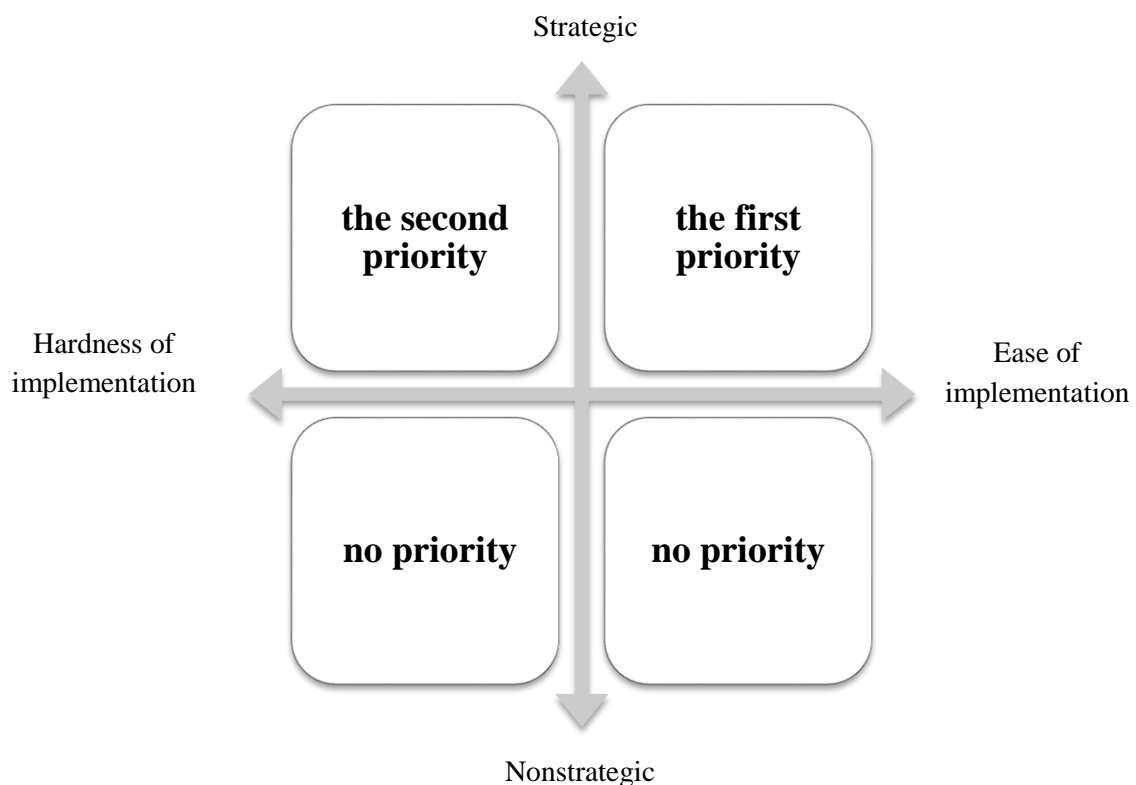


Figure 5 Strategic-easiness matrix in sorting problems and expectations

Summary and Conclusions

Because of the importance and the large number of manufacturing organizations and companies, customer satisfaction measurement for these organizations is an inevitable and key issue in the complex and dynamic environment of the current markets.

In this study, the most important models and frameworks of customer satisfaction measurement in the manufacturing/service organizations with a variety of products and

services, and customer satisfaction at the micro (enterprise) and macro (national) levels are examined, and then with a focus on manufacturing organizations, the markets and customer challenges in these industries are taken into account. In this study, the challenges in the field of measuring and managing process of customer satisfaction, the need to design a conceptual model for measuring customer satisfaction of manufacturing organizations were also discussed.

Initially, based on the conducted theoretical studies and exploratory interviews, the dimensions and components of the customer satisfaction measurement for products are identified and an appropriate model is formulated for dealing with it. Then the three-phase approach is provided as the process of customer satisfaction management; this innovative new process will lead to the deepening of the results/information obtained from the customer and greater efficiency of the process of customer satisfaction management and measurement.

- One of the main purposes of this research is to design a conceptual model for measuring customer satisfaction of manufacturing organizations. In this regard, after reviewing the literature, and use the experience, expertise and interviews, the dimensions and components are identified and examined in a two rounds Delphi technique by 30 experts to validate the components and dimensions. As it was mentioned in the previous sections, by analysis and removal of a dimension and some of the components, the final model with five dimensions and 25 components were obtained. The analysis of the experts' opinions about all aspects and components of the proposed dimensions and components indicates that the dimensions and components have different importance from experts' points of view. The experts believed that the dimensions and components can be organized in the range from the strong, medium and weak effectiveness (a dimension and three components with weak effectiveness have been removed). It should be emphasized that the importance or priority of the component and dimensions is different according to the circumstances of each organization and the interests/demands and expectations/needs of its customers. So, enumerating specific weights for each organization is essential.

- At the end of study, some suggestions for other researchers working in this field are proposed as follows:
 - Designing and integration of the customer satisfaction models with the logic of co-creation could deepen and enhance the effectiveness of the model.
 - Enriching the proposed process of the customer satisfaction management, and describing it in more detail by helping its pilot implementation.
 - The dominant view in this paper has been theoretical development. The implementation of the model of customer satisfaction in practice could receive more feedback to improve the model.

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