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RESEARCH ARTICLE • FORSCHUNGSARTIKEL • ARAŞTIRMA MAKALESİ

THE ROLE OF VIRTUAL TRY-ON TECHNOLOGY IN ONLINE PURCHASING DECISION

SANAL PROVA TEKNOLOJİSİNİN ÇEVRİMİÇİ SATIN ALMA KARARINDAKİ ROLÜ

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Abstract

Today, with the intensive use of internet technologies, the concept of e-commerce became a focused channel to understand the customer behavior and purchasing processes for different product categories. Several methods are used to enable users to conclude their surf with the purchase and up-to-date technologies are contributed to positively nudging their purchasing tendencies. In this study, the impact of one of these technologies, virtual try-on (VTO), in terms of the customer experience was investigated. According to the results, the desire to use this technology again has been determined and it has also been seen that VTO technology had increased users' purchase intention. Plus, two different user groups with different characteristics were identified according to their perceptions towards VTO technology. It is recommended that firms offering this technology seek to differentiate ways in their promotion and communication with designated groups.

Keywords: Virtual Try-On, Digital interaction, E-commerce, Segmentation
JEL Classification: O14, O33, L81, C38

Öz

Günümüzde internet teknolojilerinin yoğun kullanımı ile birlikte e-ticaret kavramı, farklı ürün kategorileri için müşteri davranışlarını ve satın alma süreçlerini anlamaya odaklı bir kanal haline gelmiştir. Kullanıcıların çevrimiçi satış sitesi ziyaretlerini satın alma ile tamamlamaları için çeşitli yöntemler kullanılmakta ve güncel teknolojilerle, satın alma eğilimlerinin olumlu yönde etkilenmesine katkıda bulunulmaktadır. Bu çalışmada, bu teknolojilerden biri olan sanal prova teknolojisinin müşteri deneyimi açısından etkisi

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araştırılmıştır. Elde edilen sonuçlara göre bu teknolojiyi tekrar kullanma isteği belirlenmiş ve ayrıca sanal prova teknolojisinin kullanıcıların satın alma niyetini arttırdığı görülmüştür. Ayrıca sanal prova teknolojisine yönelik algılarına göre, farklı özelliklere sahip iki farklı kullanıcı grubu belirlenmiştir. Bu teknolojiyi sunan firmaların, belirlenen gruplarla tanıtım ve iletişimlerinde farklılaştırma yollarını araması önerilmektedir.
Anahtar Kelimeler: Sanal Prova, Dijital etkileşim, E-ticaret, Segmentasyon
JEL Sınıflandırılması: O14, O33, L81, C38

1. Introduction

The history of the concept of commerce is as old as the existence of humanity in the world, and e-commerce is a tool that brings buyers and sellers together by using the Internet. The concept of e-commerce expands day by day with the developments occurring in today's digital world, and different approaches are available in understanding online purchasing behavior. Each perspective defines different attributes such as cultural, economic, psychological, personal, and technological, which may have an influence on purchase intention positively or negatively.

Today, COVID-19 has been the most important factor causing the rapid growth of the e-commerce sector. With this situation affecting worldwide, many companies have switched to a forced work-from-home model, and many people have tried not to leave the house unless it is mandatory. In many countries, curfews have been imposed especially in the early stages of the epidemic. Therefore, the transition from the real world to the digital world has gained even more momentum.

E-commerce is one of the most effective areas of internet technologies that come into our lives with the pandemic process and has created a space for people who want to shop at home and abroad (Renjini and Joseph, 2020). However, the online shopping experience is limited for products that have more experience of purchasing products by trying cosmetics and accessories.

According to e-commerce statistics of the ministry of commerce, Turkey's E-commerce volume in 2020 is 64% higher than e-commerce volume in 2019. In addition, the volume of e-commerce in the clothing, accessories and cosmetics sector increased by 45% in 2020 compared to 2019. When the airlines and travel sectors are excluded, the sector with the highest sales rate comes across as clothing, footwear, and accessories (Ministry of Commerce, 2021). When e-commerce statistics are examined worldwide, the most popular category is fashion and it covers nearly a quarter of the total market (Oberlo, 2021). These statistics once again emphasize the importance of the sector.

Two major problems with online sales, especially from the fashion industry, are the high return rate and the consumer's hesitation to buy the product. Previous research showed that they are reluctant to buy the product because they cannot try it to evaluate their online customer style (Protopsaltou et al., 2002). When it comes to accessories, the situation is even more serious.

Over the past decade, interest in trialing 3D products has increased worldwide. For this reason, it has been treated as an effective aspect of the customer experience. Virtual try-on (VTO) applications have become popular in recent years to allow users to see them trying different products without having

to physically try the product. This app helps the user quickly decide whether to like the product, allowing retail stores to sell more in less time. To this end, retail stores that provide e-commerce use of VTO applications to minimize product return rates (Divivier, Trieb and Ebert, 2004; Hauswiesner, Straka and Reitmayr, 2013).

Technologies aimed to improve consumers' shopping experiences also help transform the way people shop for fashionable products. As a result, several methods have been proposed to solve the VTO problem. These methods are generally divided into two categories: methods based on 3D modeling (Guan et al., 2012; Sekine et al,2014; Yang et al., 2016; Chen et al., 2016; Pons – Moll et al., 2017) and 2D images (Jetchev and Bergmann, 2017; Raj et al., 2018; Han et al., 2018; Wang et al., 2018).

The study by Hwangbo et al. (2020) found that the average sales per customer increased by USD 13 after the sales experience using this technology. The most important finding of the study was that the product selections with the wrong body selection decreased by 27%. It has been suggested that virtual trials can replace physical trial rooms.

In their study, Zhang, Wang, Cao, and Wang (2017) applied a web-based survey approach to collect data from online clothing retailing websites. The study also highlighted that VTO technology plays an important role in user experiences, attitudes towards this technology, and purchasing decisions. The study was analyzed through customers' online purchase of a garment and the data obtained was analyzed using the smallest pooled squares technique.

The study by Zhang, Cao and Wang (2018) emphasized that users' adoption of virtual trial technologies will provide significant convenience in retailing. They also pointed out that the purchasing decisions of online shoppers should be addressed in terms of perceived usefulness, perceived pleasure, perceived socialization, and perceived product risk.

In this study, the effect of an interface that emerges because of the development of real-time and 3D facial recognition technologies, allowing us to try and buy sunglasses, on the purchasing behavior of the consumer is emphasized. Especially during the pandemic, many innovations in the online shopping experience have had a closer impact on our lives. However, it is thought that the use of this technology will have a positive effect on user purchasing behaviors, especially for websites that sell accessory products in Turkey today.

In the following section, information will be given about the data collection method followed in the study and then the research design. In the third part, the results of the research will be detailed, and in the last part, discussions, and suggestions will be provided.

2. Methodology

In this section, the elements covering the research methodology will be explained in detail.

2.1. Data Collection

The data were collected by online survey method. Participants who are online shoppers, aged 18-50 participated in the study on a voluntary basis. 56% of the participants were women and 44% were men. 32% of respondents stated that they were married and 68% said they were single. 52% of the participants were in the 18-25 age group and approximately 60% of them have a bachelor's degree.

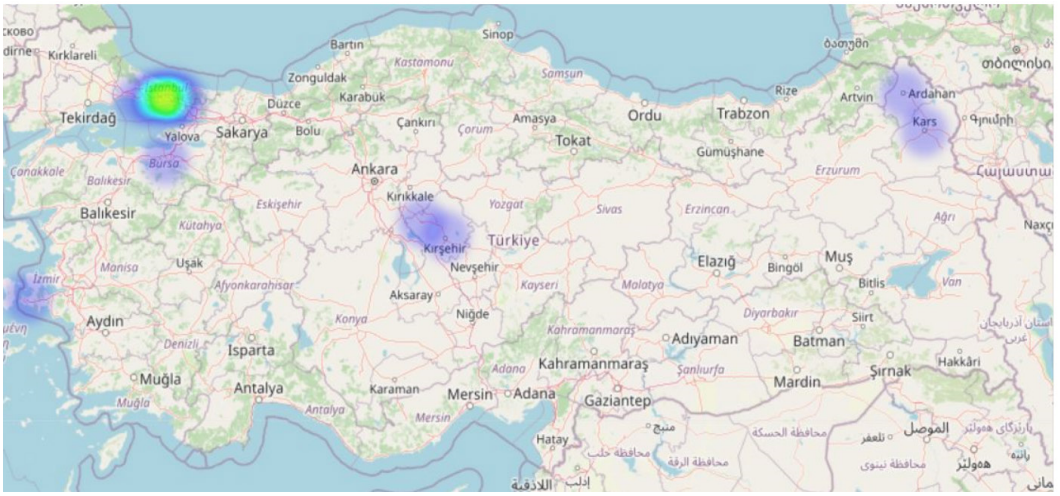

Figure 1: Location Distribution of the Respondents

According to the heat map created with the location information collected from the users, it was determined that the majority of users were located in Istanbul (see Figure 1). The group of participants with the aforementioned demographics was asked questions to measure the impact of an interface that resulted from the development of real-time and 3D facial recognition technologies and enabled us to buy by trying sunglasses on the consumer's purchasing behavior, and the responses tried to understand the participants' perspective on VTO technology and their purchasing perceptions.

2.2. Study Design

A link to www.jeeliz.com's website has been sent to respondents for glasses models. After the interaction, users' thoughts about the product and this method of interaction were obtained through the questionnaire that was communicated to them. With the survey, basic demographics like gender, age, education level, marital status of the participants were questioned. Plus, questions regarding the frequency of use of internet-web services, frequency of use of e-commerce sites, preferred searching channels for a new product, shopping experience from an overseas e-commerce site, Amazon.com membership status, intentions about ease of use, design, and content of the website, evaluations on the simplicity of the website's interface and revisiting intention were asked.

In addition, participants were asked about the availability of existing technology to gauge their views on VTO. Their experience in the use of VTO and their practice towards the directions to amazon.com to purchase were also investigated. In the questionnaire, the ease of use scale developed by Nysveen, Pederson and Helge (2005) and the system usability scale carried out by Brooke (1986) were used.

To understand how users' purchasing trends vary the aforementioned interaction model was used. Participants have not been given any training on the technology and have experienced VTO technology on the website via their computers or smartphones. Although the website, which has different interfaces in terms of interaction tools (laptop, phone, etc.), brings a different effect on users, it is assumed that the effect of the interaction tool is relatively small compared to the effect of the technology itself. During the test, the user obtained different views of different glasses from different angles on his/her face. It is assumed that the variety of products is sufficient on the website.

3. Findings

When the average age of the participants is taken into account, it can be seen that there is an audience that can be considered as young adults. It can be concluded that their ability to use technology will also be reasonable. It was observed that 44.64% of the participants used e-commerce sites several days a month, 35.71% used them several days a week, 10.1% used them every day and 8.93% used them several times a year. Based on the above data, it can be said that the participants largely used computers and/or smart mobile devices and made purchases with these devices on the web. It is seen that 60.71% of users make this product through search engines when they need to buy a new product, and 39.29% do it directly from the relevant e-commerce site. Considering that all users responded, it can be understood that the participants shopped online at least once. In order to get a level of more detailed data, participants' tendency to shop on an overseas e-commerce site was questioned, 57.14% of the purchases were made from an overseas e-commerce site. Based on the descriptive figures given below, it is understood that participants are mainly prone to purchases with computers and derivatives, and they actually carry out such purchasing behaviors. Participants were asked for their opinions on VTO technology in accordance with the purpose of the study and the effect of VTO technology on the online purchasing process was evaluated. 53.57% of users stated that the website using VTO technology is very easy to use and 35.71% indicated that it is easy. An 8.93% group of participants remained undecided. Remarkably, only 1.79% of respondents stated that the use of this technology was difficult, a rate that could be ignored compared to the remaining group of participants.

When it is asked to evaluate technology in terms of aesthetics of design, a group of 46.43% declared that the technology is aesthetic, a group of 33.93% was answered as "very aesthetic" and 16.07% was undecided. Again, the proportion of those who were evaluated negatively remained below 4%. As a result of the questions asked to the participants in this direction, similar results were obtained and it was concluded that the participants found VTO technology useful and useful outside of traditional.

The answers to questions asked to assess the impact of VTO technology on purchasing behaviors of this group of participants are concluded to have high online purchasing trends.

50% of respondents answered absolutely yes and 26.79% answered yes to the question of buying the product through this site, providing a positive return of over 75%. 12.5% of the participants were undecided and the remaining 10.71% returned negatively. In light of the descriptive results, 42.86% of respondents definitely wanted to use the technology again, and 30.36% stated that they wanted to use the technology again. 19.64% of participants were undecided and less than 8% returned negatively. When the shared data were examined together, it was observed that participants' tendency to buy using VTO technology increased and their desire to buy again using this technology was formed.

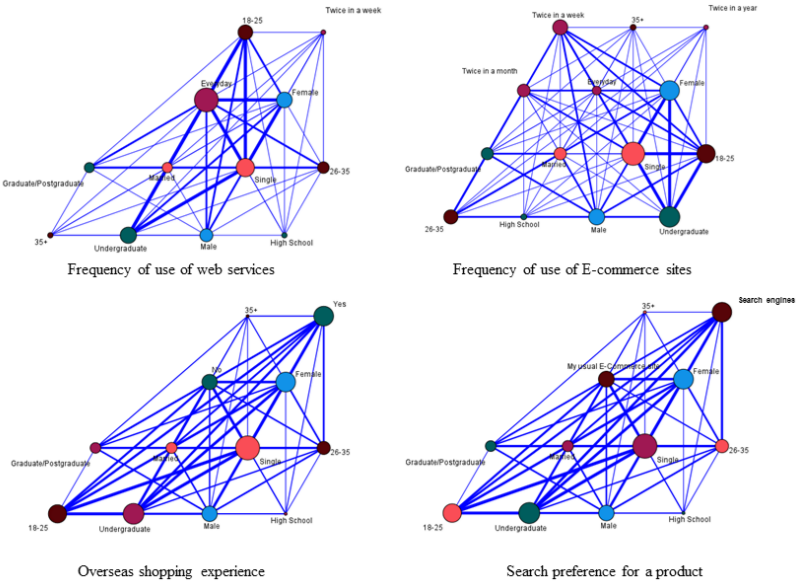

Figure 2: Relationship Maps: According To Demographics and the Usage of Different Web Services

Aiming to have a relevant comparison among different customer profiles, mean of ease of use scale responses evaluated as the "Easy use of web services". On the other hand, factor analysis has performed for the VTO system usability scale and two factors, with a 57% variance explanation rate, were generated. One of them indicated that the system is easy to use, and the other one vice versa. The average of respondents' ratings referred to attributes that were covered in the first "Easy to use" factor accepted as the variable of "Easy use of VTO", and the same was done for the other factor to indicate "Hard use of VTO". Having these three variables as indicators, different patterns in customer groups were investigated. In Figure 2, relationship maps according to the respondents' demographics are illustrated. These relationship patterns showed us, there should be more than one customer type in terms of purchasing behavior.

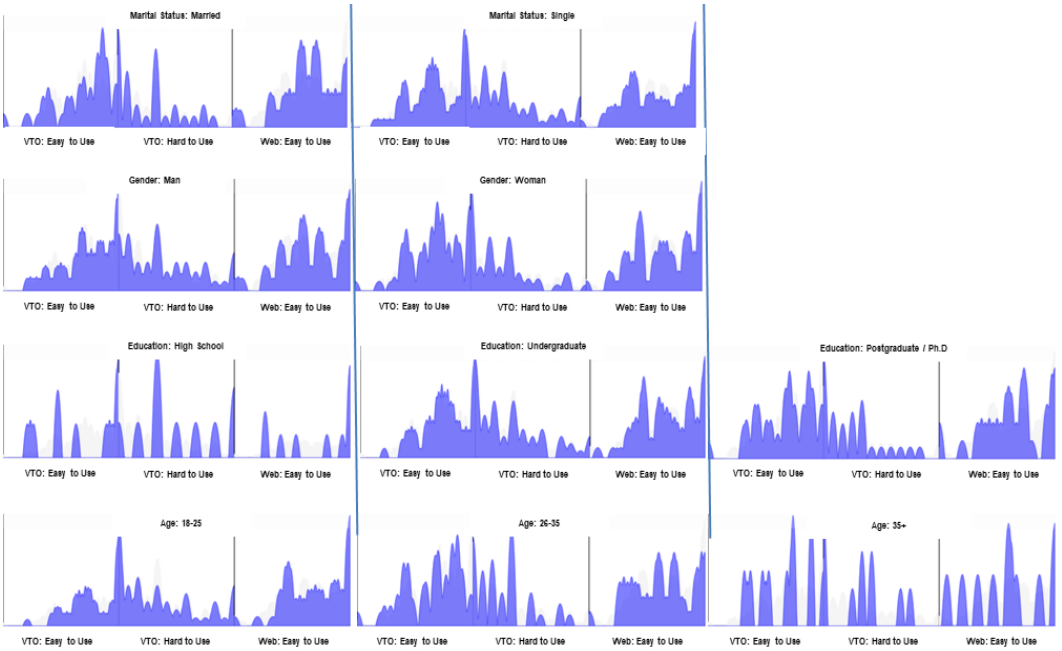

Figure 3: Distribution Maps: According to Demographics and the Perceptions of the Use of VTO & Web Services

An additional investigation with distribution maps (see Figure 3) pursued to figure out the perception according to the usage of VTO technology was realized. Plus, there were statistically significant differences according to different age groups, genders, and educational levels in terms of the evaluations regarding the usage of VTO technology (see Table 1). Men with low education levels found VTO technology hard to use while youngsters (aged 18-25) found it easy to use compared to older ones.

Table 1: Mean Values of Respondents Evaluations

Demographics		VTO: Easy to use	VTO: Hard to use	Web: Easiness of use
Gender	Male	4.16	2.59*	4.16
	Female	4.04	1.96	4.18
Age	18-25	4.28*	2.40	4.27
	26-35	3.88	2.01	4.09
	35+	3.93	2.27	3.95
Education Level	High School	4.02	3.06*	4.30
	Undergraduate	4.17	2.26	4.19
	Postgraduate	3.96	1.94	4.09
Marital Status	Married	4.03	2.04	4.14
	Single	4.12	2.33	4.19

*: $p<0.05$ according to Tukey test.

In the light of preliminary results, a two-step cluster analysis was performed with the 13 inputs such as demographics, perceptions regarding the use of VTO, frequency of the usage of web services. With the help of the method, two clusters formed with a 1619.9 BIC. 57% of the respondents are in Cluster 1 and the rest is in Cluster 2. When the centroids of two clusters (see Table 2) were investigated, customers in Cluster 1 could be accepted as more "tech-savvy" compared to Cluster 2.

Table 2: Cluster Centroids

Cluster	VTO: Easy to use		VTO: Hard to use		Web: Easiness of use	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
1	4.2	0.67	2.43	1.31	4.23	0.62
2	3.95	0.76	1.99	0.93	4.09	0.7
Combined	4.09	0.72	2.24	1.18	4.17	0.66

When we look at the profiles of the user clusters, it is seen that the first group that we call "tech-savvy", consists mostly of young adults and single women, and their average education level is at the undergraduate level. These are frequent users of web services and more frequent visitors of the e-commerce sites. The second cluster consists of individuals whose education level and age (26+) are higher than the first cluster and more of them are married. It was observed that there was no dominant gender in this group. Again, unlike the other group, the members of the second group prefer standard search engines more when searching for a certain product on the internet. In addition, it has been observed that individuals in this group have more overseas shopping experience.

Table 3: Cluster Profiles

		Between Clusters Comparison		Within Cluster Comparison	
		Cluster 1	Cluster 2	Cluster 1	Cluster 2
Gender	Men	▲ 52%	▼ 48%	40%	49%
	Women	▲ 61%	▼ 39%	60%	51%
Marital Status	Married	▼ 0%	▲ 100%	0%	74%
	Single	▲ 84%	▼ 16%	100%	26%
Education Level	High School	▲ 100%	▼ 0%	18%	0%
	Undergraduate	▲ 80%	▼ 20%	82%	28%
	Graduate/ Ph.D	▼ 0%	▲ 100%	0%	72%
Age	18-25	▲ 96%	▼ 4%	88%	5%
	26-35	▼ 18%	▲ 82%	12%	72%
	35+	▼ 0%	▲ 100%	0%	23%
Frequency of use of web services (including mobile)	Everyday	▲ 55%	▼ 45%	89%	98%
	Twice in a week	▲ 86%	▼ 14%	11%	2%
Frequency of use of e-commerce websites	Everyday	▲ 85%	▼ 15%	30%	7%
	Twice in a week	▲ 61%	▼ 39%	44%	37%
	Twice in a month	▼ 42%	▲ 58%	25%	44%
	Twice in a year	▼ 17%	▲ 83%	2%	12%
Search preference for a product	Search Engines	▲ 51%	▼ 49%	49%	63%
	My usual E-Commerce site	▲ 64%	▼ 36%	51%	37%
Overseas shopping experience	Yes	▼ 48%	▲ 52%	47%	67%
	No	▲ 68%	▼ 32%	53%	33%

4. Discussion and Conclusions

Our study highlights the impact of an interface on consumer purchasing behavior, which is the result of the development of real-time and 3D facial recognition technologies and enables the purchase of sunglasses using VTO technology. Especially during the pandemic, many innovations in the online shopping experience have had a closer impact on our lives. However, it is thought that the use of this technology will have a positive effect on purchasing behaviors, especially for websites that sell accessory products in Turkey today.

Data were obtained by survey method through a randomly determined group of users in order to evaluate the effect of VTO technology on purchasing behaviors. When the survey results were examined, it was concluded that the participants had a high tendency to buy online.

50% of respondents answered absolutely yes and 26.79% answered yes to the question of purchasing the product through the shared VTO technology integrated website, providing a positive return of over 75%. 12.5% of the participants were undecided and the remaining 10.71% returned negatively. 42.86% of respondents definitely wanted to use the technology again, and 30.36% stated that they wanted to use the technology again. 19.64% of participants were undecided and less than 8% returned negatively. When the data were examined together, it was observed that participants' tendency to buy using VTO technology increased and their desire to buy again using this technology was formed.

Looking at the results of the segmentation analysis made within the scope of the research, it was seen that two different profiles were formed both in terms of various demographic characteristics and the differences were in the use of web services. It was observed that consumers in the first (Cluster 1) of these two groups found both web services and VTO technology easier to use. Although, in general, the participants of the research draw an intense e-commerce user profile, it can be recommended to use different communication ways for these two identified groups. The second group (Cluster 2) found VTO difficult to use whereas it consists of people with a higher education level and age and, as expected, a higher income group. However, with the right communication, it could be possible to adapt this group to the technology in question, and the purchasing behavior would change accordingly. It is recommended that companies that offer VTO technology, especially in e-commerce sites, should identify such individuals and take different actions.

In future studies, it can be recommended to evaluate the profiles and perceptions of wider and different customer groups by designing experiments on different e-commerce sites that offer this technology.

Yazar Katkısı

CONTRIBUTION RATE	EXPLANATION	CONTRIBUTORS
Idea or Notion	Form the research idea or hypothesis	Hülya BAŞEĞMEZ
Literature Review	Review the literature required for the study	Hülya BAŞEĞMEZ Tutku TUNCALI YAMAN
Research Design	Designing method, scale, and pattern for the study	Hülya BAŞEĞMEZ
Data Collection and Processing	Collecting, organizing, and reporting data	Hülya BAŞEĞMEZ Tutku TUNCALI YAMAN
Discussion and Interpretation	Taking responsibility in evaluating and finalizing the findings	Hülya BAŞEĞMEZ Tutku TUNCALI YAMAN

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Çalışmada yazarlar arasında çıkar çatışması yoktur.

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Kaynakça

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