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# ANALYSIS OF THE IMPACT OF DEMOGRAPHIC AND BEHAVIORAL VARIABLES ON ONLINE SHOPPING BEHAVIOR: ESTIMATION USING THE MAXIMUM LIKELIHOOD METHOD

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**Purpose:** The aim of the article is to analyze the impact of demographic and behavioral variables on online purchasing behavior. The study also aims to estimate these impacts using the maximum likelihood method.
**Design/methodology/approach**: To achieve the research objectives and verify the hypotheses, primary research was conducted using a survey method. In June 2021, online questionnaires were distributed. The CAWI (Computer Assisted Web Interviewing) technique standards were applied during the study.
**Findings:** (mandatory) The most important factors influencing online purchasing decisions are price and product quality. Other factors, such as user interface or delivery speed, have a significantly lesser impact. The demographic variable with the greatest impact is gender, while the variable with the least impact is the field of study.
**Research limitations/implications**: One of the limitations of the study is its temporal and geographical scope. Further research in this area is recommended to include various demographic groups and markets.
**Practical implications:** The study has significant implications for marketing practice. Knowledge about the impact of demographic and behavioral factors on purchasing decisions can help companies target appropriate market segments and effectively adjust their sales strategies.
**Social implications:** The study may influence social attitudes by showing that ecological awareness is still not the main motivation for the majority of consumers in the context of online shopping. This could also affect corporate policies in the context of corporate social responsibility.
**Originality/value:** The value of this article lies in filling the existing gap in research on the impact of demographic and behavioral variables on online purchasing behavior. The article is addressed to researchers in the fields of marketing, behavioral economics, and entrepreneurs interested in better understanding their customers.

**Keywords:** Purchasing Behavior, Demographic Analysis, Maximum Likelihood Method, Econometrics, Online Marketing.

**Category of the paper:** research paper.

# 1. Introduction

In the era of growing popularity of online shopping, understanding the mechanisms guiding consumer decisions is becoming increasingly important. The aim of this article is to analyze the impact of demographic and behavioral variables on online purchasing behavior. Using the maximum likelihood method, key decision-making aspects such as price, product quality, delivery speed, and many others were estimated.

During the study, demographic variables such as age, gender, place of residence, and financial situation were considered. These were juxtaposed with behavioral factors, including price and product quality, to understand how these elements interact in the purchasing process. The ultimate goal is not only to identify the most important motivators for online shopping but also to understand how different segments of the population differ in their preferences and purchasing behaviors.

These findings have the potential not only to deepen academic understanding of consumer behavior online but also to provide practical guidance for entrepreneurs and marketers. This knowledge can be used to target specific market segments, optimize marketing and sales strategies, and build long-term relationships with customers.

# 2. Literature Review

## 2.1. History and Evolution of Online Shopping

Online shopping has become one of the most important aspects of the modern economy. The origins of this phenomenon date back to the 1990s when the internet began to become increasingly accessible. The first shopping platforms were simple and had limited functions, but over the years they have become increasingly sophisticated. In the initial phase, online shopping was treated as a novelty and did not enjoy much consumer trust. However, this changed with the advent of trusted payment platforms and mechanisms to secure transactions. As broadband internet access became more widespread, online shopping grew increasingly popular (Online Shopping, 2014).

The development of online shopping has had a significant impact on traditional retail. Many brick-and-mortar stores began to introduce online shopping options, and some have completely transitioned to the online sphere (Fihartini, Helmi, Hassan, Oesman, 2021). The introduction of technologies such as "click and collect" has allowed for the merging of online and offline shopping experiences (Clausen, 2018). In recent years, online shopping has become increasingly personalized. Through data analysis and algorithms, online stores can offer personalized recommendations and deals. Additionally, the development of mobile technology has made online shopping increasingly accessible and convenient (Lokesh, 2020).

As online shopping grows in popularity, security issues have become increasingly important. Research indicates that consumers are becoming more aware of cybersecurity threats and are looking for stores that offer advanced security mechanisms (Amer et al., 2014).

### 2.2. Online Consumer Decision-Making Mechanisms

Consumer decision-making mechanisms online are complex and diverse, affecting the way people make purchasing decisions in the digital environment. In an era of increasing online transactions and access to a wide range of information, understanding these mechanisms becomes essential for entrepreneurs, marketers, and researchers (Online shopping behavior of Chinese and Japanese consumers, 2018). In the online environment, consumers are exposed to various stimuli, such as reviews from other users, algorithmic recommendations, or elements of the user interface, which can influence their final choice of product or service (Ringbeck, Seeberger, Huchzermeier, 2019). Additionally, the availability of various communication channels, such as social media or online forums, allows consumers to exchange opinions and experiences, which also affects their purchasing decisions (Cambridge University Press, 2013; Routledge, 2020; IGI Global, 2023).

Purchasing behavior in the digital environment is also shaped by various aspects related to the design of internet systems and legal-social interactions (Dingee, 2019; Winer, 2018; Rozenkowska, 2023). For example, the way websites are designed can influence how consumers make purchasing decisions (Jones, 2011). Elements such as page layout, color scheme, or the availability of filtering options can affect consumers' final choices (IGI Global, 2011a).

Moreover, in the online environment, there is also the phenomenon of consumer complaints, which can affect a brand's reputation and its products. Consumers are more inclined to share negative experiences online, which can influence the decisions of other potential customers (IGI Global, 2011b).

It's also worth noting that consumer decision-making processes online are often framed by various conceptual models that take into account both psychological and technological factors. For example, models like "e-Search" propose frameworks for understanding how consumers use various sources of information in the decision-making process (IGI Global, 2011c).

### 2.3. Factors Influencing Online Customer Loyalty

Customer loyalty online is a key factor for the success of many companies operating online. Understanding the factors that influence customer loyalty can help businesses increase customer retention and lifetime value. The quality of online services, such as page loading speed, ease of navigation, and customer service quality, can significantly impact the level of customer loyalty (Pratminingsih, Lipuringtyas, Rimenta, 2013). Trust in the brand or online store is also a key factor affecting customer purchasing decisions. Transaction security, privacy protection, and the authenticity of other customers' reviews can influence the level of customer trust. Additionally, personalizing offers and communications to individual customer needs and preferences can increase their engagement and loyalty to the brand (Wang, 2011).

It's worth noting additional aspects that can influence the relationship between consumers and brands in the online environment (Wang, Lei, 2017; Factors Influencing…, 2023; Yoo, Kim, 2018). For example, loyalty programs offering various rewards and benefits can be an effective tool in increasing customer loyalty (Zhao, 2022). Moreover, transparency in communication and company actions, such as clear and fair return policies, can also impact the level of trust and loyalty among consumers (Sherman, 2011). The role of social media, which is becoming an increasingly important communication channel between brands and consumers, should not be overlooked (Hong, Lee, 2011). These interactions can both positively and negatively affect the perception of the brand and its products or services (Nacif, 2012).

Factors affecting customer loyalty online are diverse and complex, encompassing both technical and psychological aspects. One of the key elements affecting customer loyalty is shopping satisfaction, often shaped by the opinions of other consumers available online (Hendrayati, Atrisia, 2018). Research shows that consumer reviews and online ratings have a significant impact on customer satisfaction and their intent to return to a particular online store (Camilleri, Filieri, 2023).

Another important factor is the mechanisms of group purchases online, which can affect customer loyalty by offering attractive discounts and promotions. In this context, both price and social aspects of shopping, such as recommendations from friends, play an important role (Wu, Zhang, 2014).

In the educational context, student loyalty to online programs is also significant (Hsu, Chang, Chen, 2011; Kim, Hyun, 2007; Kim, 2021). Research in this area suggests that student retention in online programs is related to various factors (Male Consumers…, 2020), such as the quality of educational materials, interactions with instructors and other students, and access to technical support (International Association for Computer Information, 2020).

### 2.4. Technologies Supporting Online Shopping

The development of technologies such as data mining has significantly impacted online shopping experiences. Thanks to advanced algorithms, online stores can now analyze user behavior and offer products that best match their needs and preferences (IJRTER, 2017). Additionally, technologies like E-tagging enable a "one-stop shopping" experience where customers can easily compare products and prices from different stores (Latimer, 2003). It's also worth noting that different shopping channels, such as online and catalog shopping, have their own unique factors influencing consumer choice, which are also supported by modern technologies (Madlberger, 2011).

In the context of technologies supporting online shopping, attention should be given to the growing role of artificial intelligence and machine learning (Demangeot, Broderick, 2010; What Happens…, 2011; Darley, 2010). These technologies allow online stores not only to analyze user behavior but also to forecast future needs and preferences (The MIT Press, 2018). Moreover, the application of blockchain technology in online shopping is becoming increasingly popular, providing greater transparency and transaction security (Oxford University Press, 2018). It's also worth noting that the motives for online shopping can vary depending on the industry; for example, in the hospitality industry, shopping motives may be related to personality and purchasing values (Science & Engineering Research Support Society, 2016).

## 3. Analysis of the Impact of Demographic and Behavioral Variables on Online Shopping Behavior – Empirical Study Results

### 3.1. Research Methodology

In June 2021, scientific research was conducted with the aim of identifying important aspects of decision-making in online purchases. Additionally, to analyze the impact of demographic and behavioral variables on online shopping behavior, an estimation was made using the maximum likelihood method. The analysis using the maximum likelihood method allowed for the estimation of a structural model that fits well with the empirical data, as confirmed by the RMSEA value and Cronbach's alpha coefficient, suggesting the reliability and validity of the data. All of this provides valuable insights for entrepreneurs and marketers regarding the online community segments they can target for their promotional activities and product offerings.

The hypothesis was posed that demographic and behavioral factors have a significant impact on the importance of various aspects of decision-making in online purchases. To achieve the research objectives and verify the hypothesis, primary research was conducted. A survey method was employed for this purpose. In June 2021, an online questionnaire was distributed to respondents. During the study, CAWI (Computer Assisted Web Interviewing) technique standards were applied. The results of these studies will have a significant impact on understanding consumer online shopping behavior, identifying important trends and patterns. This topic was chosen due to its high relevance and timeliness, as well as the existing, clear gap in previous research in this area.

### 3.2. Presentation of Research Findings

The research sample consisted of 945 individuals, representing various generations. The study included respondents from different age groups, of which about 10% were born between 1965-1980, 28% between 1981-1995, and the largest group consisted of those born after 1995, about 62%. Of the respondents, about 67% were women, and 33% were men. Regarding the place of residence, only a small percentage, about 17%, live in rural areas, while the rest live in cities of various sizes; most, about 55%, live in cities with a population of over 200,000 residents.

From the surveyed group, about 13% rated their financial situation as very good, 58% as good, and about 26% as average. Only a small percentage, about 3%, described it as poor. In terms of employment status, most people, about 73%, work full-time. About 9% work part-time, and about 9% are unemployed. About 60% of respondents have a bachelor's degree, 34% have a master's degree, and a small percentage, about 2%, are at the doctoral level. As for fields of study, there is a wide variety. The most popular are management and economics, chosen by about 33% and 16% of respondents, respectively. Next are finance and accounting, and internal security, chosen by about 11% and 12% of respondents. Finally, the majority of people, about 77%, study in a non-residential mode, while the rest, about 23%, study in a residential mode.

The study was also aimed at identifying important aspects for respondents when making online purchasing decisions. Detailed information on this topic is provided in Table 1.

**Table 1.**
*Important Aspects During Online Purchase Decision-Making*

| Aspect | Definitely Unimportant | Somewhat Unimportant | No Opinion | Somewhat Important | Definitely Important | Total |
|---|---|---|---|---|---|---|
| Price | 22 | 25 | 26 | 295 | **577** | **945** |
| User-Friendly UX (User Experience) | 28 | 76 | 343 | 360 | **138** | **945** |
| Product/Service Quality | 20 | 13 | 17 | 264 | **631** | **945** |
| Delivery Speed | 16 | 49 | 49 | 350 | **481** | **945** |
| Warranty | 19 | 49 | 79 | 342 | **456** | **945** |

Cont. table 1.

| | | | | | | |
|---|---|---|---|---|---|---|
| Product Information | 20 | 23 | 49 | 332 | **521** | **945** |
| Payment Method | 28 | 67 | 65 | 369 | **416** | **945** |
| Reviews from Other Users | 28 | 55 | 85 | 383 | **394** | **945** |
| Post-Sale Service | 31 | 104 | 180 | 367 | **263** | **945** |
| Ecological Origin of Products | 106 | 167 | 263 | 277 | **132** | **945** |

Source: own.

Table 1 presents how various aspects influence consumers' online purchasing decisions. The study is divided into several key categories, such as price, product quality, delivery speed, and others. Regarding price, the majority of respondents (61%) consider it "definitely important," and an additional 31% consider it "somewhat important." This suggests that price is one of the most critical factors affecting online purchasing decisions.

The issue of user-friendly interface (UX) is viewed differently. About 38% of respondents think it's "somewhat important", but only 15% consider it "definitely important". It's also noticeable that a large group (36%) has no opinion on this matter. Product or service quality is another key element. A whopping 67% of respondents consider it "definitely important", and an additional 28% consider it "somewhat important". Delivery speed is also important, but to a slightly lesser extent. About 51% of respondents consider it "definitely important", and 37% consider it "somewhat important". In the context of warranties, 48% consider it "definitely important", and 36% consider it "somewhat important".

Product information is important for 55% ("definitely important") and 35% ("somewhat important"). Payment methods and reviews from other internet users have moderate importance; about 44% and 42% consider them "definitely important", and 39% and 41% consider them "somewhat important", respectively. After-sales service has varying importance for different people; 28% consider it "definitely important", and 39% consider it "somewhat important". The least important for respondents is the ecological origin of products, with only 14% considering it "definitely important" and 29% considering it "somewhat important". Overall, the table shows which aspects are most important for consumers when making online purchasing decisions. Price and product quality are the most important, while the ecological origin of products is the least important.

To assess the impact of demographic and behavioral variables on online shopping behavior, structural models were estimated using the maximum likelihood method. There was no basis for rejecting the null hypothesis that the residual values of the empirical and theoretical matrices are equal to zero ($\chi 2 = 540.587$; $p = 0.001$). The Root Mean Square Error of Approximation (RMSEA = 0.139) indicates that the model can be considered well-fitted to the data. To determine the reliability of the data, the value of Cronbach's alpha coefficient was calculated, which was 0.751.

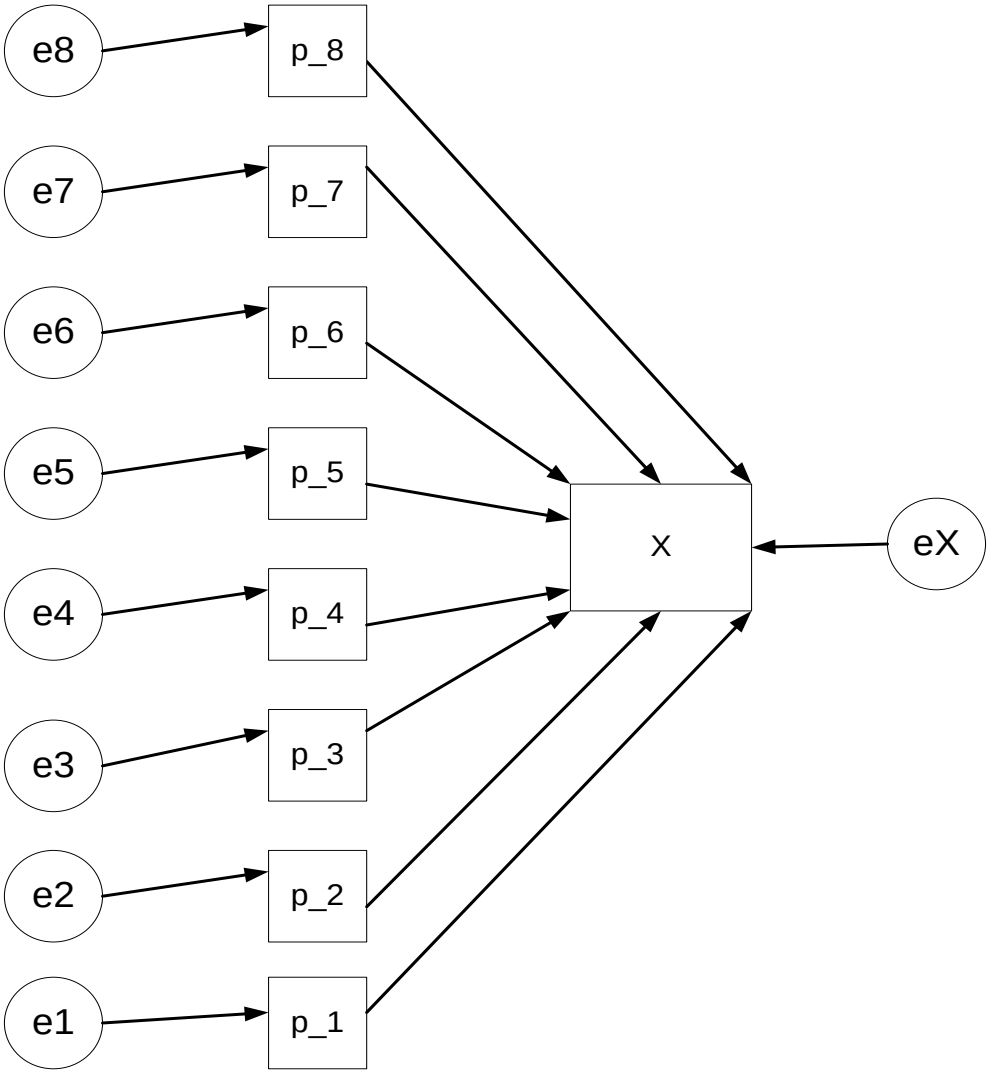
The structural models estimated by the maximum likelihood method (Fig. 1) include the following:

**A. Observable Endogenous Variables**

p_1 – Age
p_2 – Gender
p_3 – Place of Residence
p_4 – Financial Situation
p_5 – Employment Status
p_6 – Level of Education
p_7 – Field of Study
p_8 – Type of Study
p_9 – How often do you make purchases online?
p_11 – How much money do you spend on online shopping per month?
p_16_a – Price
p_16_b – User-Friendly UX
p_16_c – Product/Service Quality
p_16_d – Delivery Speed
p_16_e – Warranty
p_16_f – Product Information
p_16_g – Payment Method
p_16_h – Reviews from Other Internet Users
p_16_i – After-Sales Service
p_16_j – Ecological Origin of Products
p_17 – Do you leave your own online reviews about purchased products?
p_19 – Have you ever used personalized offers while shopping online?
p_21 – Do you respond to questions from other users online seeking information about a product?
p_22 – Have you ever suggested changes to a product to the manufacturer?

**B. Unobservable Exogenous Variables:**

*e1, e2, e3, e4, e5, e6, e7, e8, e9.*




Note: In the model, X represents the observable endogenous variables, ranging from p_9 to p_22, and eX represents the random errors associated with these variables.

**Figure 1.** Estimated Structural Model.

Source: own.

Unstandardized and standardized coefficients are presented in Tables 2 and 3.

Unstandardized coefficients of the model indicate by how many units the dependent variable will change when the value of a given independent variable increases by one unit. Standardized coefficients, on the other hand, describe by how many standard deviations the value of the dependent variable will change when the value of the independent variable increases by one standard deviation (Bollen, 1989; Kline, 2005).

**Table 2.**
*Unstandardized Model Coefficients*

| Variables | Estimated Parameter Values | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Observable Endogenous Variables | | | | | | | | | | | | | | | |
| | **p_9** | **p_11** | **p_16_a** | **p_16_b** | **p_16_c** | **p_16_d** | **p_16_e** | **p_16_f** | **p_16_g** | **p_16_h** | **p_16_i** | **p_16_j** | **p_17** | **p_19** | **p_21** | **p_22** |
| p_1 | -0,072 | -0,099 *** | -0,019 | -0,225 *** | -0,045 | -0,078 | -0,194 *** | -0,053 | -0,105 *** | 0,004 | -0,191 *** | -0,339 *** | -0,042 *** | 0,129 *** | -0,024 | -0,033 |
| p_2 | -0,011 | -0,003 | 0,189 *** | 0,099 | 0,109 *** | 0,232 *** | 0,028 | 0,288 *** | 0,232 *** | 0,279 *** | 0,116 | 0,666 *** | 0,024 | 0,023 | -0,052 | -0,094 *** |
| p_3 | -0,017 | 0,028 | -0,011 | 0,059 *** | 0,009 | 0,008 | -0,039 | -0,035 | -0,042 | -0,036 | -0,016 | -0,029 | -0,006 | -0,013 | 0,004 | 0,015 |
| p_4 | -0,303 *** | 0,415 *** | -0,069 *** | 0,150 *** | 0,074 *** | 0,133 *** | 0,032 | 0,033 | 0,007 | 0,03 | 0,052 | 0,062 | 0,003 | 0,061 *** | 0,033 | 0,012 |
| p_5 | -0,178 *** | 0,245 *** | -0,014 | 0,008 | 0,008 | -0,050 | -0,084 | -0,002 | 0,052 | -0,002 | 0,042 | -0,071 | 0,037 | 0,020 | 0,005 | -0,004 |
| p_6 | -0,007 | -0,044 | 0,021 | 0,001 | -0,054 *** | -0,024 | -0,034 | -0,016 | -0,052 | -0,014 | -0,032 | -0,027 | -0,050 *** | -0,017 | -0,008 | 0,007 |
| p_7 | -0,008 | 0,014 | 0,003 | -0,016 | 0,001 | -0,005 | 0,002 | -0,008 | -0,003 | -0,007 | 0,010 | -0,001 | 0,003 | 0,002 | -0,010 *** | -0,002 |
| p_8 | -0,017 | 0,066 | 0,207 *** | -0,133 | 0,101 | 0,169 *** | 0,085 | 0,269 *** | 0,069 | 0,131 | 0,096 | -0,115 | 0,003 | 0,027 | -0,069 | -0,091 *** |

Note: *** indicates $p < 0.001$.

Source: own.

**Table 3**
*Standardized Coefficients of Models*

| Variables | Estimated Parameter Values | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Observable Endogenous Variables | | | | | | | | | | | | | | | |
| | **p_9** | **p_11** | **p_16_a** | **p_16_b** | **p_16_c** | **p_16_d** | **p_16_e** | **p_16_f** | **p_16_g** | **p_16_h** | **p_16_i** | **p_16_j** | **p_17** | **p_19** | **p_21** | **p_22** |
| p_1 | -0,039 | -0,064 | -0,015 | -0,162 | -0,038 | -0,058 | -0,137 | -0,042 | -0,069 | 0,003 | -0,120 | -0,189 | -0,057 | 0,176 | -0,035 | -0,060 |
| p_2 | -0,004 | -0,001 | 0,103 | 0,050 | 0,065 | 0,120 | 0,014 | 0,158 | 0,107 | 0,132 | 0,051 | 0,259 | 0,023 | 0,022 | -0,052 | -0,118 |
| p_3 | -0,016 | 0,032 | -0,015 | 0,074 | 0,013 | 0,011 | -0,049 | -0,048 | -0,049 | -0,043 | -0,018 | -0,028 | -0,015 | -0,031 | 0,009 | 0,046 |
| p_4 | -0,164 | 0,270 | -0,055 | 0,108 | 0,064 | 0,099 | 0,022 | 0,026 | 0,005 | 0,021 | 0,033 | 0,035 | 0,004 | 0,083 | 0,047 | 0,021 |
| p_5 | -0,099 | 0,162 | -0,011 | 0,006 | 0,007 | -0,038 | -0,061 | -0,001 | 0,035 | -0,002 | 0,027 | -0,041 | 0,051 | 0,029 | 0,007 | -0,007 |
| p_6 | -0,006 | -0,042 | 0,024 | 0,001 | -0,068 | -0,026 | -0,035 | -0,018 | -0,050 | -0,014 | -0,029 | -0,022 | -0,097 | -0,034 | -0,017 | 0,018 |
| p_7 | -0,024 | 0,048 | 0,012 | -0,060 | 0,005 | -0,019 | 0,008 | -0,035 | -0,009 | -0,026 | 0,033 | -0,003 | 0,018 | 0,015 | -0,078 | -0,018 |
| p_8 | -0,006 | 0,027 | 0,101 | -0,060 | 0,054 | 0,078 | 0,038 | 0,132 | 0,029 | 0,055 | 0,038 | -0,040 | 0,002 | 0,023 | -0,062 | -0,103 |

Source: own.

The above interpretations are only valid when the values of the other variables remain unchanged. The coefficient values thus describe the direction (positive/negative) and the strength of the influence of the independent variable on the dependent variable. The strength of the influence on the dependent variable can be compared between independent variables using standardized coefficients. This is because the values of the unstandardized coefficients depend on the units in which the variables are measured (Domański, 1990; Konarski, 2010; Osińska, 2008; Osińska, Pietrzak, Żurek, 2011).

## 4. Conclusions

Based on the analysis of the conducted research, several key conclusions can be drawn. Price and quality of the product or service are the most important factors influencing consumers' online purchasing decisions. This suggests that most consumers are looking for products that offer good value for the price. User interface and delivery speed also have some impact, but they are less prioritized compared to price and quality. Warranty and product information are also important but at a medium level of importance.

Payment methods and opinions from other internet users have a moderate impact on purchasing decisions. This may suggest that consumers value flexibility and additional information, but these are not key elements in their decisions. After-sales service is important for a large group of consumers, but it is not a critical choice factor for everyone.

The least important for consumers is the ecological origin of products. This may indicate that ecological awareness is still not the main motivation for most consumers in the context of online shopping. Generally speaking, online consumers are mainly focused on economic and quality aspects, while other factors such as ecology or payment method are less important to them.

Moreover, based on the presented data and analysis results, several key conclusions can be drawn regarding the impact of demographic and behavioral variables on online shopping behavior:

Demographic Factors:

Age (p_1): The younger generation, especially those born after 1995, show more online shopping activity. The coefficient value for age is negative, indicating that shopping activity decreases with age.

Gender (p_2): Women are significantly more active in online shopping than men. This is evident from the significant coefficient values for this group.

Place of residence (p_3): People living in larger cities are more active in online shopping, which is intuitive – they probably have better access to the Internet and are more oriented towards new technologies.

Financial situation (p_4): People with a better financial situation are more inclined to shop online, which confirms the positive coefficient for this variable.

Behavioral Factors:

Price (p_16_a) and product quality (p_16_c) are the most important factors in the shopping process.

Delivery speed (p_16_d) and product information (p_16_f) are also important but to a lesser extent.

Opinions from other internet users (p_16_h) and payment method (p_16_g) have moderate importance.

Ecological origin of products (p_16_j) is the least important for respondents.

Additionally, the results of statistical analyses suggest significant relationships between various factors and online shopping behavior. The main variable affecting most of the analyzed aspects of online shopping is the buyer's gender (variable p_2), while the field of study (variable p_7) generally has the least impact. Specifically, the financial situation has the greatest impact on the frequency of online shopping and the amount spent monthly. Interestingly, gender is the least influential factor here. However, in the context of other aspects, such as price, user-friendly interface, product or service quality, and many others, gender shows the strongest influence. In relation to some specific categories, such as warranty and after-sales service, age turns out to be the most important factor. In the matter of responding to questions from other online users, the most important factor turns out to be the field of study. These findings can be key to understanding how different consumer groups make online purchasing decisions. Identifying these correlations can help in targeting the appropriate market segments and effectively adjusting the sales strategy, especially since the buyer's gender turned out to be the main variable affecting shopping behavior.

The added value of conclusions from the statistical model concerning online shopping behavior is based on several key points:

Understanding Demographics: The model highlights the difference in shopping behavior depending on gender. Understanding this aspect can help sellers in adjusting their offer and marketing strategy in such a way as to attract a specific demographic group.

Adjusting the Offer: Understanding how different factors (such as age, financial situation, field of study) affect shopping behavior can help companies in adjusting their offer – from price to warranty and after-sales service.

Targeting Market Segments: Finding correlations between factors and shopping behaviors allows companies to focus on specific market segments, which can lead to greater effectiveness of marketing and sales activities.

Optimizing Online Interaction: Since the model indicates that the field of study affects interaction in the form of responding to questions from other online users, companies can use this information to better engage their online community.

Building Greater Loyalty: Understanding what drives the purchasing decisions of different consumer groups can help companies in building greater loyalty among customers by delivering products and services more tailored to their needs.

Basis for Further Research: Each statistical analysis can also provide a basis for further research. For example, since gender has such a large impact on some shopping behaviors, it would be worth investigating what other variables may be related to this difference.

Strategic Application in Business: Conclusions from the model can be used strategically by companies to predict trends, plan investments in advertising, create new products or services, and also to adjust pricing strategy.

Basis for Customer Education: Understanding what factors affect shopping behavior can help companies in educating their customers, which in turn can lead to better purchasing decisions by consumers.

Further research directions can focus on several aspects. First, there is a need for a deeper understanding of the role of gender in shopping behavior. Gender turned out to be a significant factor, but it would be worth investigating how other variables, such as personality or level of education, affect differences in shopping behavior between men and women. Second, an interesting direction could be to investigate the impact of geographic location on the availability and choice of different shopping options. People living in different regions may have different experiences and expectations that would be worth analyzing. The third potential research direction is the impact of the financial situation on shopping behavior. Although the research pointed to its importance, the detailed mechanisms of this impact are not known, especially in the context of different demographic groups.

The fourth direction is the analysis of how consumer priorities change depending on age. Since age turned out to be important in the context of warranty and after-sales service, it would be worth investigating how different generations approach other aspects of shopping, such as ecology or payment method. Finally, it would also be reasonable to investigate how education and consumer awareness affect their purchasing decisions. Since gender and demographics are so important, it would be important to understand whether education on various aspects of shopping, from ecology to quality and price, could affect a change in these behaviors. Each of these research directions could significantly contribute to understanding how different consumer groups make online purchasing decisions.

In the context of the impact of gender on online shopping behavior, there are also other studies that can be compared with the presented analysis. For example, a study conducted in the United Arab Emirates focuses on impulsive buying and differences between genders in this aspect (Karim, Nisa, Imam, 2021). Additionally, a study on attitudes towards online shopping also notices differences between men and women (Hasan, 2010). It is also worth noting a doctoral thesis that analyzes the impact of the characteristics of the website interface on shopping behavior, although it does not focus strictly on gender (Hong, 2014). These studies can provide additional context and deeper understanding for the analysis, especially in the aspect of the impact of gender on online purchasing decisions.

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