Alireza Aminpour,
Master Of Executive MBA (EMBA), Major Marketing, Department of Management,
College of Human Science, Saveh Branch, Islamic Azad University (Saveh, Iran);
Seyed Jalil Hosseini,
PhD of Economic Science, Professor of the Department of Management,
College of Human Science, Saveh Branch, Islamic Azad University (Saveh, Iran);
Amini Sabegh Zeinolabedin,
PhD of Governmental Management,
Professor, Head of the Department of Management,
College of Human Science, Saveh Branch, Islamic Azad University (Saveh, Iran)

CUSTOMER SATISFACTION MODEL INDSAT&DEMING AND IMPROVING CUSTOMER SATISFACTION INDEX IN INDUSTRIAL MARKETING (CASE STUDY: ARYA CONTROL COMPANY)

The aim of this article is to identify and explore this matter that how taking corrective and preventive actions in all parts of organization according to results of customer satisfaction measurement (CSM) can increase the level of customer satisfaction. In other words, this study is designed to develop a better understanding of benefits of customer satisfaction measurement and explore effects of utilization integrated customer satisfaction model Indsat & Deming in two phases on the amount of customer satisfaction increasing in industrial marketing

Statement of problem. In today's world, which the possibility of mass production of goods and services has provided increasing amount of supply over demand there is no way for manufacturers except try to keep their customer satisfied until they can attract more and more customers and their customers will change from simple buyers to loyal customers. Experience has shown the organizations that traditionally looked and are looking to concepts of customer, product, market, sell, buy, ads and ect. in addition to lack of success; they have lost their wealth [10]. Hence it can be said one of the most important organizational tasks is respond to customers and try to increase their satisfaction. Whatever an organization tries more in this field, success of that organization will be equally more. So, a successful organization always is looking for the evaluation of customer satisfaction and ensuring from their satisfaction. Also, it can be said that basically the purpose of good organization is to create a satisfied customer. An organization is realized and is defined based on customer's needs and wishes. But the important thing is that customer satisfaction should be managed. Based on this managerial fact that everything cannot be measured, it cannot be controlled also [8]. Necessity to provide, maintain and promote customer satisfaction is its continuous measurement. Assessing and determining the level of customer satisfaction of goods and services means to determine the efficiency level of goods and services from the customer's perspective [7].

Accordingly, in spite of the past, nowadays only attract new customers to sell products and services is not main goal. But also it is beginning of establish good relationship with them in the future. Therefore, changes in the competitive market are actually movement from a seller's market to buyer's market [6]. The seller's market is a market that is guided by supply on the market, a market that will be exist sales to extent that there is production. While a buyer's market is a market that is guided by the demand. In seller's market recognition criteria of appropriate products, usually is price. While in a buyer's market, price and quality of products both use as a diagnostic criteria of proper product and the accountability and responsibility of each product manufacturer's that has sold a product, use as a criterion to select superior product.

Arya Control Company is the first company in Iran which produces elevator control panel since 25 years ago. Customers of the company are elevator companies who are working in elevator market of Iran and Middle East. So, relation between company and its customers is a kind of B2B model. The customers consider various aspects such as product quality, after-sales service, orders process and ect. In dealing with Arya Control Company, policy of the company is not only trying to keep customers satisfied but also make effort to promote amount of their satisfaction continually.

With this attitude Arya Control Company has dedicated itself on customer satisfaction concept and has had significant progress to attract customers around the country. Also, this organization restores its market by definition of new and operational ideas for itself. The globalization of markets and spreading of competition internationally in several recent decades have transformed the company's marketing strategy to customer orientation strategy.

So, Arya control company regarding to the highly competitive market that exists in buildings construction and consequently in the elevator control panel, must be a customer oriented company which provides high quality products and also good services to attract more customers and to gain more market share.

The main issue that is arisen in this research is that how extent Arya control customers are satisfied of its various processes, and at the second step, if corrective and preventive actions in all parts of organization according to results of customer satisfaction measurement (CSM) in first step can increase the amount of customer satisfaction or not.

About necessity and importance of this research can be said. One of the major changes in the field of quality improvement philosophy in the last decade of the twentieth century took place was the matter of measuring the level of customer satisfaction, which is known today as one of the main elements and requirements of quality management systems in all institutions and business enterprises. Great effort done by researchers, experts and managers of commercial organizations until we face promoted and developed customer orientation attitude today. All indicate that customer satisfaction is considered as one of the most important factors in determining the success of organizations in business and profitability. Creation and implementation of measuring and monitoring systems for customer satisfaction is the most significant index in introduction of products and services quality and considered as an essential requirement in today's organizations. Therefore, regard to the importance of customer satisfaction and requirements of quality management system of ISO 9001: 2008 and due to the intensive competitive market in the field of production and imports of elevator control panel, Arya control company decided to perform a project to monitor current amount of satisfaction of its customers and try to increase the level of that.

Analysis of recent researches and publications. A quick review of existing literature reveals that despite the robust body of literature and numerous researches in customer satisfaction subject, CSM and improving customer satisfaction in industrial marketing is a relatively incomplete area of marketing research. Most of the early research in this field concentrated only on the methods of measuring level of customer satisfaction and they did not pay attention to modifying aspects of research based on results of CSM. Also, the most of studies are dedicated to service market and the way of measuring customer satisfaction in this market. In another hand, dedicating weight to items of CSM questionnaire according to Deming method and its impacts on final customer satisfaction index is very limited issue. However significant researches which almost provided questions concerned to the article subject are collected and used as below.

Homburga C & Rudolph B. [4] have done a study "Dimensional and multiple role issues of customer satisfaction in industrial markets". Their findings demonstrate that customer satisfaction in industrial markets has a direct relation with their satisfying of seven dimensions include satisfaction with products, satisfaction with sales people, satisfaction with product-related information, satisfaction with order

handling, satisfaction with technical services, satisfaction with interaction with internal staff and satisfaction with complaint handling. Each of the seven satisfaction dimensions has a positive effect on overall satisfaction and final customer satisfaction index in industrial market.

Kazemi A., Balenj A. & Dolatabadi H. [5] have done a case study "Evaluation of the effective factors on customers' satisfaction using INDSAT model" in Mobarakeh Steel Company.They used the model to monitor the amount of customer satisfaction. Their conclusions show that there's an unfavorable level of satisfaction with items including complaints handling, product-related information, and order handling. These items have a high factor loading in satisfaction level. So, managers of company should make correction and preventive actions to improve satisfying level of these items.

Rossome J. [9] in her study "Customer satisfaction measurement in a business-to-business context" says there is significant gap between academic and trade literature with regard to effective customer satisfaction measurement of business-to-business exchanges. The reason is that the role of the end users is ignored by academic method and if company wants to make reform in all its processes, managers should involve their method of customer satisfaction measurement with opinion of end users to have more realistic results.

Caruana A. [1] knows services quality as a mediating role in customer satisfaction and customer loyalty. He studied concept of loyalty in order to the income from services quality and customer satisfaction for the first time. According to his tests, there is a significant relation between organization services quality for customers and loyalty of customers.

Hamzepour M. [3] has done a study about relationship between service quality, customer satisfaction and performance of service companies in cost and benefit. According to the results, there is an important relationship between quality of service with customer satisfaction and performance of organization and the amount of profit and loss. However, the quality of services has had the greatest impact on customer satisfaction. As well as customer satisfaction has laid significant impact participation on performance of service companies in profit and loss.

The aim of this article is the elucidate effect of using integrated model Indsat&Deming for measuring customer satisfaction in two phases on increasing amount of customer satisfaction by emphasizing the role of corrective and preventive actions according to result of the first step.

Basic material. There are different patterns to measure customer satisfaction of industrial units. After many study about models of measuring customer satisfaction a combination of two models 'Deming and Indsat" were used to design the questionnaire. Both models are mental and feature-orientated. Indsat is a model for measuring customer satisfaction of industrial units which pays attention to survey 7 dimensions and items related to each dimension (usually 27 items; the number of items can be changed based on type of industry) [4].

Deming enters the weight and importance of each parameter into the survey process according to models of organizational excellence which are very good tools for assessing organization's performance in all aspects such as amount of satisfying of interested parties like customers [2]. Deming award in Asia, Malcolm Baldrige National Quality Award (MBNQA) in USA & The European Foundation for Quality Management (EFQM) excellence model in Europe are samples of this tools [2]. According to organizational excellence models, Deming suggests this formulation for measuring customer satisfaction:

$$\frac{\sum_{i=1}^{n} A_i \cdot B_i}{\sum_{i=1}^{n} B_i}. \tag{1}$$

In this formula, A_i is amount of satisfaction and B_i is amount of importance, according to opinion of customers and also N is number of our samples. The combination of two models has been selected

because of being more administrative according to the research limitations and regarding to collection of voice of customers through the following ways:

1) direct discussion with customers (verbal visiting the customers – participation in various exhibitions);

2) research about market conditions (market conditions of each provinces of country and its cities to identify each market and its specifications);

3) receiving feedback from the company employees about customers (especially sales and aftersales people);

4) analysis the existing documentation of customer's complaints and their opinions.

Comparison between this combined model and another existing models demonstrates that the indices of combined model cover problems in organization better. Other models need longer time to measure customer satisfaction and also require researchers who should be expert in industry case study.

This research type is applied research in terms of nature and objectives and is descriptive – survey in term of methodology. Statistical population of this research includes 12 sale agencies and 125 elevator companies as customer (137 customers in total) in the whole country. A sample including 76 customers was determined based on the sampling methods and applying AHP (Analytic Hierarchy Process) algorithm. The research was done on these 76 customers in both steps. Available sampling method is used for sampling in this research.

Information collection tool is researcher-made questionnaire with 29 items and 7 variables (product, product-related information, order handling, sales people, technical services, interaction with internal staff (aftersales people), complaint handling).

Cronbach's alpha has been calculated in this research by the help of SPSS software to test reliability. The value of reliability for the variables of product, product-related information, order handling, sales people, technical services, interaction with internal staff (aftersales people), complaint handling was obtained 0.802, 0.706, 0.797, 0.802, 0.743, 0.721 and 0.752 for this purpose. One-sample T-test and independent T-test have been used in SPSS software environment to evaluate hypotheses.

The results of research. In this study, after describing variables in the sample, checking the hypothesis by statistical tests starts. With statistical analyzing of results we can judge about accuracy of claims of this research (Table 1, Table 2). We use Kolmogorov-Smirnov test (K-S test or KS test) to ensure about homogeneity of data collected with statistical distribution. T-test has been used according to normality of the data. In agreement with obtained results from testing normality of components such as amount of Z Kolmogorov-Smirnov test all of the variables are more than 0.05 from the probability. So, the null hypothesis is not rejected and by 95% confidence can be said that the variables have normal distribution.

Table 1 – **Normality test of components**
(developed by the authors on basis of [4] and numerous empirical data)

Variables	Kolmogorov-Smirnov Z	P-value	Variable distribution	Tests
Product	1.93	0.071	Normal	T-test & Correlation
Product-related information	2.12	0.065	Normal	T-test & Correlation
After sales	1.99	0.085	Normal	T-test & Correlation
Technical services	2.35	.0217	Normal	T-test & Correlation
Complaint handling	1.90	0.069	Normal	T-test & Correlation
Sales people	2.01	0.060	Normal	T-test & Correlation
Order handling	1.84	0.081	Normal	T-test & Correlation

Table 2 – **Correlation matrix between customers' satisfaction of Arya control company and different processes of the company**

(developed by the authors on basis of [4] and numerous empirical data)

Variable	Customer satisfaction	*	*	*	*	*	*	*
Customer satisfaction	1	Product	*	*	*	*	*	*
Product	0.825	1	Product-related information	*	*	*	*	*
Product-related information	0.762	0.539	1	After sales	*	*	*	*
After sales	0.638	0.624	0.368	1	Technical	*	*	*
Technical services	0.342	0.534	0.129	0.424	1	Complaints handling	*	*
Complaints handling	0.569	0.368	0.689	0.356	0.249	1	Sales	*
Sales	0.258	0.139	0.354	0.120	0.254	0.429	1	Orders
Orders	0.432	0.296	0.431	0.232	0.249	0.654	0.260	1

In agreement with the obtained sig (Significant level, P), which is less than the error 0.05, H0 hypothesis is rejected.

This means there is significant relation between customer satisfaction of Arya control and various processes of the company. This relationship is meaningful in 95% confidence level. Regarding to obtained correlation value for variables can be said there is a positive linear relationship between these two variables.

Table 3 – **Descriptive indicators of customer satisfaction, level of customer satisfaction of each dimension in each step, sample size: 76**

(developed by authors on basis of [4] and numerous empirical data)

Variables	Group	Number	Mean	Standard deviation
Product	first step	76	3.79	1.002
	second step	76	4.28	0.939
Product-related information	first step	76	3.64	0.978
	second step	76	4.03	0.833
After sales	first step	76	3.11	0.821
	second step	76	4.03	0.797
Technical services	first step	76	3.39	0.899
	second step	76	3.88	0.890
Complaints handling	first step	76	2.91	0.794
	second step	76	2,89	0.837
Sales people	first step	76	3.29	0.706
	second step	76	3.53	0.854
Orders	first step	76	3.95	0.782
	second step	76	4.01	0.880

From the table above (Table 3), we can see the average of customer satisfaction. And in the second step the average of customer satisfaction is more than in first one.

Table 4 – **Results of customer satisfaction of Arya Control Company**
(developed by author on basis of [4] and numerous empirical data)

	Group	Number	Mean	Ratio of T	Degrees of freedom	Significant level, P
Product	first step	76	3.79	6.12	150	0.001
	second step	76	4.28			
Product-related information	first step	76	3.64	4.83	150	0.003
	second step	76	4.03			
After sales	first step	76	4.15	8.32	382	0.002
	second step	76	3.22			
Technical services	first step	76	3.39	2.23	150	0.002
	second step	76	3.88			
Complaints handling	first step	76	2.91	1.23	150	0.001
	second step	76	2.89			
Sales people	first step	76	3.29	4.80	150	0.001
	second step	76	3.53			
Orders	first step	76	3.29	4.80	150	0.001
	second step	76	3.53			

The results of above show (Tables 3 and 4) that there is a significant difference between Arya control customer satisfaction of each factors in second and first step.

The first hypothesis: corrective and preventive actions based on the results of the first step effect on increasing customer satisfaction in the second step.

Table 5 – **T-test related to index of corrective and preventive actions**
(developed by authors' study)

Hypothesis	Test Value = 3							
	T	Degrees of freedom	Significant level	Mean	Standard deviation	Mean dfference	level of 99%	
							Low boundary	High boundary
It is established	2.46	75	0.002	3.80	0.74	0.42	0.69	1.11

According to the results of T-test (Table 5), significant level of test (Means 0.002) is lower than amount of Alpha Test (0.01).

As a result, it can be stated that corrective and preventive actions based on the results of the first step have had positive impact on increasing customer satisfaction in the second step. In the other word, can be said the significant level statistically is significant (P = 0.002, T = 2.46) and the obtained average is higher than population average.

The second hypothesis: focus on the processes and items that have higher importance for customers is effective on increasing amount of customer satisfaction index.

Table 6 – **T-test related to importance of processes and items in overall customer satisfaction**
(developed by authors' study)

Hypothesis	Test Value = 3							
	T	Degrees of freedom	Significant level	Mean	Standard deviation	Mean difference	level of 99%	
							Low boundary	High boundary
It is established	1.02	75	0.003	3.49	0.831	0.65	0.93	1.76

According to the results of T-test (Table 6), significant level of test (Means 0.003) is lower than amount of Alpha Test (0.01). As a result, it can be stated that focusing on processes and items which are more important for customers and they dedicated more weight to this items in their questionnaire, can cause the increase in customer satisfaction. In the other word, can be said, observed significant level is meaningful statistically ($P = 0.003, T = 1, 02$) and obtained average is more than society average.

The third hypothesis: the rate of customer satisfaction of Arya Control Company in different processes is more than average.

Table 7 – **T-test related to customer satisfaction index of Arya control from various processes**
(developed by authors' study)

Hypothesis	Test Value = 3							
	T	Degrees of freedom	Significant level	Mean	Standard deviation	Mean difference	level of 99%	
							Low boundary	High boundary
It is established	10.23	75	0.001	3.18	0.563	0.92	0.79	1.10

Regarding to obtained results of T-test (Table 7), the amount of Test significant level (0.001) is lower than Alpha test (0.01). So it can be declared that Arya control costumers' satisfaction of different processes is more than medium level. In the other word, can be said, observed significant level statistically is meaningful ($P = 0.001, t = 10.23$) and obtained average is more than society average.

Conclusions and directions of further researches. The current study examines the relationship between corrective and preventive actions according to customer satisfaction measurement and amount of customer satisfaction increasing. This model will not only assist managers on identifying weak and strength points of organization, but it will also extend the existing knowledge on how to explore the roles of process owners to modify weak points in their process according to weight of each items.

The results of article demonstrate that customer satisfaction index of each item and each dimension is more than average and in the second step is more than first step else dimension of complaint handling. In this dimension amount of customer satisfaction in the second step is lower than the first one. This indicates that taken corrective and preventive actions had not been affective for this dimension.

Therefore, should be proceeded to establish a customer's complaints unit based on ISO 10002 in order to complaints handling of the customers. That is one of the most important factor of satisfaction or non-satisfaction of customers.

Another result of this study is recognizing more important factors for customers according to their weight. Factors such as, the availability of technical documentation, effectiveness of telephone tips,

effectiveness of the services provided, warranty conditions, ease of settling accounts and production according to customer's order. By knowing more important factors for customers, process owners can focus on them more and more to improve their quality.

Also, it is recommended according to the research's findings:

1. All companies in industrial market, weather deal directly by end users and follow B2C model weather follow B2B models and their customers are owner of business. They can do this research on their organization and make their customers more satisfied.

2. According to section 8.2.1 of Standard of ISO 9001:2008 as one of the measuring indexes of system's performance of quality management, company is obliged to monitor and measure their customer's satisfaction. It is recommended to implement CSM process annually to identify the strength and weak points of company and consequently performe corrective and preventive actions in all organizations to reduce errors and increase the level of customer satisfaction every year.

3. Top manager should pay more attention to performing CRM method (Customer Relationship Management) in the organization and dedicate authority to the manager of the CRM's department, and ask from process owners to cooperate with the CRM department.

4. Company staffs, especially employees of COP processes (Customer Oriented Process), such as sales and aftersales people be thought about on how to properly behave with the customers before buying, during buying and after buying.

5. Identifying hidden needs and customers' expectations and expanding the scope of services and products. Based on feature of various markets within the country to be poured as a strategic policy in the organization level.

6. The managers of company should identify components that have more weight for customers in determined and defined period of time and try to improve them for further increase in the customer satisfaction that will lead to increase customer loyalty.

7. Managers of company pay more attention to indexes such as "provide new products on the basis of customer needs", "easy access of customer to all products", "understanding the specific needs of customers" and "providing high quality products in all circumstances" as more important indexes for customers. Focusing on them make customers more satisfied.

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А. Амінпоур, магістр EMBA, кафедра управління, Коледж гуманітарних наук, відділення у м. Савех, Ісламський університет Азад (м. Савех, Іран);

С.Ж. Хоссеіні, PhD, професор кафедри управління, Коледж гуманітарних наук, відділення у м. Савех, Ісламський університет Азад (м. Савех, Іран);

А.С. Зеінолабедін, PhD, професор, завідувач кафедри управління, Коледж гуманітарних наук, відділення у м. Савех, Ісламський університет Азад (м. Савех, Іран);

Модель задоволеності споживачів Indsat & Deming та особливості підвищення індексу задоволеності споживачів у промисловому секторі (на прикладі компанії Arya Control)

Метою цієї статті є визначення відповідних коригувальних і запобіжних дій на основі вимірювання фактичного рівня задоволеності споживачів організації, впровадження яких може підвищити рівень задоволеності споживачів у майбутньому. Дослідження спрямоване на розуміння переваг вимірювання рівня задоволеності споживачів організації на основі інтегрованої моделі Indsat&Deming та визначення впливу її використання на зростання рівня задоволеності споживачів у промисловому секторі.

Ключові слова: клієнт, задоволеність, Indsat, Deming, CSI, промисловий маркетинг.

А. Аминпоур, магистр EMBA, кафедра управления, Колледж гуманитарных наук, отделение в г. Савех, Исламский университет Азад (г. Савех, Иран);

С.Ж. Хоссеини, PhD, профессор кафедры управления, Колледж гуманитарных наук, отделение в г. Савех, Исламский университет Азад (г. Савех, Иран);

А.С. Зеинолабедин, PhD, профессор, заведующий кафедрой управления, Колледж гуманитарных наук, отделение в г. Савех, Исламский университет Азад (г. Савех, Иран)

Модель удовлетворенности потребителей Indsat & Deming и особенности повышения индекса удовлетворенности потребителей в промышленном секторе (на примере компании Arya Control)

Целью этой статьи является определение соответствующих корректирующих и предупреждающих действий на основе измерения фактического уровня удовлетворенности потребителей организации, внедрение которых может повысить уровень удовлетворенности потребителей в будущем. Исследование направлено на понимание преимуществ измерения уровня удовлетворенности потребителей организации на основе интегрированной модели Indsat&Deming и определение влияния ее использования на рост уровня удовлетворенности потребителей в промышленном секторе.

Ключевые слова: клиент, удовлетворенность, Indsat, Deming, CSI, промышленный маркетинг.