Customer satisfaction assessment of E-Supply chain quality in online shopping: a case study

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Abstract

Purpose

The purpose of this study, by introducing the concept of service quality (SQ) in E-supply chain management(E-SCM) and its impact on increasing Customer Satisfaction (CS), is to examine the influence of Quality E-Supply Chain Management Services in CS in online shopping.

Design/methodology/approach

After a comprehensive review of the literature, four key factors for measuring the E-supply chain, four key factors for measuring CS, and four factors for measuring the quality of identification services were selected. Then, the proposed conceptual model was presented. To validate this model, the data were collected through a survey of 150 respondents to diagnose customers' satisfaction including online customers of online websites in Iran. The model and their interrelationships were examined based on the partial least square-structural (PLS), and model fit indices were calculated. Sample data was analyzed using SPSS21 and PLS, and model fit indices were calculated. The proposed model was validated using factor analysis and structural equation modeling techniques.

Findings

The results indicated that E-SCM has a direct impact on CS. The effect of SQ is also confirmed. There is a positive and significant relationship between E-SCM and CS, E-SCM and SQ, and also, SQ and CS (P> 0.05).

Research limitations/implications

The first limitation was convincing respondents to cooperate with the researcher. The second one, there is a lack of research-related background due to its new subject matter.

Keywords: service quality; E-Supply chain management; customer satisfaction; online shopping

Introduction

With the growth and development of information technology, supply chain management, along with other industries, has been affected and has seen significant growth in areas from traditional supply chain to E-SCM (Electronic Commerce Supply Chain Management, e-commerce supply chain management). E-SCM refers to the management in all the processes in the entire supply chain, such as planning and forecasting, procurement, inventory, production, logistics, sales and information and other resources as well as customer satisfaction, which is achieved by means of e-commerce/information technology. It is the result of the integration of e-commerce and supply chain management (Hua and Cong 2011) and has received much interest from researchers (Piera et al. 2014)(Ross 2003).

The internet and information technology (IT) have had important effects on E- Supply chain management (Valverde and Saadé 2015) (Ben-Daya, Hassini, and Bahroun 2017). The growth of IT in recent decades has caused enormous companies and economic institutions in the world to invest heavily in this field and to use the best and most modern facilities to gain more benefits and attract more customers (Abdirad and Krishnan 2020).

Companies prefer to use the E-supply chain to speed things up. In fact, the purpose of using the E-supply chain is to provide an alternative means of customer service. Companies are able to offer their products and services full-time and online to all buyers around the world, regardless of geographical boundaries and nationalities. Companies are turning to this system to speed up the process, making it easier and better to provide their services. Customers no longer have to travel long distances to get the goods they need, which has made them more satisfied. Overall, online shopping saves time and money and also delivers high data processing accuracy (Pulevska-Ivanovska and Kaleshovska 2013). Using modern supply chain has led to the expansion of services with easier purchases and more choices (Valverde and Saadé 2015).

As an example of E-SCM, Amazon has millions of orders every day. Amazon uses the benefits derived from the impact of the Internet. Amazon robots fetch and pick up those orders and bring them to the employees to fill them at the right time. Another interesting example of the use of E-SCM is DHL. By collecting and evaluating big data from customers, DHL can provide customers with information on potential interference in their respective supply chains. It is possible to protect and also to improve the efficiency of the supply chain and achieve long term customer satisfaction (Valverde and Saadé 2015) (Witkowski 2017).

Many companies are reviewing their sales systems to switch to E-supply chain to support their operations. In fact, E-supply chain without the use of information and communication technology is a major obstacle for online shopping. It is important to identify the factors that affect the modern supply chain. One of the factors that plays an important role in this field is the quality of supply chain services. Service quality reduces costs, while increasing customer satisfaction, and customer loyalty and profitability. Poor service quality leads to loss of reputation, reduced customer satisfaction, reduced customer loyalty, poor supply chain performance, and reduced profits. For this reason, in this paper, we examine customer satisfaction with supply chain management in online shopping through their perception and evaluation of service quality.

The remainder of this paper is organized as follows. Section 2 provides a theoretical foundation and background. Section 3 explains the conceptual model and provides hypotheses development. Section 4 is dedicated to research methodology, including sampling, data collection, questionnaire design and testing hypotheses. Section 5 presents the results and discussion. In section 6, we conclude with conclusion limits and future directions.

Theoretical Foundations

Role of Customer Satisfaction and E-supply Chain Management

A review of the relevant literature has shown that a limited number of previous studies have attempted to identify the impact of E-SCM processes on customer satisfaction (Shamout and Emeagwali 2016). Tan and Trang mentioned the impact of E-SCM on improved customer satisfaction, efficiency, effectiveness and its ability to increase the enterprise's chance to do market development (Le Tan and Thi Dai Trang 2017). Also, they reviewed the impact of the Internet on the order fulfillment process in two major aspects. The first is related to the fact that e-commerce consists of fulfilling customer orders through the internet which increases efficiency. The second aspect is related to the use of the Internet, to improve the efficiency of the order fulfillment process, which actually requires the access and manipulation of a large amount of data from customer orders to inventory levels (Le Tan and Thi Dai Trang 2017).

Pulevska-Ivanovska & Kaleshovska found that E-SCM has proved its importance for numerous reasons: improving operations, better outsourcing, increasing profits, enhancing customer satisfaction, generating quality outcomes, tackling competitive pressures, increasing globalization, increasing importance of e-commerce as well as the growing complexity of the supply chains (Pulevska-Ivanovska and Kaleshovska 2013).

Omoruyi and Mafini discussed the relationship between customer satisfaction, supply chain management practices and three input factors; namely, product quality, flexibility and product variety in small to medium enterprises (Omoruyi and Mafini 2017).

Bucko et al. determined factors that affect the consumers' willingness to purchase products from an online store. They evaluated the criteria based on which users make decisions

when purchasing online. They found that the price factor causes consumers in online shopping to be satisfied or unsatisfied (Bucko, Kakalejčík, and Ferencová 2018).

Role of Service Quality in Customer Satisfaction

SQ is one of the most important and critical issues and one of the most effective tools in creating competitive advantages and improving organizational performance. Creating a top-level of SQ brings CS and loyalty.

The nature of the exact relationship between SQ and CS (especially in the way the two constructs have been operationalized) is still shrouded with uncertainty (Sureshchandar, Rajendran, and Anantharaman 2002). Some research considers customers as one of the most essential features of the service and suggests that CS is directly related to the service quality (Meidutė-Kavaliauskienė, Aranskis, and Litvinenko 2014) (Rahman, Khan, and Haque 2012).

Some research attempts to develop a better understanding of the most important dimensions of e-service quality that have effects on customer satisfaction. Hong et al. explained that logistics service elements concerned with customer satisfaction are convenience, communication, integrity, responsiveness, and reliability (Hong et al. 2019). Gupta and Singh have discussed the concept of SQ in supply chain. They mentioned that exemplary service has always built up the confidence of the customer in a firm (K. Gupta and Singh 2012). Chang et al. tested the interrelationships among the perception of e-service quality, customer satisfaction, and customer loyalty on electronic service quality (Chang, Wang, and Yang 2009). Most of the studies on this matter have concluded that customer satisfaction is one of the major determinants of CS and customer loyalty (Kumar, Batista, and Maull 2011). By increasing SQ, CS is increased and, in turn, customer loyalty is increased.

Al-dweeri et al. revealed in their study that CS mediates the relationship between e-SQ and behavioral and attitudinal loyalty(Al-dweeri et al. 2017).

Zehira and Narcıkara, looked into understanding the relationships between E-Service Quality, Perceived Value, Recovery Service Experiences and Loyalty Intentions. They wanted to see the effects of recovery services during nonroutine encounters of customers with the sites as well as e-service quality's effects on routine encounters. Their results show that there is a strong relationship between E-service quality and loyalty intentions, and perceived value acts as a mediator between them (Zehir and Narcıkara 2016).

Sundaram et al. in their study tested the conceptual framework of customer perception on service quality online business and its impact on satisfaction and loyalty through e-commerce business (Sundaram, Ramkumar, and Shankar 2017).

Khan et al. indicated that all the first latent constructs are significant where electronic customer satisfaction and e-customer loyalty are influenced by e-service quality. The analysis shows that there is a strong positive relation between E-SQ and E-CS and, also E-SQ and E-CL (Khan, Zubair, and Malik 2019). The interested reader can learn more about logistics service quality impact on CS and Loyalty (Saura et al. 2008)

Role of Services Quality in E-supply Chain Management

As pointed out in the last subsection, creating a high level of SQ brings CS and loyalty, thus leading to increased market share and profitability. There is no general model for measuring SQ. Information regarding the integrating of SQ and supply chain management still remains limited in the literature (Quang et al. 2016).

Rita et al. in their analytical results mentioned that three dimensions of e-service quality, namely website design, security/privacy and fulfillment, affect overall e-service quality (Rita,

Oliveira, and Farisa 2019). Barnes & Vidgen (2002) also pioneered a new e-service quality measurement called WebQual that focused on the importance of easy-to-use websites.

Later, Blut (2016) empirically tested the Blut et al. (2015) model using 358 U.S. online customers. The study showed that the e-service quality construct conformed to the structure of a higher-order factor model that links online service quality perceptions to distinct and actionable dimensions, including website design, fulfillment, customer service, and security/privacy. The results also demonstrated that overall quality fully mediated the relationship between dimensions and outcomes for fulfillment and security, and partially mediated the relationships for customer service and website design.

From another point of view, providing the goods needed by the customers and making the purchase easy is part of the quality service. At the same time as buying some goods, they need other goods. Selling goods that customers need to buy together can help with the quality of service.

Customer service systems have a great role in SQ. Customer service representatives have direct contact with customers. If a customer is unsatisfied about a product or service, they are the first group that is notified. İt is important how customer service responds to the customers. They can solve the customers' problems or offer customers a better offer to keep them satisfied.

İnterested reader are offered further details by referring to (Shanthi and Kannaiah 2015)(Ben-Daya, Hassini, and Bahroun 2017) (H. J. Kim, Son, and Kim 2016)

Conceptual Model and Hypothesis

According to the literature review and research gap, we developed a theoretical model, as visualized in Figure 1, that considers the direct and indirect effects of E-supply chain over service

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quality and customer satisfaction as well as the effect of service quality over customer satisfaction. We propose the following hypotheses:

H 1. E-Supply chain management seems to affect customer satisfaction.

H 2. Service quality in e-supply chain affects customer satisfaction.

H 3. E-Supply chain management appears to affect the service quality.
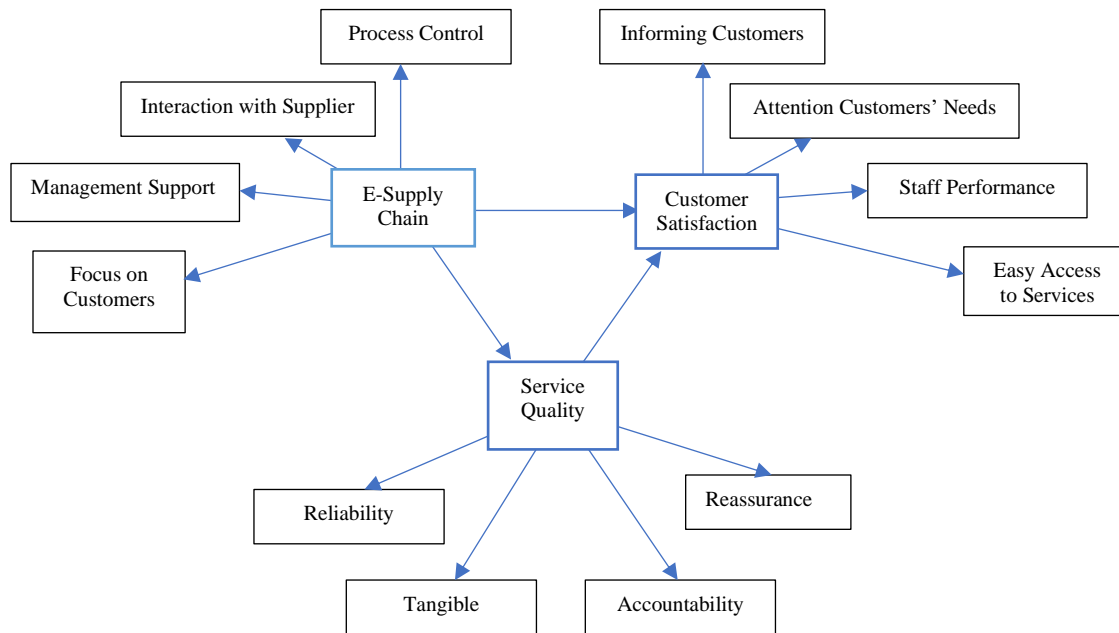
Figure 1. Complete conceptual model

Research Methodology

The research methodology starts with sampling and data collection for the study. Later, descriptive questionnaire design and measures are covered. Then, the testing of the hypotheses is explained. In the last subsection, the research method used for the study is discussed.

Sampling and Data Collection

Our case-study company for the statistical analysis was the biggest e-commerce startup and the largest online store in Iran. Customers submit their orders online and this company

delivers products to the customers in a brief period of time (similar to well-known retailers such as Amazon).

We collected data for this study using survey results from customers who made the most of their purchases from this online site. We selected customers based on marital status, education (having at least a bachelor's degree), and number of children. These people had skills to use technology like computers and mobile devices. They were risk-taking to buy new products online. These demographics indicated customers would be more likely to buy products online because of their technical skill set.

In this study, we randomly selected the sample from the customers who met the foregoing criteria. Since the presumed statistical population in this study was online customers of this retailer, we calculated the sample size according to the Cochran formula. Out of the 150 randomly selected online customers, 50 of them were from the social class B and 100 of them from the social class C+.

Questionnaire Design and Measures

This research is practical. The results of the current research are used by companies that sell products online. Additionally, this study is descriptive in that the research variables are examined based on the current status. To collect data, a researcher-made questionnaire was used in three levels of variables as follows:

E-Supply Chain Management: This variable is evaluated with indicators of process control, interaction with suppliers, management support and focus on customers in E-Supply Chain. Each variable has 3 questions that are assigned to this variable from questions 1 to 12.

Customer Satisfaction: CS is an issue that companies and customers have in common. In this study, different factors were measured such as informing customers, attention to customers'

needs and their problems, staff performance accuracy, and easy access to services. This variable is assigned from Question 13 to 24.

Service Quality: SQ is a complex issue that a customer will judge. According to Parasuraman et al., the quality is a customer's judgment and the difference between the customer's expectations of what the organization should deliver and the performance of the service received (Zeithaml et al. 1990)(Scott, Lundgren, and Thompson 2018). In this study, the service quality was measured with the components of tangible factors, reliability, accountability, and reassurance. A total of 12 questions from questions 25 to 36 are devoted to Service Quality.

After obtaining the necessary permits, the authors provided the questionnaires for a statistical sample in person. The completed questionnaires were collected and entered into the software to analyze.

The most important methods of data collection in this research are as follows:

1. **Field research:** For this part, we used a questionnaire to collect the data and information for analysis. To design these questions, we used a five-point Likert scale, which is one of the most common measurement scales. To test the hypotheses in research, it is necessary to identify the variables. The main variables of this research include service quality, customer satisfaction and supply chain in online-shopping.

2. **Content validity:** Content validity is a type of validation used to evaluate the components of a measuring instrument (Garver 2019). In this study, the validity of the content has been used by a team of academic professors and experts in the supply chain management profession.

3. **Structure validity:** Another type of validation is structure validity. This type of validation examines the relationship between the measuring instrument and the general

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theoretical framework, to reflect the relationship of the measuring instrument to the concepts and theory assumptions. Structure validity is obtained through factor analysis (KMO and the significant level of Bartlett test) (Khyzer Bin Dost et al. 2018). KMO is a test to measure how suited data is for factor analysis (Shashi et al. 2019). Thus, if the KMO level is 0.6 and higher and the significance level of Bartlett test is 0.05 or lower, the variables of the questionnaire set are valid. In this study, concerning KMO higher than 0.05, the questionnaire is acceptable and approved.

Table 1. The Kolmogorov-Smirnov statistical test was used to check the normality of the questionnaire variables. According to the results, the significance level of the Kolmogorov-Smirnov test was less than 0.05. Therefore, the distribution of variable data in this statistical sample is normal. PLS software was used to perform the structural equations and test the measurement models.

Table 1. Results of Normality of Research Variables (Kolmogorov-Smirnov)

Variables	t-value	Significant Level	Test Results
E-SCM	2.114	0.000	Normal
SQ	1.164	0.020	Normal
CS	2.307	0.000	Normal

4. **Reliability:** Reliability is the overall consistency of a measure. A measure is said to have high reliability if it produces similar results under consistent conditions'(Khyzer Bin Dost et al. 2018). Cronbach's alpha was conducted to assess the reliability of each scale. Alpha values over 0.7 indicate that all scales can be considered reliable (Sukati et al. 2012). In this research Cronbach's alpha was 0.826, indicating high reliability of the questionnaire.

To analyze the data at the level of descriptive and inferential statistics, SPSS 21 statistical software was used. Also, Smart PLS software was used to model structural equations.

5. **Confirmatory factor analysis (CFA):** CFA is a statistical technique used to determine if the questions in the questionnaire are well selected and completely correlated (Hussain, Khan, and Al-Aomar 2016). Table 2 shows the confirmatory factor analysis statistics in all dimensions. The findings in this table show that all model paths were significant, based on scale items, and these values range from 49.74 to 53.32. Also, this table examines the parameters and coefficients of impact factors for the second-order confirmatory model which indicates that CS had the most impact factor.

Table 2. Statistics of confirmatory factor analysis in all dimensions

Variable	Impact Factor	Parameter Estimation	Confidence Interval	T-value
CS	0.745	0.927	0.000	53.32
E-SCM	0.466	1.000	0.000	51.40
SQ	0.724	0.917	0.000	49.74

Testing Hypotheses

To assess the measurement and our structural model, we evaluate the relationship between variables. Table 3 shows the analysis of the research hypotheses. If the T-value is greater than 1.96, the relationships between the variables are confirmed. According to the results of table 3, the impact of E-SCM with SQ is 87% and the significance level is 4.78. The effect of service quality on CS was 79% and significance was 4.61. Also, the effect of supply chain management on CS is 70% and the significance level is 5.03.

Table 3. The results of the analysis of research hypotheses

Dependent Variable	Independent Variable	Standard Coefficient	T-value	Test Results

CS	E-SCM	70 %	5.03	Confirm
CS	SQ	79 %	4.61	Confirm
SQ	E-SCM	87 %	4.78	Confirm

Results and Discussion

Regression Analysis

To assess the measurement and our structural model, we utilized partial least squares structural equation modeling (PLS-SEM), to find the effect of independent variables on the dependent variable (Sener et al. 2019). In multiple regression analysis, it is determined how each of the independent variables affects the dependent variable between them. To test the set of cause and effect relationships between the components and to investigate the research hypotheses, multiple regression analysis was applied by using PLS software. Figure 2 illustrates the hypothesized relationships between the constructs and presents PLS-SEM results for the structural path coefficient significance and the relevance of the structure model.
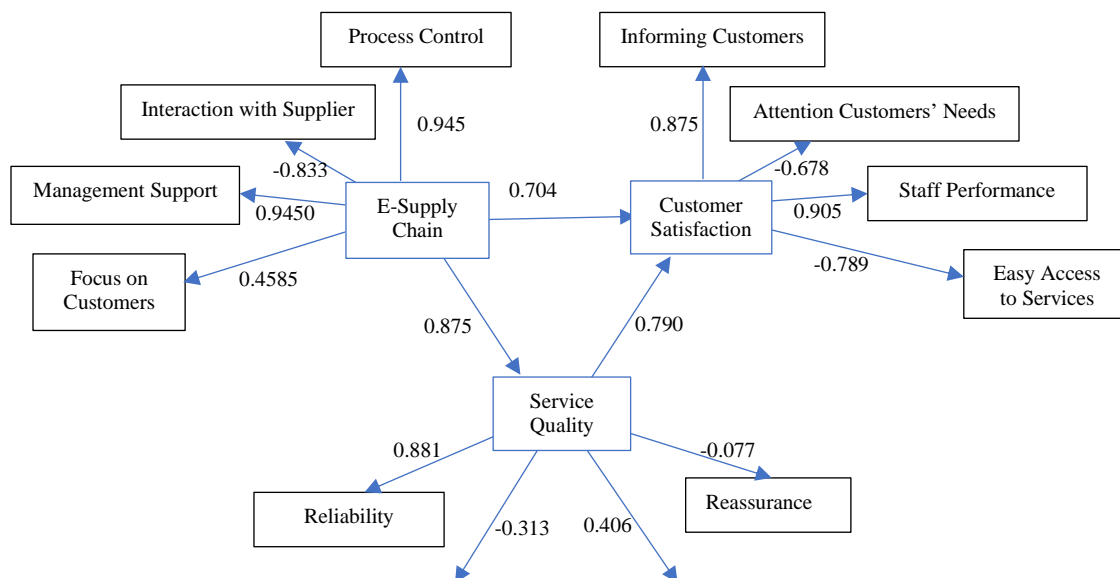

Figure 2. Results summery of conceptual model by PLS-SEM

Assessment of Structural Model

Table 4 indicates the fit indices of the role of E-SCM in explaining the factor of CS by

mediating the SQ factor. Based on the findings of this table, the set of fit indices shows the fitted

model to the data.

Table 4. Fit Indicators Role of Supply Chain Management in Explaining CS with SQ Mediation

Fit	Criteria	Value	Goodness-of-Fit Model
Chi-square (χ^2)	The less is the better	0.12%	…………..
The significance level	< 0.001	0.000	Appropriate
Normed Chi-square	2 to 5	2.931	Appropriate
RMSEA	Less than 0.08 and prefer less than 0.05	0.063	Appropriate
CFI	0.9 <	0.941	Appropriate
NFI	0.9 <	0.927	Appropriate
PCFI	0.6 <	0.767	Appropriate

Bootstrap

Bootstrap is a simple method used to determine statistical accuracy or to estimate

distribution from sample statistics. Bootstrap and its confidence interval are used to determine the

significance of the indirect paths of the independent variable to the dependent variables through

the mediator variable which assesses the mediator's role directly and has greater statistical power.

Since the Bootstrap method provides an empirical representation of the indirect effect distribution

of the sample, it does not face the problem of non-normal distribution of the indirect effect (Sener

et al. 2019).

In order to measure the indirect effect of the independent variable using the Bootstrap

method, the mediator variable is randomly sampled (by placement) at least a thousand times

through the dependent variable, and the size of the indirect effect is calculated at each re-

sampling. If the upper and lower limits of the indirect effect size are not zero at the confidence

interval, the hypothesis that the indirect effect of the independent variable is mediated by the

dependent variable is confirmed (C. Kim and Kim 2019).

Table 5 illustrates the Bootstrap results for the intermediate path. The upper and lower

confidence intervals for the IT variable are placed as the intermediate variable outside the zero

range. The confidence level for this confidence interval is 95%. Since zero is assured outside of

this gap, therefore, the indirect path to information technology mediation between customer

relationship management and supply chain is significant.

Table 5. Bootstrap freight path intermediate results

Path	Value	Bootstrap	Bias	Standard Error	Confidence Interval 0.95	
					Lower limit	Upper limit
E-SCM / SQ/ CS	0.3201	0.1621	0.0012	0.4658	0.2432	0.4354

Conclusion, Limits and Future Research

Nowadays, to improve and increase customers' satisfaction, companies have to cooperate

closely with all components of their supply chain system in order to assure product quality and

SQ. Supply chain quality management is a new concept in response to the challenge that experts

cite as the last step towards comprehensive quality management. They believe that its

implementation can provide the necessary framework for supply chain members to collaborate on

service quality, maintain product quality, and consequently increase CS. The primary goal of this

study was the influence of Quality E-Supply Chain Management Services in CS in online

shopping.

Based on a literature review, the authors arrived at the conclusion that the supply chain is

an important issue for companies and corporate managers. Managers, in addition to focusing on

their internal business, focus on building long-term relationships based on commitment and trust

with their suppliers and customers. E-SCM is a set of growing tools and technologies to coordinate and optimize key processes in production and SQ, including process control, supplier interaction, management support and customer focus, and other factors include cost reduction, quality enhancement, distribution facilitation and increased CS. To achieve these goals, E-SCM should promote coordination among all components of supply chain.

The present study is a survey study that was conducted to evaluate the customers' satisfaction with the service quality in online shopping in the last quarter of 2019. After reviewing relevant articles and books in this field, the required data was were obtained using a questionnaire and a survey of the sample. Then, the obtained data from the previous step was were analyzed by structural equation modeling.

In this study, the effectiveness relationship between E-SCM, SQ and CS was examined. The most important factor affecting CS is E-SCM. Therefore, it can be seen that four-dimensional supply chain management (process control, interaction with supplier, management support and focus on customers) enhances CS and also enhances the quality of online shopping.

Most of the proposed models in the literature review considered QC, CS, and E-Supply chain two by two. The main contribution of this research is that, for the first time in an empirical study, we explicitly proposed relating all three factors in one model.

This research is applicable because its results are used by the relevant customers and organizations, and it is descriptive because the research variables are examined based on the current situation.

There are some limitations to doing this research. As in the rest of the research using surveys, one limitation was convincing respondents to cooperate with the researcher. Second, there is a lack of research-related background due to its new subject matter.

As future work, we suggest considering the effect of customer satisfaction over quality service in all sections that deals with online shopping like, for example, electronic customers. It can be a reliable document for the policies and plans of customer organizations and so on. It is suggested that this research be conducted with qualitative methods to examine the strengths and weaknesses of opportunities and threats in detail such as SWOT.

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