

E-SERVICE QUALITY ASSESSMENT ACCORDING TO HIERARCHICAL SERVICE QUALITY MODELS

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Abstract:

E-commerce is becoming more and more popular. The COVID-19 pandemic made its development even faster. Currently, an enterprise that does not provide its services via the Internet is suffering heavy losses. Online shopping is largely different from traditional purchases, so their assessment should be made on the basis of different criteria. The aim of the paper was to assess the quality of services provided by the selected e-shop, in terms of its commercial services. The first stage of the research was the analysis of the literature in terms of hierarchical models of e-service quality, which in their structure indicate the areas of assessment. This allowed for the construction of the author's hierarchical model of e-services and for making a list of attributes that were used in further research. On the example of the clothing e-shop, an analysis of the provided services was made, taking into account the opinions of its customers. The Importance Performance Analysis (IPA) was selected as the basis for conducting the survey research and analyzing its results, which facilitates the commenting of the obtained results. The research allowed to indicate the strengths and weaknesses of the examined e-shop, but also to identify areas requiring improvement in order to increase the quality of the offered services, as well as the customers satisfaction.

Key words: *e-commerce, e-service quality, service quality models, IPA*

INTRODUCTION

The key to the functioning of each enterprise is the concept of elasticity, which is mainly associated with adapting to the very dynamically changing requirements of customers and the market [1]. The elasticity not only in the case of service and e-commerce enterprises, means the possibility of adjusting the offer by taking into account the changing market, its conditions, but also the constantly changing requirements of customers who have learned that they are the most important elements in the market, that they decide what to buy and what to pay for. It is especially visible in e-commerce, where the development of technology, application possibilities, and the number of e-stores are constantly changing.

People make bigger or smaller purchases practically every day. At the beginning of the Internet, the first e-shops were created. Their offers, operations, payments, and interfaces are constantly changing, adapting to the constantly changing requirements of their customers but also to technological changes which appear. It can be seen that the competition in the e-commerce market is increasing, and the fight between e-shops is taking new forms [2]. The rapid development of e-commerce, especially in the last two years,

was caused by the COVID-19 pandemic, which caused many solutions to be implemented faster than expected. As a result, people who were locked at home could make everyday purchases, despite the closure of shops. Some people decided to continue using this purchasing channel even when the pandemic situation was partially stabilized.

In addition, it should be emphasized that in recent years, the global economy has been dominated by the development of Industry 4.0, which has revolutionized the way the industry operates in terms of technology [3]. This also applies to e-commerce, where modern technology and the development of communication channels play a very important role. The Revolution 4.0, but also the earlier stages of introducing new products and solutions to the market, allowed for the very wide development of modern computer technology and many fields of science, especially in the field of production engineering, it enabled the virtual simulation of real production processes, as well as virtual customer service [4]. The concept of Industry 4.0 is a new reality of the modern economy, as the progress in the digital transformation and growing interconnections pose new challenges for many organizations, including service and commercial enterprises. Certainly, the implementation of

this concept will have further consequences for the management and operation of enterprises [5]. This may mean further development of the possibilities of using online stores and improving their operations.

Nowadays, due to the constantly growing competition, the overriding goal of any company is to meet or even exceed the requirements of its customers, which allows building strong relationships between the company and its customers [6]. This means, foremost, offering products and services that will be considered by customers to be of good quality and that will result in the satisfaction of these customers and the fact that the next time they decide to buy products or services from the same company again. Klimecka-Tatar [7] stated that the value of the product/service depends on the activities included in the process, including the service provision process. One of the most important determinants is the estimation of the quality level of the implemented process at each stage, which is also the basis for management in accordance with the principles of TQM and in relation to the quality management standards ISO 9001:2015. One of the stages is the sales process, whether it is stationary or online sales. Of course, in both cases, the sales process will be assessed by customers differently, and the attributes that should be taken into account during customer satisfaction surveys will be different.

The emergence of e-services, as well as e-commerce, made scientists think about how to evaluate such services and what to take into account. Kowalik [8] drew attention to the development of electronic banking, which allowed for the appearance of new types of services on the e-market, the extension of payment methods, and the adaptation of services to the needs and expectations of customers who use the Internet on a daily basis. Whereas Suvittawat [9] drew particular attention to the need to develop the logistics industry in terms of the possibility of delivering products ordered online and then delivered to the customer in a traditional form.

It should also be emphasized that small and medium-sized enterprises often deal with e-commerce. They often only become intermediaries in e-commerce, linking customers with manufacturers. This type of activity is also one of the driving forces in the development of the national economy in many countries [10]. Moreover, it is the enterprises of the SME sector that dominate e-commerce and are the basis of the GDP of any national economy.

There are many examples of factors whose development is directly related to the development of e-commerce, i.e. caused the e-commerce development or the e-commerce forced its development. However, it should be remembered that the most important element of the entire e-commerce service chain is the customer. That is why it is essential to analyze his satisfaction, shopping opinions, and how he assesses the quality of services provided by a given e-shop. However, it should be remembered that such an assessment should be based on a specific set of attributes, which should be selected in such a way that the survey is not burdensome for customers, because the assessment of the quality of services is based on customer opinions, i.e.

customers take part in such a survey. On the other hand, the attributes should be selected in such a way as to obtain as much as possible and the most detailed information on the research topic.

The aim of the paper was to assess the e-shop's activity in terms of its commercial services. First the selection of the attributes should be done. In order to do this, at the beginning, the author decided to analyze selected hierarchical quality models, which in their structure indicate the areas of assessment. On the basis of such an analysis, the author created her own hierarchical model of e-services and made a list of attributes that she used in further research. On the example of an e-shop with clothes, the services provided by this entity, taking into account the opinions of customers who made purchases in them, were analyzed. The Importance Performance Analysis (IPA) was selected as the basis for conducting the survey research and analyzing its results, which facilitates the commenting of the obtained results. The research allowed to indicate the strengths and weaknesses of the examined e-shop, but also to identify areas requiring improvement in order to increase the quality of the offered services, as well as the satisfaction of customers.

LITERATURE REVIEW

The basis for assessing the quality of any service is most often questionnaire surveys based on a set of attributes (quality dimensions) that describe the assessed service. Unfortunately, the selection of attributes for assessment is not as easy as it seems. Too many attributes will make the survey too long, and thus many customers will not want to complete it. On the other hand, too few attributes may not be enough to give the right amount of information.

Most of the models of service quality are the basis for the selection of attributes. Since the end of the seventies of the twentieth century, many models that relate generally to the quality of services or to selected types of services, have emerged. Some of them have been verified, some have been modified by subsequent authors. Their aim is to help in understanding the issues of service quality assessment. In the paper, selected hierarchical models, less known, but indicating areas requiring assessment, and thus helping in the selection of attributes for the study, were taken into account. It should be remembered that those sample models, according to the author, are most helpful for shops and e-shops.

Dabholkar, Thorpe and Rentz [11] suggested and tested a service quality model to develop dimensions and structures based on the Servqual and Servperf methods. It was a response to the most famous gap model, created in 1985 by Parasuraman, Zeithaml and Berry [12]. The gap model is used in many service sectors (it has been verified from surveys on the quality of service in retail banking, credit cards, securities brokerage, product repair and maintenance sectors), but is not always suitable for certain sectors, such as retail shops.

In the new model [11], its authors proposed a hierarchical structural model of service quality based on a literature

analysis, taking into account dimensions and subdimensional levels. In the proposed model, they introduced three stages (dimensions): quality of service (quality of retail services), basic dimensions (physical aspects, reliability, personal interaction, problem solving, and enterprise policy), and sub-dimensions for three dimensions, i.e. physical appearance and comfort, promises and making correct for the reliability dimension, and inspiring confidence and helpfulness in the personal interaction dimension. To test the model and construct the validity of the model, they decided to measure and analyze customer perception in the simplest way to avoid psychometric problems with different outcomes. However, the construction of the model and the coefficients is based on a method that confirms the identification of service quality gaps.

The hierarchical model developed a new way of measuring service quality due to the strong support in the literature and the combination of several models. In later years, scientists used this model to study the development of a hierarchical model. This hierarchical model is generic and applicable to various service industries, as well as allowing and flexibly considering various factors depending on different businesses [13, 14].

Until now, this model has been the most appropriate and adequate model for measuring the service quality. However, this is a general model and requires different factors for some services. This model has the ability to take into account other dimensions and subdimensions related to a specific industry. Some researchers investigated this model and proposed a hierarchical-multi-level model specifically for the service industry based on a hierarchical-multi-level model. [15, 16], e.g. in healthcare [17] mobile healthcare, telephone subscribers, and hairdressing [14]. By using different (multi-level) and multi-dimensional stages in this model, it enables managers to identify problems at the core of service delivery and find customer needs and service weaknesses to improve consumers' perception of the service quality.

Brady and Cronin [13] proposed a new hierarchical model by comparing the previous models to each other. They adopted the concept of Dabholkar and its co-authors [11] saying that the perception of service quality is multi-level and multi-dimensional. They tried to expand the dimensions of the Servqual method by refining its dimensions to what should be credible, responsive, empathetic, certain, and tangible.

The first attempt by these researchers was to prove that customers shape perceptions of service quality based on their assessment of three basic dimensions, which are: output, interaction, and environment. The first two dimensions, i.e. the (technical) result and the (functional) interaction, were adapted from Grönroos' study [18, 19], in which the service quality was analyzed on the basis of assessments of customer performance and interactions with service employees.

Brady and Cronin [13] argue that each of the core dimensions of service quality has three sub-dimensions and that customers aggregate their sub-dimension scores to frame

their perception of the enterprise's performance base under the three core dimensions. These insights then lead to a general perception of the service quality. According to these researchers, this means that customers shape the overall perception of the service quality based on performance scores on multiple levels, and ultimately combine these scores to get an overall perception of the service quality.

Finally, the results of Brady's and Cronin's research also indicate that three of the nine sub-dimensions presented by the North American school they represented, namely reliability, responsiveness, and empathy from service providers, are important in delivering the highest quality service. They further argue that these items are sub-dimension modifiers as opposed to direct determinants. That is, they represent a way of assessing each sub-dimension (fair or not, corresponding or not, etc.), while the sub-dimensions answer the question of what should be fair, responsive, and empathetic in the service. Therefore, based on the results of this study, managers can identify weak areas by focusing on the nine sub-dimensions.

Due to the increasing popularity of e-services, a hierarchical model was also created that applies in this case. This model was developed by Blut and his colleagues [20], then verified by himself [21]. On the basis of the conducted research, the attributes that, in the authors' opinion, should be taken into account in the assessment of the e-services quality have been identified and verified. Four groups of attributes were distinguished: website design (9 attributes), filling (3), customer service (2), security/privacy (2). It is noteworthy that the developed model includes attributes not included in the previous scales. There is one very important detail to note. A lot of space in this model, and thus in the e-service quality, is devoted to the website itself. This is an element that will often affect whether the customer decides to buy something in a given e-shop. It takes into account, not only the appearance of the page itself, but also what information is included there and how to use it. This model should be treated separately, as it does not apply to traditional services, which are ordered, provided, and delivered in a traditional way. It can be said that it is a kind of complement to other models of service quality, but due to its application, it has to be treated separately.

A very simple conceptual model for e-services has been developed and validated by Sharma [22]. The first part of the model deals with the drivers of e-satisfaction in the online environment. The variables are website design, customer service, and trust. In this case, these variables act as dependent variables, and e-satisfaction acts as an independent variable. In addition, the quality of e-services influences e-satisfaction. Another variable, e-loyalty, acts as an independent variable. The author showed the connections between the various factors influencing e-customer satisfaction.

METHODOLOGY OF RESEARCH

The aim of the study was to assess the quality of services offered by the selected e-shop. The shop operates throughout Poland, has its seat in southern Poland, and its profile is

the clothing trade. It is a small family business from the SME sector. Clothes are products that are often bought over the Internet. According to the E-Commerce Report [23] on average, in 2021, a resident of Poland spent PLN 199 per month on online purchases of clothing, accessories, and add-ons, and their purchase was declared by 48% of online buyers. The authors of the report also emphasized the high dynamics of online shopping in recent years.

The first step was to define an e-service quality model that could apply to e-commerce. The hierarchical model of the e-services quality was created on the basis of literature research, which mainly included the analysis of various models of the service quality. This model has not been published yet.

According to this model, the e-services quality consists of three elements: physical aspects, provision quality, and result quality. As for the physical aspects, the convenience of purchasing is important, but so is what the website through which the customer can place an order looks like. When ordering, the customer takes into account the available offer, the possibility of personalizing the e-service, but also the completeness of information about the products offered, which can help to make a choice of products.

The customer chooses and orders the products himself, and therefore takes into account the operation of the website (e.g. availability, navigation) and its capabilities (e.g. search engine, basket, registration). In the case of online orders, the customer would like to have great options when it comes to payment methods. Some people prefer, for example, cash on delivery in the case of home delivery. The last element, which is probably the most important, is the possibility of contact with the service provider. This means that the customer knows from whom he is ordering the service, he can easily find the contact details of the service provider and, if necessary, contact him. All these elements consist of the provision quality.

The final element of the model is the result quality. This group includes the waiting time, both in terms of e-services delivered in electronic and traditional ways. In the case of the second form of delivery, the result quality will be influenced by materiality, i.e. what the customer receives. Security should not be forgotten. In the case of e-services, the importance of this factor clearly increases. This is due to the appearance of not only hackers and malware, but also the website itself, which may turn out to be a fake. The customer also wants to be sure about the delivery of the service and whether he can handle it (e.g. in the case of purchasing e-software). The last factor that affects the result quality is, as in the case of traditional products, the compliance of the e-service with the order.

This model may be very general, but it can apply to various types of online services, including e-commerce services and also e-services delivered in electronic and traditional ways. It can be expanded, and the use of its elements to assess the services quality can be the basis for the selection of attributes.

The research on the quality of the clothing e-shop services was carried out with the use of a questionnaire prepared

on the basis of the model presented above. It was assumed that each of the elements included in the model must be referred to by at least one attribute. According to the model, the attributes were divided into three groups: the physical aspects, provision quality, and result quality. The attributes are summarized in Table 1.

The analysis of the answers resulting from the research questionnaire was carried out using the assumptions of the Importance Performance Analysis (IPA) created by Martilla and James [24]. Therefore, the respondents were asked to evaluate all the attributes twice, i.e. their importance in the case of the e-shop and the service provision (performance) of online shopping [25]. A seven-point Likert scale was used.

Table 1
Classification of e-shop quality assessment attributes

No	Group	Attribute
1.	Physical aspects	The internet platform is convenient to use.
2.		The internet platform looks professional.
3.		The internet platform includes the full offer of the e-service provider.
4.		The online platform has selection of the personalization functions.
5.		The internet platform contains an exact description of the products.
6.		The online platform contains detailed product parameters.
7.		The information contained on the internet platform is up-to-date and comprehensive.
8.	Provision quality	The internet platform is very easy to use.
9.		The organization and layout of the internet platform facilitate the search for products.
10.		The internet platform contains precise contact details with the e-service provider.
11.		The internet platform is organized in an intuitive way.
12.		There is a product search engine on the internet platform.
13.		The online platform informs about the availability of products when searching.
14.		Customer service staff responds promptly to your question.
15.		The customer can choose the payment option "on delivery".
16.		The customer can choose the payment method.
17.		The transactions on this online platform are error-free.
18.	The transaction confirmation informs the customer of the total charges.	
19.	Result quality	The delivery schedule is clear.
20.		The customer may refuse to accept the shipment in the case of any non-compliance.
21.		The shipment is in accordance with the order.
22.		The ordered products are as described on the platform.
23.		The quality of the products ordered is high.
24.		The return policy on the online platform is described in detail.
25.		The online platform has a security system that protects all customer information.
26.	The company that owns the internet platform is legal.	

The results of the analysis were presented in the form of the IPA map, due to which it was possible to indicate areas requiring improvement. The IPA map is a two-dimensional model, divided into four areas according to two axes: the X axis is performance or perception (performance), while the Y axis is weight or importance. Quadrant I is labelled as "Concentrate here". Attributes that fall into this quadrant represent key areas that need to be improved with top priority – high importance and low performance. Quadrant II is labelled "Keep up good work". It is also sometimes called "the area of reasonable property needs" because of its high importance and high performance. Quadrant II does not require any serious action from the service provider, only those necessary to maintain the current level of services. Quadrant III is labelled as "Low priority – low importance and low performance". Thus, any of the attributes that fall into this quadrant are not important and pose no threat to the organizations. Quadrant IV is labelled as "Possible overkill" – low importance and high performance. It is often called "the area of quality excess". They should not be improved [26, 27].

The customers of the clothing e-shop were asked to fill in the survey after the products they ordered were delivered. This survey was compiled using a Google form and made available in electronic form. It was assumed that at least 300 clients should take part in the study. The study was conducted in June–December 2021.

RESULTS OF RESEARCH

319 respondents took part in the research (which means that a sufficient number of responses were collected). First, the respondent structure was analyzed to see who participated in the survey. Most of the respondents were women (over 70%). Most often, they were people aged 21-30 (almost 40%) and 31-40 (almost 30%). There were no people over 61 years old among the respondents, and people aged 51-60 years accounted for less than 1% of all respondents. The respondents were mostly working people and pupils/students (both groups-nearly 40%), and entrepreneurs (almost 20%). Most of the respondents were people with higher education (almost 40%) or secondary education (over 35%). In addition, almost 20% were people with vocational education. When it comes to residence, the respondents' responses varied considerably. They most often indicated cities with 201 to 400k residents (almost 25%), cities with 101 to 200k residents (over 20%) and cities with over 300k residents (almost 20%). In the case of this feature, indications were recorded for all selection options (at least 5% each). It can be concluded that the structure of the respondents was dictated by the activity profile of the surveyed e-shop (clothing e-shop). The first stage of the analysis of the respondents' responses was the assessment of the reliability of the collected responses using the Cronbach Alpha test (Table 2). This analysis was performed for the importance and performance groups separately. The results of the research were commented on, taking into account the interpretative assumptions presented by Hair et al. [28].

According to the assumptions, data for which the Cronbach Alpha test was at least 0.7 should be considered reliable. In both cases, the result was above 0.7, which means that all the obtained dimensions can be subjected to further analysis. The table also includes the average values of the grades and standard deviations. It can be seen that the average importance of the attributes was much higher than the average performance. Moreover, in the case of importance, a smaller standard deviation was observed, which means that the respondents were unanimous about the assessments given to the attributes in this group.

Table 2
Cronbach Alpha and statistical analysis

	Cronbach Alpha	No of items	Mean	Standard deviation
Importance	0.819	26	5.876	0.773
Performance	0.784	26	4.786	1.112

First, the average importance and performance values for individual attributes were calculated (Fig. 1).

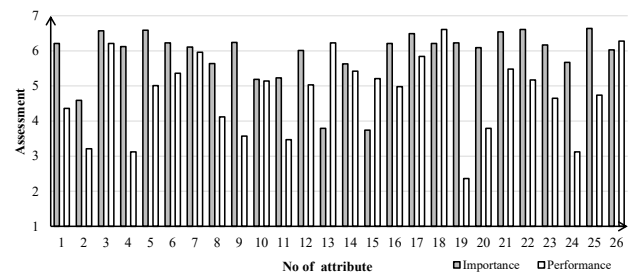


Fig. 1 Average Importance and Performance for the clothing e-shop

When it comes to importance, customers assessed the result quality the highest (6.25), then the physical aspects (6.06), and then the provision quality (5.50). This means that the attributes associated with result quality are the most important for the customer. When it comes to performance, customers assessed the provision quality the highest (5.06). Physical aspects got a 4.75 and the result quality was a 4.45.

One can also observe a large variation in the average assessments for individual attributes. When it comes to importance, many attributes were rated above 6, but it can be noticed that not all attributes are so important to customers, e.g. two attributes were rated below 4 (13 and 15) on average, with attribute 2 below 5.

Greater deviation can be observed in the case of average performance assessment. Attributes 3, 13, 18, and 26 were assessed above 6. But there were also attributes that were assessed very low, below 3 attribute 19, and below 4 attributes 2, 4, 9, 11, 20, and 24. It can be expected that these will be attributes that require improvement, as can probably be confirmed by the IPA map.

An important part of the analysis was to calculate the difference between performance, i.e. the assessment of the service provided, and importance of the individual attributes (Fig. 2), although it is not a typical stage of IPA analysis.

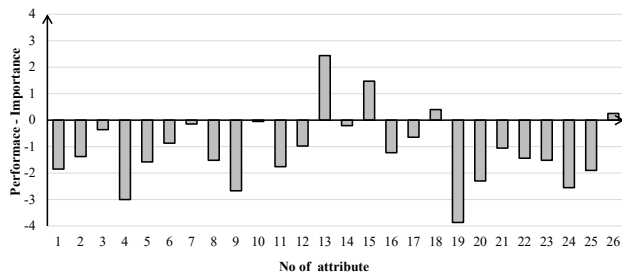


Fig. 2 Difference between Performance and Importance for the clothing e-shop

The average difference for all attributes in total amounted to -1.09, which means that customers were generally rather dissatisfied with purchases in the research e-shop. The worst situation was noted for the attributes related to the result quality (-1.80), then those related to the physical aspects (-1.31), while the attributes from the group of provision quality in comparison with the other groups caused slight dissatisfaction (-0.43). Only in the case of four attributes this difference was positive (13, 15, 18, 26), additionally in the case of attributes 7, 10, 14 it was negative, but the value was very close to 0. For the attribute 19 the difference was much below -3, for the attribute 4 exactly -3, and for attributes 9, 20 and 24 below -2. These are the attributes that cause the greatest customer dissatisfaction.

DISCUSSION

The most important stage of the Importance Performance analysis is the construction of the IPA map for the results obtained in the research (Fig. 3). This map helped to indicate the strengths and weaknesses of the services offered by the chosen e-shop. When analyzing the map, it can be observed that in quadrant III, no points have been recorded, and in quadrant II, the most customer indications are found. At the same time, Quadrant II, which stands for "Keep up good work", is an area where points are important to customers, but are also highly assessed by them. This is the area that indicates the strengths of the services offered by the chosen e-shop, although point 8 (The internet platform is very easy to use) is very close to quadrant I, which indicates that the research company must be careful and perhaps introduce some features of the online platform that will make it easier to use.

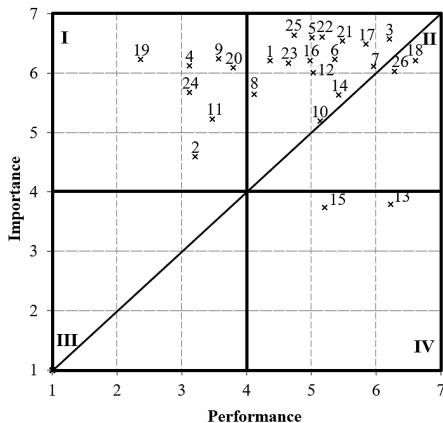


Fig. 3 IPA map for the clothing e-shop

It is worth emphasizing that, despite the fact that the difference between performance and importance demonstrated earlier was often negative, it may result not from the low quality of the services offered, but from the high expectations of customers. It should be remembered that quadrant I means "Concentrate Here", so the area that requires improvement, i.e., the weaknesses of the research e-shop. The points included in it are attributes that are important to customers, but were not assessed too highly by them for the service provided. Customers were not satisfied with the functioning of the e-shop as far as the attributes in this area are concerned. These are points 2 (The internet platform looks professional), 4 (The online platform has selection of the personalization functions), 9 (The organization and layout of the internet platform facilitate the search for products), 11 (The internet platform is organized in an intuitive way), 19 (The delivery schedule is clear), 20 (The customer may refuse to accept the shipment in the case of any non-compliance), 24 (The return policy on the online platform is described in detail). When it comes to the attributes related to the appearance and operation of the website (2, 3, 9, 11), it should be emphasized that the research e-shop is a small family business run on its own by individual family members. The website was created by one of the family members to reduce the operating costs of the enterprise. Perhaps the e-shop should, however, invest in a better website or ask someone to help improve the existing one. Delivery schedule (19) and return policy (24) partially relate to the functioning of the internet platform itself, but also to what information its owners want to share with their customers. It should be emphasized that this is important information for the customer. The customer often takes into account how quickly the parcel will be delivered, but also wants to know if and how he can return the ordered goods in the case of any problems. In addition, the fact that the customer may refuse to accept the shipment in the case of any non-compliance (20) results from legal regulations. A customer shopping online has increased rights. He has a specified time to check the product and send it back to the e-shop where it was purchased. He also has the right to refuse to accept the goods if he believes that he detects any damage. He has the right to open the parcel before its acceptance in the presence of the courier or at the point where he picks up the parcel. Therefore, the e-shop must complete this information on its online platform and ensure that the legal regulations related to e-commerce are respected. Perhaps the problem with the refusal to accept the parcel is not the fault of the e-shop itself, but the shipping company or the place of collection. However, such a situation has a negative impact on customer satisfaction, and thus on their opinion on the functioning of the e-shop.

CONCLUSIONS

Understanding customer requirements and assessing their satisfaction with the enterprise's products is the key to success. This is especially important for various types of

services, including e-commerce services. It is the customer who determines the requirements he has for the ordered goods, how important these requirements are to him, and also assesses the course of the purchase. In the case of e-commerce, where customers do not have direct contact with employees, they pay attention to many details related to the functioning of the e-shop's website, the entire purchase process, including the selection of products, payment methods, or delivery methods, and also that they get what they ordered. Their requirements are completely different than in the case of the traditional trade.

In the paper, the quality of services offered by a chosen clothing e-shop was analyzed. The creation of a hierarchical model of e-services on the basis of previous literature research helped in the selection of the attributes needed for survey research. On the other hand, the survey itself, conducted among the customers of the chosen e-shop, allowed to indicate its strengths and weaknesses, and, as a consequence, to identify areas that require improvement.

The research is not free from limitations. It should be emphasized that the proposed model was created on the basis of literature research and the author's experience with the research topic. Certainly, it was not possible to find all the models existing in the literature, and additionally, the limitations were mainly to hierarchical models. For the same reason, the selection of attributes is not free from subjectivity. Perhaps some attributes should be removed, and others added. The structure of respondents also deserves special attention. It is related to the activity profile of the examined e-shop.

The author plans further research in this direction in order to be able to verify or modify the proposed model. It is noteworthy that the current form of the model is very universal and applies to various types of services that can be ordered via the Internet.

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