



Developing Affective Model for Measuring and Managing Customer Satisfaction in Container Ports

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Abstract

Nowadays changes in global trade and Maritime transportation always will create competition between ports. Following this competition will be absorption of goods, and it will bring about economic boom. It is therefore appropriate to provide facilities to increase satisfaction of Shipping Lines, which in turn can attract the many shipping lines to port and the port will increase their allegiance. Aimed to identification of factors affecting the extent of satisfaction of container shipping lines from port services as well as prioritization of the factors affecting customer satisfaction in Iraqi container ports, this research has been implemented. Based on the objective, the present research is an applied one as it uses the principles and tactics - formulated in basic researches - for solution of actual and executive problems of Iraqi container ports. Kano model is applied to reach to the objectives of research. Finally, the indicators affecting shipping lines customers' satisfaction were determined and classified according to Kano model. Coefficients of satisfaction and dissatisfaction were estimated and prioritized for each one.

Keywords: Iraqi container ports, shipping lines, Kano, coefficients, satisfaction and dissatisfaction

Introduction

Nowadays container ports in the world are faced with many changes in global trade (Jafari, 2013a). Maritime transportation will be an unforgettable component of the global trade (Brooks, 1984; Chang *et al.*, 2008; Ha, 2003). These changes always will create competition between ports (Jafari, 2013a). Following this competition will be absorption of goods, and it will bring about economic

boom. It is therefore appropriate to provide facilities to increase satisfaction of Shipping Lines, which in turn can attract the many shipping lines to port and the port will increase their allegiance (Lirn *et al.*, 2004; Lu, 2000; Malchow and Kanafani, 2001). On the other hand, due to lack of proper facilities and lack of port services suit to the needs of customers and other dissatisfaction causes, shipping lines are less willing to use these ports for loading and unloading. Consequently, in order to maintain port market position in the field of maritime transportation, port should increase competitive position through the understanding of customer's expectations and

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coordinate all port operations in order to increase customer satisfaction, to stay on top of rival ports (Malchow and Kanafani, 2004). So customer satisfaction is a fundamental issue in a competitive world that can bring up a port (Murphy and Daley, 1994; Murphy *et al.*, 1992). In this context, considering that what can be more accurate and more effective in increasing customer satisfaction is necessary and important (Slack, 1985). Aimed to identification of factors affecting the extent of satisfaction of container shipping lines from port services as well as prioritization of the factors affecting customer satisfaction in port industry, this research has been implemented Today, companies in different industries with superior performance trying to have customer retention and loyalty. Competition and costs of attracting new customers is increasing strongly, because most of markets are at their mature stage and customer retention and loyalty is vital for their business (Malchow and Kanafani, 2001).

Iraqi Container Ports also must understand the importance of customer in order to understand their desires and satisfy them. This better understanding of the market can help ports to use their strengths and advantages in market. Currently adopt a customer-oriented approach which has become a necessity for every organization. Any organization that does not fit with this approach will be condemned to destruction and failure.

Literature review

By our research it was determined that no any integrated and systematic research carried out in the field of shipping lines and port services customer satisfaction based on a known model. Of course the Kano model is used in Iran studies to assess customer satisfaction that some of them are mentioned in the following.

Venus *et al.* (2008) in their study “Determination of the factors affecting

customer satisfaction of Pakshoo Company using the Kano model” seek to identify and classify the different needs of the customers of this product with optimal allocation of resources for these needs. In this paper, the characteristics and requirements classified in excitement, performance, indifference, basic attributes, and thus the importance of each feature was determined for the customer. They have tried to focus in the subject of customer satisfaction and pointed out the importance of this subject in the modern business world and described way to achieve this goal.

Vazifehdoust *et al.* (2009) in their research evaluate customer satisfaction in, after sales service of Saipa products by using the Kano model. Researchers in this study identified 21 factors affecting customer satisfaction of the Saipa products service. Then based on Kano model categories and then prioritized each of them in each category.

Rodposhti (2011) in an article entitled analysis and application of kano model for customer Satisfaction (Case Study: Website Design). In this paper, after analyzing the different dimensions and aspects of the Kano model, how to use this model to design a website according to the visitor's comments was introduced. Also how to interpret the results of the customer opinion poll and how to use them to manage customer satisfaction are explained. In end of this article some suggestions were presented and applied by this model.

Kia *et al.* (2012) in their research paid to identify and prioritize the factors affecting customer satisfaction of the A.B.C powder of Condor Company using the Kano model. The studied industry in this research was "detergents and cleaners industries", and the desired product was "detergent powder". They use the results of the analysis of collected data and concluded that: The standard label as the basic attribute, price and usability for different types of fabric as the

exciting attribute and cleaning ability as the performance attribute are of great importance.

Research objectives

- Understanding the factors affecting customer satisfaction (shipping lines)
- Prioritize the factors affecting customer satisfaction in Seaports
- Suggestions to provide services appropriate to customer's needs and expectations

Methodology

With a view to the objective, the present study is an applied research as its results can be useful for quality improvement of services of Iraqi Container Ports. Taking into consideration the type and nature of the problem, objectives and questions, this research is descriptive and for gathering the required data field study technique is applied.

Statistical population of this research consists of experts of shipping lines which located in the studied Container Ports. In current study, to determine the sample size, a preliminary study with distribution of 30 questionnaires among the shipping lines experts was carried out. Via estimation of variance of primary sample in confidence level of 95%, the sample size was determined as 200 persons. Simple random sample is used.

The research questionnaire was distributed in the following manner: 240 questionnaires were distributed and 228 questionnaires were collected finally. (The rate of return is 95%). After collecting the questionnaires and eliminating incomplete questionnaires, 200 were extracted for further analysis.

Validity research questionnaire was confirmed based on the opinions of several experts. Cronbach's alpha test was applied for checking the reliability. The figure obtained by use of SPSS Ver. 19 was 0.89 for the functional, and 0.76 for non-functional part.

And it shows the reliability of the questionnaire

Kano model

The Kano model divides product or service features into three distinct categories, each of which affects customers in a different way. A two-way model on quality based on customers' perception and experience. The first, Performance Attribute: result in customer satisfaction when fulfilled and dissatisfaction when not fulfilled. The better the attributes are, the better the customer likes them. The second, Excitement Attribute: their absence does not cause dissatisfaction because they are not expected by customers and customers are unaware of what they are missing (Saeidi *et al.*, 2013a). However, strong achievement in these attributes delights the customer. The third must be or Basic Attributes: Customers take them for granted when fulfilled. However, if the product or service does not meet the need sufficiently, the customer becomes very dissatisfied. Kano's model provides an effective approach to categorizing the customer attributes into different types. Methodology to identify which customer attributes are must-be, which are one-dimensional and which excitement are. The data needed in classifying customer attributes are obtained through a Kano questionnaire that consists of a pair of questions (one positive and one negative) (Yeo and Oh, 2004; Ng, 2006; Kondo, 2001).

Must be or basic attributes

The first and the most important characteristic of the Kano model is the must be attributes. These are basically the features that the service must have in order to meet customer demands. If this attribute is overlooked, the service is completely incomplete. If a new product is not examined using the basic aspects, it may not be possible to enter the market (Kondo, 2001).

Performance or one-dimensional attributes

The second characteristic of the Kano model is the performance attribute .Performance

attributes are those for which more is better, and a better performance attribute will improve customer satisfaction. Conversely, a weak performance attribute reduces customer satisfaction. When customers discuss their needs, these needs will fall into the performance attributes category. Then these attributes will form the weighted needs against the product concepts that are being evaluated. Identifying and considering of performance attribute of the product is minimum effort to preserve market position in the competitive market (Berger *et al.*, 1993).

Excitement attributes

Excitement attributes are unspoken and unexpected by customers but can result in high levels of customer satisfaction, however their absence does not lead to dissatisfaction. In a competitive marketplace where manufacturers’ products provide similar performance, providing excitement attributes that address “unknown needs” can provide a competitive advantage (Saeidi *et al.*, 2013b).

Steps of research implementation

Stages of implementing Kano model is as follows:

Determination of independent variables

In this step the indicators of selecting a port from the view point of the shipping lines have been studied. And also characteristics and indicators of port services as independent variables were used in this research.

Preparation of Kano questionnaire

To prepare the questionnaire, according to the features of the products, Kano questionnaires were made in the following form (Chu and Cho, 2000):

- According to Kano model, for each attribute, a functional question is designed. So that the customer was asked: Rate your satisfaction if the product has this attribute?
- According to Kano model, for each attribute, a dysfunctional question is designed. So that the customer was asked: Rate your satisfaction if the product did not have this attribute?

Interviews with customers

To applying the Kano Model Analysis, is to ask customers the two questions for each attribute. Customers should answer with one of the following responses:

- 1- I like it that way(like)
- 2- It must be that way(must be)
- 3- I am neutral(neutral)
- 4- I can live with it that way(live with)
- 5- I dislike it that way(dislike)

The first questions are functional and second questions are dysfunctional attribute. The questionnaire will be evaluated in three stages. After the integration of functional and dysfunctional answer, results will indexed for each attribute in table of results, indicating frequency distribution of attribute of each item.

Table1: Evaluation of customer needs and explains the symbols used in its

Functional (positive) Question	Dysfunctional (negative) question				
	Like	Must be	Neutral	Live with	Dislike
Like	Q	E	E	E	O
Must be	R	Q	I	I	M
Neutral	R	R	I	I	M
Live with	R	R	R	Q	M
Dislike	R	R	R	R	Q
Q: questionable	I: indifferent			E: Excitement	
R: reverse	M: Basic			O: Performance	

The customer satisfaction (CS) coefficient

The customer satisfaction (CS) coefficient states whether satisfaction can be increased by meeting a product requirement, or whether fulfilling this product requirement merely prevents the customer from being dissatisfied (Berger *et al.*, 1993). The CS coefficient indicates how strongly a product feature may influence customer satisfaction or dissatisfaction, in the case of its fulfillment or non-fulfillment. Positive customer satisfaction coefficient varies between zero and one. And if it is much closer to one have greater impact on customer satisfaction. And if this value is near zero it shows that it is the minimum impact on. Likewise the negative customer satisfaction coefficient with values closer to -1 shows greater impact on customer dissatisfaction. Zero value indicates that if an attribute is not provided, will not cause of customer dissatisfaction. Customer satisfaction (CS) coefficient and customer

dissatisfaction coefficient based on Kano's Model has described as follows (Chu and Cho, 2000; (Matzler and Hinterhuber, 1998):

$$\begin{aligned} &\text{Extent of satisfaction} \\ &= \frac{O + M}{E + O + M + I} \end{aligned}$$

$$\begin{aligned} &\text{Extent of dissatisfaction} \\ &= \frac{O + M}{(E + O + M + I) \times (-1)} \end{aligned}$$

E: excitement, M: Basic
O: Performance, I: indifferent

Results

The following tables prioritize each variable according to requirements. (Respectively, Reverse, indifferent, functional, must-be, on- dimensional, excitement)

Table 2: Result KANO model

	Indicators	Percentage of replies						Category	Coefficient	
		A	O	M	I	R	Q		Satisfaction	Dissatisfaction
1	Port's safety	30	35	128	5	1	1	B	0.328	-0.823
2	Compliance with MARPOL-IMO-ISPS codes and EU legislation	22	49	129	0	0	0	B	0.355	-0.89
3	Sufficient draft in approach channel and at berths	27	56	115	2	0	0	B	0.415	-0.855
4	24 h a day, seven days a week service	18	70	112	0	0	0	B	0.44	-0.91
5	Accessibility to port	54	29	114	2	0	1	B	0.417	-0.718
6	Liners' schedule reliability and service frequency	34	14 4	22	0	2	0	P	0.89	-0.838

7	Peripheral resources within the port (Ship Chandelling)	29	14 0	31	0	0	0	P	0.845	-0.863
8	Port reputation and promotion	51	11 0	38	1	0	0	P	0.805	-0.747
9	Location of the port	44	96	57	3		1	P	0.7	-0.772
10	Availability empty container port	42	93	64	1	1	0	P	0.675	-0.792
11	Physical condition of Container (20 or 40 foot)	30	29	46	95	0	0	I	0.295	-0.375
12	Port disbursement account tariff	12 7	38	23	7	0	5	E	0.846	-0.312
13	Computerized port operation (radar network)	12 2	47	31	0	0	0	E	0.845	-0.39
14	Efficient Intermodal links to the port (road, rail, air, feeder, ...)	11 9	45	29	7	0	0	E	0.82	-0.37
15	Zero waiting time service	11 2	59	22	7	0	1	E	0.855	-0.405
16	Value added benefit offered	10 6	67	24	3	0	0	E	0.865	-0.455
17	Professional and skilled labours in port operation	99	50	45	6	1	0	E	0.745	-0.475
18	Size and activity of FTZ in port hinterland	89	73	38	0	0	0	E	0.81	-0.555
19	Information technology and availability of port-related activities	75	69	54	2	0	0	E	0.72	-0.615
20	Port productivity	70	60	66	4	0	0	E	0.65	-0.63

P= Performance Attribute, E= Excitement Attribute, B= Basic Attribute, I= indifferent Attribute

Analyses of result

Basic attributes

Are basic criteria of a product? If these requirements are not fulfilled, the customer will be extremely dissatisfied. On the other hand, as the customer takes these requirements for granted, their fulfillment will not increase his satisfaction. Fulfilling the must-be requirements will only lead to a state of "not dissatisfied". Must be requirements are in any case a decisive

competitive factor, and if they are not fulfilled, customers will be very dissatisfied. Port's safety with 0.328 CS coefficient was ranked 5th. And with -0.823 customer dissatisfaction coefficient was ranked 3th.

Compliance with MARPOL-IMO-ISPS codes and EU legislation with 0.355 CS coefficient was ranked 5th. And with 0.355 customer dissatisfaction coefficient was ranked 5nd.

Sufficient draft in approach channel and at berths with 0.415 CS coefficient was ranked 3th. And with -0.855 customer dissatisfaction coefficient was ranked 2rd.

24 h a day, seven days a week service with 0.44 CS coefficient was ranked 1st. And also with -0.91 customer dissatisfaction coefficient was ranked 1st.

Accessibility to port with 0.417 CS coefficient was ranked 2th. And with -0.718 customer dissatisfaction coefficient was ranked 4th.

Performance attribute

Analyses of results according to the given answers show that these factors have been classified in the One-dimensional requirements. With regard to these requirements, customer satisfaction is proportional to the level of fulfillment – the higher the level of fulfillment, the higher the customer's satisfaction and vice versa. Performance requirements are usually explicitly demanded by the customer.

Liners' schedule reliability and service frequency with 0.89 customer satisfactions (CS) coefficient was ranked first. And with -0.838 customer dissatisfaction coefficient was ranked second.

Peripheral resources within the port (Ship Chandelling) with 0.845 CS coefficient was ranked 2th. And with -0.863 customer dissatisfaction coefficient was ranked 1st.

Port reputation and promotion with 0.805 CS coefficient was ranked 3th. And with -0.747 customer dissatisfaction coefficient was ranked 5th.

Location of the port with 0.7 CS coefficient was ranked 4th. And with -0.772 customer dissatisfaction coefficient was ranked 4th.

Availability empty container port with 0.675 CS coefficient was ranked 5th. And with -

0.792 customer dissatisfaction coefficient was ranked 3rd.

Indifferent attribute

This category means that the customer is indifferent to these product features. Customers do not care whether they are fulfilled or not. They are, however, not willing to spend more on this feature.

Physical condition of Container (20 or 40 foot) with 0.295 CS coefficient was ranked 1st. And with -0.375 customer dissatisfaction coefficient was ranked 1rd.

Excitement attribute

The results of the study according to responses to the questions show that these factors are attractive requirements. Attractive requirements are neither explicitly expressed nor expected by the customer. Fulfilling these requirements leads to more satisfaction. Even if they are not met, customers do not feel dissatisfied.

Port disbursement account tariff with 0.846 CS coefficient was ranked 3th. And with -0.312 customer dissatisfaction coefficient was ranked 9th.

Computerized port operation (radar network) with 0.845 CS coefficient was ranked 4th. And with -0.39 customer dissatisfaction coefficient was ranked 7th.

Efficient Intermodal links to the port (road, rail, air, feeder,) with 0.82 CS coefficient was ranked 5th. And with -0.37 customer dissatisfaction coefficient was ranked 8th.

Zero waiting time service with 0.855 CS coefficient was ranked 2st. And with -0.405 customer dissatisfaction coefficient was ranked 6th.

Value added benefit offered with 0.865 CS coefficient was ranked 1nd. And with -0.475 customer dissatisfaction coefficient was ranked 5th.

Professional and skilled labours in port operation with 0.745 CS coefficient was ranked 7th. And with -0.475 customer dissatisfaction coefficient was ranked 4th. Size and activity of FTZ in port hinterland with 0.81 CS coefficient was ranked 6th. And with -0.555 customer dissatisfaction coefficient was ranked 3rd.

Information technology and availability of port-related activities with 0.72 CS coefficient was ranked 8th. And with -0.615 customer dissatisfaction coefficient was ranked 2nd.

Port productivity with 0.65 CS coefficient was ranked 9th. And with -0.63 customer dissatisfaction coefficient was ranked 1th.

Conclusion

According to the results of this research, the factor affecting the shipping line satisfaction were determined and classified by the Kano model. And the coefficients of satisfaction and dissatisfaction were calculated and prioritize for each one. The results can be used for port managers and terminal operators of Iraqi Container Ports in providing port services in order to satisfy the customers (shipping lines), that eventually causes customers loyalty. According to this study, following conclusions can be inferred. First, the attractive attribute and Performance attribute were positively associated with overall customer satisfaction: as the attractive attribute and Performance attribute increased, the level of overall customer satisfaction also increased. Therefore must focus on how to create attractive and Performance Attributes that increase customer satisfaction levels and gain customer loyalty. port disbursement account tariff, computerized port operation, efficient Intermodal links to the port, zero waiting time service, offered value added benefit, professional and skilled labors in port operation, size and activity of FTZ in port hinterland, information technology and port productivity, are attractive attribute and could be the keys to customer satisfaction

and loyalty. Liners' schedule reliability and service frequency, Peripheral resources within the port, Port reputation and promotion, Location of the port, Availability empty container port are Performance attribute that could increase satisfaction. Secondly, the must-be attribute did not have a significant direct association with the overall level of customer satisfaction. Port's safety, Compliance with MARPOL-IMO-ISPS codes and EU legislation, Sufficient draft in approach channel and at berths, 24 h a day, seven days a week service, Accessibility to port, are must-be attributes.

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