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**Article**

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## Article

# Using a Modified SERVQUAL Approach to Assess the Quality of Supply Chain Services in Greek Online Supermarkets

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**Abstract:** *Background:* The purpose of this paper is to study customer satisfaction concerning orders from online supermarkets, which have recently boomed to fulfil the increased needs of customers during the COVID-19 pandemic. The service quality, as well as aspects of the logistics efficiency, are being examined, and the gaps between the expectations of people using these services and their perceptions about the received services are being evaluated. *Methods:* A modified approach of the well-known model SERVQUAL is suggested and used in the case of Greek online supermarkets. Thus, an initial contribution of this paper is the formulation of a framework which can be used to assess the quality of B2C logistics services. *Results:* The results show that customers' expectations are exceeding their experiential perceptions in all the examined fields, and therefore there is room for substantial improvement. The study identified areas in which supermarkets' online shops are close to meeting customer expectations and areas in which they fall far short. *Conclusions:* Competition is expected to become more intense and efficient supply chains that provide services of high quality will have a determinant role to play. Moreover, online supermarkets will have to rethink of their omni-channel structures to maintain and increase their market share. This is of particular importance during turbulent times such as the ones we are experiencing now.

**Keywords:** supply chain; service quality; SERVQUAL; logistics; last mile; supermarket; e-shopping; B2C; Greece



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## 1. Introduction

A supply chain is a network of activities and operations performed by collaborating actors aiming at producing, delivering, and offering a product (good, service or their combination) to final customers/users. Logistics, by definition, relates to the operations of obtaining, transferring, and storing resources between points of origin and consumption to fulfill the needs of consumers or companies. Both terms, "supply chain" and "logistics", are dynamic in nature and even their definitions are still evolving [1,2]. Nowadays, supply chains and logistics constitute the driving forces in every economy. Effective and efficient supply chain and logistics management have received increasing attention as globalization has intensified global competition. Hence, businesses have recognized that excellence in the supply chain can be a source of competitive advantage and business success [3–6].

Therefore, supply chain efficiency is a requirement for companies since it is one of the key metrics for the performance of the supply chain and greatly affects the overall performance and financial success of the enterprise [7–10]. In addition, supply chain efficiency is one of the main success factors that can play a significant role in the development of the supply chain and the creation of competitive advantages [11]. The most efficient supply chain is the one with the lowest possible cost which also fulfills customers' operating standards, such as accurate lead times, especially for short-life goods [12]. However, this is not at all easy to achieve. Third-party logistics providers play a significant role in the efficiency

of supply chains. New innovative business models and digital technologies are increasingly posing new challenges to these service providers. Moreover, digital disruptions may transform whole markets in a short period of time [13].

The rapid rise of e-commerce has stimulated the growth of the retail and logistics industry in recent years [14]. With the wide use of the Internet, retailers can attract more consumers, extend the distribution chain even more, and leverage available resources. At the same time, consumers can, at any time, engage in the service encounter and compare offers very easily. The e-commerce revolution, driven by consumers, emerges from the last leg of the supply chain: the last mile where the order is placed, and the service takes place. Supply chain management (SCM) and transportation planning have adopted the term “last mile” in order to refer to the last portion of a supply chain which is often considered the most costly and decisive, and which is influenced the most by environmental factors [15–17]. The last mile of a supply chain is considered as the most intensive part of the whole chain and nowadays its demands are being stretched to the highest degree. This is the consequence of the market expansion to include, along with the existing retailers, e-retailer businesses, which have created an entirely new pool of merchandise to be delivered and returned. Of course, these developments have been associated with certain problems in urban development. City logistics is a relatively new study topic whose goal is to ensure the long-term viability of city centers for all stakeholders. Bottlenecks, increased greenhouse gas emissions, and delays in deliveries are all consequences of urban population development, which is accompanied by a rise in the number of cars and the need for delivery services [18].

From the market perspective, e-retailers, who work in this recently developed world, and postal as well as logistics service providers, who are facing a rapid growth in the quantities of items shipped and returned, are confronted with the first wave of e-commerce challenges [19]. In addition, the research has shown that customer demands for service quality is continuously increasing as consumers pursue tailored service with diverse delivery options concerning time and place, flexible buying terms, and easier ways to collect and return their packages [20].

Customer satisfaction is multidimensional and quite extensive; the level of satisfaction can be influenced by several variables throughout the lifecycle of customer–firm interaction, including the brand name, the salesforce, the quality of product/service, and even the after-sales support [21]. It is therefore quite important for companies to bring many different factors into attention and consider constant evaluation and enhancement of their activities (such as addressing customer questions and concerns, fulfilling their needs, etc.) in order to be able to keep their customers satisfied [22].

Customer satisfaction can describe the relationship between firm and customer behavior. An enterprise should introduce a strategy to meet its customers’ needs and manage their expectations. As one of the greatest challenges is not only to achieve, but also to maintain customer satisfaction, this strategy must evolve continuously and be dynamic, so that the company can compete anytime against its rivals and improve its customer satisfaction. It is impossible for an organization to expand if customer needs are being ignored or disregarded [23].

However, in order for a company to be able to increase its customer satisfaction, it is essential to receive continuous feedback from its clients, so that all the relevant inputs can be gathered. In the case that the firm has already established a relationship of trust with its customers, this process is much easier. This trust can be the result of a “customer-oriented” strategy [24–26].

The need of online shopping for essential goods and other products became imperative during the COVID-19 pandemic and especially during the quarantine periods in many countries. A very large number of traditional consumers have joined the ever-growing group of online customers in an extremely short period. This abrupt change in demand has caused several issues on top of the difficulties derived by the special current situation due to the pandemic.

Because supply chains are now under more pressure to evolve and adapt to a setting of restrictions, the economic and social climate created by the COVID-19 epidemic has put more pressure on them [27]. In contrast to the economic crisis caused by the COVID-19 pandemic, supermarkets have faced a significant increase in their profits. Most of them have also proceeded in urgent upgrades of their services, with the development of their online shops to be one of their top priorities, the result of which is the increase in the market share that their online shopping had. The above increase in the contribution of online shop profits to the overall supermarket profits makes the evaluation of customer satisfaction in this field extremely important. Moreover, the economic crisis of the previous decade has provided valuable lessons for managers, who recognized cooperation, adaptive learning, and innovation in logistics operations as suitable reaction mechanisms to the challenges of growing logistics costs and declining worldwide market demand [28].

The purpose of this research is twofold:

- To employ and extend an established methodological approach and suggest a framework that can be used to examine the service quality and the logistics performance of online supermarkets from the end-customer point of view;
- To apply this approach to the case of Greek online supermarkets.

Eventually, the paper intends to extend our understanding of clients' expectations for such services.

The remainder of the paper is structured as follows: Section 2 provides an overview of the integration of SCM and quality management (QM) that has led to the concept of supply chain quality management (SCQM). In Section 3 the service quality model SERVQUAL is briefly presented. Section 4 focuses on contemporary online shopping trends while in Section 5 an overview of the turbulent Greek supermarket sector is provided. In Section 6 we discuss our research objective and our approach to achieve it. In Section 7 the results of the application of a modified SERVQUAL approach to assess the quality of supply chain services in Greek online supermarkets are presented. The paper ends with some concluding remarks.

## 2. Supply Chain Management and Quality Management

SCM and QM are two critical aspects of every organization and supply chain quality is an important factor in gaining and sustaining a competitive advantage [29]. As rivalry expands beyond a single business and into the supply chain, academics from a variety of disciplines have begun to investigate the role of quality management in this setting by reconsidering current notions, structures, and theoretical models towards incorporating QM into supply chain processes [30].

SCQM is an integrating, structured approach to performance management, which governs quality-related characteristics of supply chains and entails the coordination and integration of business operations between supply chain partners in order to generate value and satisfy customers [31,32]. It is a systems-based approach to performance improvement that builds on the possibilities provided by supply chain partners [33].

The development of frameworks and models for quality management coordination and integration in supply chains is an ongoing research endeavor which has recently gained researchers' growing attention [34].

Based on a thorough literature research, the goal of Talib et al. [35] was to offer a collection of total quality management (TQM) and supply chain management (SCM) practices, as well as to discover links between them. These practices were then assessed, and from a total of 50 TQM and 40 SCM practices, the results lead to six significant TQM and SCM practices. The authors concluded that management support and commitment, customer focus, and supplier collaboration were the most frequent techniques identified in both TQM and SCM literature and had the greatest influence on TQM and SCM integration.

The strategic management concepts of ISO 9001 and supply chain integration were examined by Bastas and Liyanage [36] through the lens of sustainability. A conceptual framework for the integration, measurement, and improvement of sustainability was

developed based on theoretical synergies, and a business diagnostic tool was provided to aid implementation of the framework. The same authors [37] studied the integration of sustainability into QM and SCM in order to assist organizations in meeting this requirement. Towards this end, a conceptual framework was developed based on the identified research gaps, combining QM and SCM concepts holistically for organizational sustainable growth.

Analytical models for SCQM coordination and integration that were introduced in papers published between 2000 and 2018 were analyzed to see what the key contributions were, what analytical modeling approaches were utilized, and what research pathways were open. The majority of the SCQM coordination and integration models studied were exclusively used in manufacturing businesses and for a single product or product line. They focused on only one side of the supply chain (suppliers or distributors) and only two connections were considered [34].

A systematic review of the literature on SCM and QM led to the identification of areas of integration between QM and SCM (i.e., leadership, continuous improvement and innovation, sustainability performance, stakeholders, information systems, management, and strategic planning) and the development of relevant key performance indicators [29].

In studying how SCM and QM are integrated in an organization, Peng et al. [38] elaborated on the Baldrige excellence framework. In this context, they culminate in a restructured quality-oriented organizational framework, which combines the SCM components of customer, supplier, and operations focus.

Using a survey approach, Zimon et al. [39] addressed the effects of introducing standardized management systems on competitiveness processes and aimed to comprehend deeper how these systems add value to clients of partners that are co-developing supply chains in Eastern and Central Europe. According to the findings, standardized management systems are beneficial in SCM, independent of the organization's function in the supply chain. The intensity of their beneficial influence, however, varies.

The goal of Agrawal et al. [40] was to systematically analyze papers on data-driven quality management in SCs. The findings show that implementing data-driven technology and quality management systems may aid strategic decision making and improve the performance of supply chain operations and networks.

A theoretical model was developed and empirical research was conducted to examine the influence of SCQM aspects on organization performance based on a balanced scorecard viewpoint [41]. The results demonstrate that in the four balanced scorecard performance perspectives, all of the SCQM dimensions have a strong positive connection. The categories with the highest average ratings were product/service quality and quality culture, while for the regions studied, no significant differences were found in any dimension.

Karamouz et al. [42] investigated what was known about quality management performance measurement in the literature in order to find performance measures in the field of total quality management. They concluded with delivery, product and services, financial, productivity, and customer, and classified these measures into three levels: supplier, customer, and company.

Many aspects of the human factor that are important for combining data-driven SCQM practices with organizational performance were analyzed by Mondal and Samaddar [30]. Moreover, the significance of the human factor was outlined and the difficulties and challenges in current organizational structures were discussed, keeping in mind the transition from "Industry 4.0" to "Industry 5.0."

The combined influence of tools such as SCQM practices, capabilities, and knowledge transfer on firm output is addressed by Zaid et al. [43], who show that SCQM practices may be utilized by companies to improve their performance. Moreover, the direct impact of SCQM capabilities and knowledge transfer on operational and innovation performance was empirically verified.

The papers discussed in this section point out the need for integration of SCM and QM. Both notions are performance-oriented and help organizations to improve their efficiency and respond to the needs of their customers and the markets they serve.

### 3. The SERVQUAL Model

Nowadays the concern for service quality is growing continuously, as the competition is becoming more and more intense and the environmental factors are changing constantly [44]. In the research literature, service quality has been described as a second-order construct consisting of various first-order variables [45]. Several studies have presented different theories over time. However, there are two frameworks which have been widely used by academics and practitioners, i.e., the service quality model by Grönroos [46] and the SERVQUAL model [47].

Both support the concept that service quality is related to the perceptions and expectations of the customers. Therefore, customer-perceived service quality is the result of the comparison between the expected service requirements and the understanding of the received service.

Grönroos [46] measures service quality based on three components, namely the technical quality, the functional quality, and the image, or in other words, the reputational quality. Technical quality refers to the outcome of the production process, meaning what the customer actually receives as a result of his interaction with the firm, while functional quality measures the quality of the process through which the customer receives the final outcome. On top of the aforementioned two components, the positive or negative image that the customer has for a firm can also affect accordingly the minor errors or mistakes that occur.

In the first place, Parasuraman et al. [48] identified ten determinants of service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer, and tangibles. They argued that it is quite possible that the importance of these dimensions in forming consumer expectations before service delivery can be different from their relative importance in consumer perception after the delivered service. After extensive research and empirical testing, the authors conclude with five distinct dimensions (three original and two combined), which capture the concept of all ten original ones. Therefore, the three dimensions of tangibles, reliability, and responsiveness remain the same, and the rest have been aggregated to the new two dimensions of assurance and empathy. Each dimension is measured by four or five items, making a total of 22 items across the five dimensions.

As tangibles, all physical facilities, equipment, or even the appearance of personnel can be measured. With the second dimension of reliability, the ability to perform the promised service dependably and accurately is under evaluation. The dimension of responsiveness measures the willingness to help customers and the promptness of service. The knowledge and courtesy of employees and their ability to inspire trust and confidence is included in the fourth dimension of assurance. At the end, with the last dimension of empathy, the level of caring and the individualized attention which is provided by the firm to its customers are being evaluated.

SERVQUAL standardizes service quality by measuring the discrepancy between expectations and perceptions, assessing both of them in relation to the 22 items/questions which constitute the five dimensions of service quality. A five- or seven-point Likert scale is usually used (from "Strongly Agree" to "Strongly Disagree"). The SERVQUAL model suggests a gap-based concept of service quality where the gap demonstrates the degree to which assumptions are verified by the service received. By subtracting the expected scale values (E) from the actual perceived scale values (P), the quality perception or difference score (Q) is determined. Hence,  $Q = P - E$ . The higher the difference score, the higher the perceived service quality score. In SERVQUAL, both service performance and consumer expectations of the service are specifically evaluated to assess the gap.

SERVQUAL is considered the most common instrument in measuring service quality. This model has been widely cited in the literature, but it is also used very widely in the industry. Its application can be found in several sectors, such as banking [49–51], telecommunications [52,53], health sector [54–56], hospitality [57–59], education [60,61], logistics [62–64], e-commerce [65], etc.

#### 4. Online Shopping Trends

Online shopping has increased on a worldwide scale in past years. As the Internet and the opportunities it offers expand more and more, people become familiar with it and use it as a source of information and online shopping [66,67]. Online stores have many benefits compared to traditional shops: they are convenient, save time for the consumer, and waiting in queues is no longer needed. They are also free and accessible from anywhere, anytime. These stores also provide customers with free and detailed information on goods and services. They still provide some online resources to help customers compare and decide among different goods and services.

With respect to Europe, e-commerce penetration rates are highest in Western and Northern Europe, but in Eastern and Southern Europe more customers are entering the online shopping world, a trend that is expected to continue. The percentage of companies in the EU-27 that had e-sales grew from 15% in 2010 to 21% in 2019. Similarly, the company turnover generated by e-sales rose by 7% during the same period. Among all EU member states, the percentage of turnover from e-sales ranged from 4% in Greece to 44% in Ireland, followed by Belgium (32%), the Czech Republic (30%), and Denmark (29%) (e-commerce statistics, 2021).

E-commerce has been striving to develop in Greece, following the global trends. Particularly, in the first quarter of 2020 it was observed that 47.8% of persons aged 16–74 with access to the Internet have purchased goods or services for personal use. The increase in the share of Internet users who ordered goods or services online in the first quarter of 2020 has increased by 15.2% compared to the first quarter of 2019 [68].

Till 2019, online shopping from supermarkets in Greece maintained a low market share of 0.4%, despite the significant growth that has been shown in the last years. The data of the annual consumer survey of the Research Institute of Retail Consumer Goods (IELKA) in 2018 in a sample of 2000 people from all over the country showed that a small but distinct customer base for online supermarkets had been formed. The year 2017 was the first year where a significant number of consumers expressed their intention to constantly use online supermarkets for their weekly purchases [69]. There are quite a few advantages, such as easier and faster shopping with one click or better comparison of prices online, that make people begin to turn to online purchases of supermarket goods. In another survey conducted at the end of 2020, several advantages had been recognized by the public (regardless of whether they are shoppers of e-supermarkets). Obviously, at that time the main advantage of e-shopping was safety against COVID-19 (reaching almost 40%). However, it is remarkable that the easiness of online shopping is in the second place (38%), followed by the speed of shopping with 23% and the search for offers with 22% [70].

#### 5. The Greek Supermarket Sector

A supermarket is a departmentalized, mostly self-service grocery store selling a wide range of food items, such as meat, vegetables, dairy, and so forth, along with other household products, such as detergents, paper products, and cosmetics. It is larger in size and offers a greater range of goods than a typical grocery store. Supermarkets, usually, are at comfortable locations and are easily accessed.

The very important acquisitions that took place in the Greek market in the past years have drastically changed the picture of the industry. The concentration of the market in a few, large chains is now a fact, and this trend is expected to continue in the near future. The major reforms that took place created conditions of intense competition and cultivated a culture of aggressive pricing policy, which has decisively influenced supermarket profit margins.

In 2019, the annual turnover of the 40 operating firms in the sector was € 9.1 billion, based on the Panorama of the Greek Supermarkets 2020, an annual edition that is published by Boussias Communications SA and provides a financial overview of all the supermarkets operating in Greece. Turnover was increased by 5.95% compared to 2018. The ten largest groups in the market account for 97.5% of the turnover. It is also quite interesting that

the first four groups or companies (Sklavenitis, AB Vassilopoulos, Metro, and Masoutis) possess around 80.3% of the market. Sklavenitis holds the dominant position in the market, reporting around 36% of the overall sector's turnover. At this stage it should be noted that the analysis does not include Lidl's subsidiary in Greece.

While many Greek supermarkets had already established e-shops, the COVID-19 pandemic acted as a catalyst for the late majority and the laggards. Moreover, several intermediaries emerged, aiming to provide supply chain services such as online ordering platforms and delivery services. In particular, omnichannel approaches have emerged since there are supermarkets which offer their products online both from their own e-shops and the platforms of intermediaries. The main competitive advantage of the latter is mainly to do with express delivery. On most occasions they can fulfill orders within a few hours, while the e-shops owned by supermarkets may take 1–4 days. However, in cases where companies decide to engage in omni-channel supply chain structures, there are several concerns that arise, such as risk aversion and fairness, that may affect pricing strategies as well as the entire collaboration framework [71,72].

## 6. Materials and Methods

### 6.1. Research Objective and Method

The purpose of this study is to examine service quality and evaluate logistics efficiency from the perspective of the end user of online supermarkets. It aims to broaden our comprehension of clients' preferences for the related service and their view of its delivery. For this purpose, a survey on Greek online supermarkets' customers was used to assess their perceptions on service quality in the case of online shopping from supermarkets. The survey was conducted through an online questionnaire. The decision to apply this method was due to the fact that this approach is the most effective and affordable way to obtain a satisfactory number of responses [73], which was particularly convenient during the COVID-19 pandemic, when travel and social restrictions were applied.

The questionnaire was prepared based on the SERVQUAL model and according to dimensions of tangibility, reliability, responsiveness, assurance, and empathy. Some adjustments were made to better fit with the case examined. Thus, an initial contribution of this paper is the formulation of a framework which can be used to assess the quality of B2C logistics services. All the participants were informed in the introductory section of the questionnaire about the purpose of the study, the details and contact information of the researcher, as well as the commitment to guarantee confidentiality. Additionally, it was clarified to them that participation in the survey would be anonymous and voluntary, and the data collected would be kept and analyzed only for the purpose of the specific research.

The first part of the survey contains questions concerning the demographic profile of the respondents, such as respondents' gender, age, education level, and occupation. The second and third part of the questionnaire constitutes the main body of the current research. In the second part there are 22 questions about the expectations of the consumers concerning the features of an excellent online shopping online shopping experience, while in the third part the 22 questions were repeated in such a way as to measure the perception of the consumers concerning the received services from an online supermarket. As stated earlier, both sections were based on the SERVQUAL model. The 22 questions are divided into 5 categories corresponding to the 5 dimensions for measuring the quality of services according to the SERVQUAL method as follows:

- Questions 1–4 refer to tangibility;
- Questions 5–9 refer to reliability;
- Questions 10–13 refer to responsiveness;
- Questions 14–17 refer to assurance;
- Questions 18–22 refer to empathy.

To answer the questions, a five-point Likert scale (1–5) was used. The responders specify their level of agreement to each statement choosing one of the following options: (1) strongly disagree; (2) disagree; (3) neither agree nor disagree; (4) agree; (5) strongly

agree. The five-point scale was chosen against a scale with more points to facilitate the choice of the answer by the participants.

The full questionnaire is presented in Appendix A.

## 6.2. Sample and Collection of Answers

The questionnaire was addressed to residents of Athens and Thessaloniki, which are the cities where online supermarkets are mostly active. Furthermore, it is obvious that the questions can be answered only by regular customers of online supermarkets. Since the audience are Greek citizens, it was considered appropriate to translate the questions into Greek to be more convenient for and to be able to be answered by everyone. The sampling method which has been chosen for the current study is a mixture of convenience and snowball sampling. The total number of recipients of the questionnaire cannot be estimated, as the questionnaire was distributed via multiple paths, such as emails, messages, etc. Additionally, the survey was published in the social networks of the authors. The survey was conducted in a period of six weeks between 5th April till 16th May, and a total of 147 fully completed questionnaires were collected.

## 7. Results

### 7.1. Reliability

The reliability of the internal consistency of a tool's measurements refers to the degree to which questions measuring the same attribute are highly consistent or correlated, both with each other and with that attribute. The most common way to assess this reliability is with the Cronbach's alpha coefficient [74]. During reliability analysis, questions which show low correlation with the total sum have a negative effect on the measurement's reliability and corrective action should be taken with these questions. The reliability of internal consistency is greater when the value of the Cronbach's alpha factor is higher. The Cronbach's alpha coefficient takes values between 0 and 1. In order for the sample to be reliable, its value must be at least 0.7 [75]. On some occasions, values between 0.6–0.7 can also be accepted. In our case the Cronbach's alpha is 0.90, reflecting an overall reliability factor that is very close to the one of the Parasuraman et al. study [47], which was 0.92.

### 7.2. Demographics

There were, in total, 147 participants. Gender wise, the sample consisted of 86 women, who constituted 58.5% of the total respondents, and 61 men, who corresponded to 41.5% of them. Most of the people who took place in the research belonged to the age group of 26 to 35 years old, with a percentage of 32.7%, and the age group of 36 to 45 years old, with a percentage of 28.6%. A figure of 12.9% belonged to respondents with ages between 46 and 55, while the participants of the age group 56 to 65 and above 66 years corresponded to 10.2% each. A lower percentage was observed in the age group of below 25 (5.4%). Among the respondents, 37.4% of them held a bachelor's degree, while 35.4% of them held a master's degree. A percentage of 10.2% had completed technical studies, while 17% had finished secondary education. Those working in the private sector made up the largest group of our sample (39%), followed by freelancers (22%), employees in the public sector (13%), unemployed (8%), and students (5%). A percentage of 13% corresponded to participants working in other fields.

### 7.3. Expectations and Perceptions

In the analysis that follows we see the detailed results concerning all the questions about each of the dimensions of tangibility, reliability, responsiveness, assurance, and empathy. One of the main and more important observations is that the expected values are always higher than the perceived ones, meaning that the expectations of the customers exceed their perceptions.

From the results in Table 1, we observe that proper packaging according to product specification has the highest perceived score among the tangibility features (3.946), while

this expectation was at the same time the most important (4.503). Furthermore, it seems that the differences between the expected and the perceived values for tidiness of the distributing vehicles (4.388 and 3.721) and the easiness to use the website (4.415 and 3.769) are considerably large.

**Table 1.** Descriptive statistics of expectations and perceptions for the tangibility dimension.

	Q1		Q2		Q3		Q4	
	Exp	Per	Exp	Per	Exp	Per	Exp	Per
Mean	4.415	3.769	4.388	3.721	4.088	3.728	4.503	3.946
Standard error	0.05	0.058	0.052	0.055	0.055	0.061	0.052	0.063
Median	4	4	4	4	4	4	5	4
Mode	4	4	4	4	4	4	5	4
Standard deviation	0.606	0.703	0.635	0.67	0.672	0.736	0.634	0.766
Sample variance	0.368	0.494	0.403	0.449	0.451	0.542	0.402	0.586
Kurtosis	0.54	1.657	0.314	-0.59	0.227	-0.36	1.909	0.053
Skewness	-0.7	-0.84	-0.71	0.255	-0.38	-0.04	-1.24	-0.46
Range	3	4	3	3	3	3	3	3
Minimum	2	1	2	2	2	2	2	2
Maximum	5	5	5	5	5	5	5	5
Sum	649	554	645	547	601	548	662	580

Concerning the dimension of reliability (Table 2), it seems that most customers experience delivery of their products at once (4.102), very close to what they are expecting (4.361). On the other hand, it seems that online supermarkets are suffering from on-time delivery of the orders, as the difference between customers' expectations (4.531) and their perceived service (3.905) seems to be quite remarkable. The largest gap, however, is observed in the reasonable compensation in case of damaged goods, where the customers are looking for service that is close to excellent (4.367), while in reality the companies did not perform that well (3.639).

**Table 2.** Descriptive statistics of expectations and perceptions for the reliability dimension.

	Q5		Q6		Q7		Q8		Q9	
	Exp	Per								
Mean	4.531	3.905	4.347	3.701	4.361	4.102	4.367	3.639	4.293	3.891
Standard error	0.051	0.068	0.051	0.071	0.059	0.067	0.054	0.064	0.056	0.069
Median	5	4	4	4	4	4	4	4	4	4
Mode	5	4	4	4	5	4	4	4	4	4
Standard deviation	0.623	0.822	0.615	0.855	0.721	0.817	0.653	0.776	0.685	0.837
Sample variance	0.388	0.676	0.379	0.732	0.52	0.668	0.426	0.602	0.469	0.7
Kurtosis	2.278	1.001	0.363	0.827	0.824	1.221	1.798	0.168	1.035	-0.04
Skewness	-1.33	-0.87	-0.56	-0.64	-1	-0.95	-0.99	-0.16	-0.84	-0.57
Range	3	4	3	4	3	4	3	4	3	3
Minimum	2	1	2	1	2	1	2	1	2	2

**Table 2.** *Cont.*

	Q5		Q6		Q7		Q8		Q9	
	Exp	Per								
Maximum	5	5	5	5	5	5	5	5	5	5
Sum	666	574	639	544	641	603	642	535	631	572
Count	147	147	147	147	147	147	147	147	147	147

In the case of responsiveness (Table 3), there is a significant gap in customers' expectations concerning the possibility to change the delivery after an order is placed (4.007) and the actual offered service by the companies (3.231). Furthermore, considering the questions of this dimension, the features rated highest for the actual service perceived were the willingness of the employees to help the customers (3.789) and the employees' availability to respond to customers' requests (3.694).

**Table 3.** Descriptive statistics of expectations and perceptions for the responsiveness dimension.

	Q10		Q11		Q12		Q13	
	Exp	Per	Exp	Per	Exp	Per	Exp	Per
Mean	4.313	3.646	4.007	3.231	4.367	3.789	4.231	3.694
Standard error	0.053	0.079	0.07	0.095	0.051	0.076	0.057	0.079
Median	4	4	4	3	4	4	4	4
Mode	4	4	4	4	4	4	4	4
Standard deviation	0.639	0.964	0.848	1.147	0.62	0.916	0.693	0.962
Sample variance	0.408	0.929	0.719	1.316	0.385	0.839	0.48	0.926
Kurtosis	0.156	0.225	1.73	-0.55	1.364	0.914	1.283	0.781
Skewness	-0.54	-0.73	-0.97	-0.49	-0.79	-0.81	-0.84	-0.8
Range	3	4	4	4	3	4	3	4
Minimum	2	1	1	1	2	1	2	1
Maximum	5	5	5	5	5	5	5	5
Sum	634	536	589	475	642	557	622	543
Count	147	147	147	147	147	147	147	147

Concerning the dimension of assurance (Table 4), it seems that most of online supermarkets operate websites which inspire trust and safety to perform transactions (4.095), while this feature is also quite important for the clients as well (4.565).

**Table 4.** Descriptive statistics of expectations and perceptions for the assurance dimension.

	Q14		Q15		Q16		Q17	
	Exp	Per	Exp	Per	Exp	Per	Exp	Per
Mean	4.299	3.837	4.565	4.095	4.347	3.837	4.19	3.735
Standard error	0.057	0.066	0.051	0.066	0.054	0.071	0.057	0.07
Median	4	4	5	4	4	4	4	4
Mode	4	4	5	4	4	4	4	4

**Table 4.** *Cont.*

	Q14		Q15		Q16		Q17	
	Exp	Per	Exp	Per	Exp	Per	Exp	Per
Standard deviation	0.687	0.803	0.62	0.805	0.658	0.86	0.686	0.855
Sample variance	0.471	0.644	0.384	0.648	0.434	0.74	0.47	0.731
Kurtosis	−0.2	0.418	1.441	0.912	0.847	0.414	0.742	0.201
Skewness	−0.6	−0.5	−1.3	−0.81	−0.8	−0.53	−0.65	−0.33
Range	3	4	3	4	3	4	3	4
Minimum	2	1	2	1	2	1	2	1
Maximum	5	5	5	5	5	5	5	5
Sum	632	564	671	602	639	564	616	549
Count	147	147	147	147	147	147	147	147

With respect to empathy (Table 5), it seems that most of the customers expect the online supermarkets to have convenient payment methods that can serve all of them (4.361), and the actual service is quite remarkable (4.088). On the other hand, customers' expectations for individual attention or personalized promotions are not very high (3.912), with this feature also having the lowest score in perceived services (3.272).

**Table 5.** Descriptive statistics of expectations and perceptions for the empathy dimension.

	Q18		Q19		Q20		Q21		Q22	
	Exp	Per								
Mean	3.912	3.272	4.204	3.571	4.361	4.088	4.129	3.517	4.122	3.517
Standard error	0.063	0.088	0.058	0.079	0.056	0.068	0.066	0.07	0.062	0.079
Median	4	3	4	4	4	4	4	3	4	4
Mode	4	3	4	4	5	4	4	3	4	4
Standard deviation	0.758	1.063	0.702	0.958	0.682	0.819	0.796	0.847	0.758	0.953
Sample variance	0.574	1.131	0.492	0.918	0.465	0.67	0.634	0.717	0.574	0.909
Kurtosis	−0.6	−0.32	0.06	−0	0.643	1.966	1.458	−0.24	1.56	0.156
Skewness	−0.14	−0.29	−0.55	−0.42	−0.86	−1.08	−0.98	−0.05	−0.88	−0.43
Range	3	4	3	4	3	4	4	4	4	4
Minimum	2	1	2	1	2	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	5
Sum	575	481	618	525	641	601	607	517	606	517
Count	147	147	147	147	147	147	147	147	147	147

In general, considering the above analysis, we can observe that the feature with the best performance among all of them concerns the delivery of all products at once (4.102), followed by the safe websites for transactions (4.095) and the convenient methods to perform payments (4.088) ones. On the other hand, the customers' expectation with the highest score was the safe websites for transactions (4.565), followed by the delivery of the order on time (4.531) and the proper packaging of the order according to the products' specifications (4.503) aspects.

In the opposite site, customers do not really expect to receive personalized attention, with this characteristic having the lowest value among all items (3.912), while it has the second lowest value concerning the perceived services as well (3.272). The worst received

service, however, is the ability that customers have to change the delivery time after they have placed the order (3.231).

#### 7.4. Gap Analysis

Table 6 shows the differences between the average expectations and perceptions of the customers of online supermarkets.

**Table 6.** Gap analysis for all questions.

		Mean Expectation	Mean Perception	Mean Gap
Tangibility	Q1	4.415	3.769	-0.646
	Q2	4.388	3.721	-0.667
	Q3	4.088	3.728	-0.360
	Q4	4.503	3.946	-0.557
Reliability	Q5	4.531	3.905	-0.626
	Q6	4.347	3.701	-0.646
	Q7	4.361	4.102	-0.259
	Q8	4.367	3.639	-0.728
	Q9	4.293	3.891	-0.402
Responsiveness	Q10	4.313	3.646	-0.667
	Q11	4.007	3.231	-0.776
	Q12	4.367	3.789	-0.578
	Q13	4.231	3.694	-0.537
Assurance	Q14	4.299	3.837	-0.462
	Q15	4.565	4.095	-0.470
	Q16	4.347	3.837	-0.510
	Q17	4.190	3.735	-0.455
Empathy	Q18	3.912	3.272	-0.640
	Q19	4.204	3.571	-0.633
	Q20	4.361	4.088	-0.273
	Q21	4.129	3.517	-0.612
	Q22	4.122	3.517	-0.605

We can conclude that the perception of the services provided is below the expectations of the customers in all the points of interest of this research. Q11, “Possibility to change the delivery time after order”, where the absolute mean gap value is 0.776, followed by Q8, “Reasonable compensation for damaged package”, where the absolute mean gap value is 0.728, are the two features with the largest gaps between expectations and perceptions. On the other hand, Q7 “Delivery of all products at once” (-0.259), and Q20, “Convenient payment methods to all customers” (-0.273), correspond with the smaller gaps, meaning that in these two areas customers are quite satisfied as the received service is quite close to their expectations.

According to the results shown in Table 7, in all five dimensions of the SERVQUAL gap model, the expectations of the respondents exceed their perceptions according to the absolute values of the gaps measured. The responsiveness dimension shows the largest gap with an average value of -0.64, followed by tangibility (-0.56). From the above, the need for the services provided by online supermarkets to be improved is clear. In particular, focus shall be paid on the responsiveness dimension, while it is also important to improve specific features, such as the possibility to change the delivery time even after an order is placed or to foresee appropriate compensations in case of damaged goods received by a client.

**Table 7.** Gap analysis for each dimension.

	Mean Expectation	Mean Perception	Mean Gap
<b>Tangibility</b>	4.349	3.791	-0.558
<b>Reliability</b>	4.380	3.848	-0.532
<b>Responsiveness</b>	4.230	3.590	-0.640
<b>Assurance</b>	4.350	3.876	-0.474
<b>Empathy</b>	4.146	3.593	-0.553

## 8. Concluding Remarks

The study presented in this paper was carried out to shed light on a quite poorly researched field, as the rise of online supermarkets has occurred quite recently. To our knowledge, there are no similar studies published, so we cannot compare the results and seek temporal or geographical differentiation. Even though several supermarkets have implemented such possibilities several years back, the use of online shopping for supermarket products has been abruptly increased due to the COVID-19 pandemic. Therefore, this research examines how far Greek customers are satisfied with the services provided by the online supermarkets, as well as what they expect of such services. Results of the survey can be used by managers or administrators of supermarkets to improve the services provided to their customers. Moreover, the research instrument could be used for various B2C settings where logistics services are offered following electronic orders.

The study identified areas in which supermarkets online shops are close to meeting customer expectations and areas in which they fall far short. This is particularly true when it comes to changes in the delivery time after an order has been placed, as well as the provision of compensation for any damaged products. In general, it has been observed that expectations exceed perceptions of the provided service quality in all characteristics measured, indicating that there is room for quality improvement initiatives in all five dimensions of the SERVQUAL model.

One of the most important limitations of this study is the difficulty in reaching a larger sample. Due to the COVID-19 pandemic the survey was conducted online, and respondents were reached electronically. Another difficulty is the comprehensive understanding of the questionnaire. Despite the effort to make the questionnaire comprehensible to the general audience, there is always a risk that some questions are not adequately understood and therefore the answers do not correspond with reality. This is the main disadvantage of an online survey, as the interaction with the researcher is limited or non-existent, and therefore it is difficult to provide clarification to respondents. As the sampling method was convenience sampling, it is not feasible to estimate the participation rate of the respondents in the research.

This research was mostly focused on an overall evaluation of the online services of supermarkets in Greece. Further research can be implemented for the evaluation of services of certain firms and for comparing different firms. Another suggestion could be to evaluate the provided services in different locations (cities and countries). In general, as online supermarket shopping is one of the developing fields nowadays, we expect that further investigation in the future, covering different perspectives of their provided services, will be required. Moreover, supermarket companies will have the necessary feedback to decide whether they should maintain their omni-channel structures and in what areas they need to improve their performance to meet customers' expectations.

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## Appendix A

**Table A1.** The modified SERVQUAL questionnaire.

	5: Strongly agree	4: Agree	3: Neither agree nor disagree	2: Disagree	1: Strongly disagree
	No	E-shop features	What do you expect by an excellent e-shop:	What did you receive by a supermarket e-shop:	
Tangibility	1	Modern and easy-to-use website			
	2	Tidy distributing vehicles			
	3	Neat appearance of drivers and delivery personnel			
	4	Proper packaging for product specification			
Reliability	5	On-time delivery of the order			
	6	Employees with sincere interest to solve customers' problems			
	7	Delivery of all products at once			
	8	Reasonable compensation for damaged package			
Responsiveness	9	Accurate records of the delivery			
	10	Information provision to the customers about the exact status of the order			
	11	Possibility to change the delivery time after order			
	12	Employees' willingness to help customers			
Assurance	13	Employees' availability to respond to customers' requests			
	14	Employees' behavior which promotes customers' confidence			
	15	Website with sense of safety to perform transactions			
	16	Employees consistently courteous with customers			
Empathy	17	Knowledgeable employees to answer customers' questions			
	18	Individual attention/personalized promotions to customers			
	19	Convenient delivery time frames to all customers			
	20	Convenient payment methods to all customers			
	21	Customers' best interests at heart			
	22	Understand specific needs of the customers			

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