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The future of digital marketing? Artificial Intelligence and Augmented Reality

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The Internet and digital technologies make consumers more informed and sophisticated nowadays, with a variety of rational and irrational factors influencing their shopping behavior. The present paper focuses on new digital trends, specifically artificial intelligence and augmented reality. The utilization of these trends in marketing communication within the food market is steadily increasing. The paper explores their influence on consumers' rational decision-making processes based on a questionnaire survey involving 764 respondents who are food consumers and use digital technologies. Statistical methods and techniques were used to evaluate the established hypotheses, such as the Chi-square test of independence, the Share test with known constant, and the Chi-square test of good agreement. Based on the results, some recommendations are suggested for improving digital marketing communication in the food market.

Keywords: digital marketing, AI, AR, rationality and irrationality in consumer shopping behavior.

1. Introduction

The present paper intends to underscore the significance of digital marketing, particularly the trends in digital marketing communication, and to evaluate their effect on consumer behavior, considering both rational and irrational factors in creating consumer preferences in the food market.

Dinker and Misra (2023) characterize digital marketing as promoting products or services using digital technologies. Marketers advertise products and services online through websites, blogs, social media, mobile applications, and other digital channels. Digital marketing integrates several channels and technologies through which a company explores marketing campaigns, content and strategies to understand what works and what does not in real time (Adler 2021).

Vysekalová and Mikeš (2018) state that the Internet has permeated our lives more than we realize, with the number of users continually rising. New modern technologies offer expanded communication possibilities. Nowadays, speed, the virtual world, and the need to be constantly online dominate (Vysekalová et al. 2020).

Chaffey and Ellis-Chadwick (2019) add that digital media and technologies are nothing new. We see significant development in digital marketing, aiming to discover new ways to communicate with customers. According to Shankar et al. (2022), the impact of digital communication has increased compared to traditional ways of communication, especially during the Covid-19 era. Sheremetyeva et al. (2021) suggest that the Internet has become the dominant marketing tool for companies, and the digitalization of marketing makes products and brands accessible to customers precisely when needed.

According to Bartanus (2021), the goal of digital marketing is maximum effectiveness of advertising messages targeted at a specific group of customers. Achieving this goal requires flexibility and the ability to react instantly to the current situation. Digital marketing focuses on a selected group of customers to obtain feedback and foster bilateral interaction between the company (seller) and the customer (Adler 2021).

Burešová (2022) outlines the following advantages of marketing in the online environment: unlimited availability, targeting desired customer segments, easy measurement of user response (tracking) and online tool effectiveness, flexibility, interactivity and two-way communication, price flexibility, and atypical and unique communication formats.

Veleva and Tsvetanova (2020) point out that digital marketing has several disadvantages. The main disadvantages include: negative reviews, lack of trust from customers and consumers, overcrowding of the online space with advertisements, unsuitability for all types of products, services, and companies, and high dependency on technologies.

Chaffey and Ellis-Chadwick (2019) explain various forms of digital marketing, such as search engine marketing, remarketing, social media marketing, influencer marketing, video marketing and content marketing. These forms have different goals and functions, therefore, not all are suitable for every marketers or industries. For example, in the accommodation sector, communication mainly takes place through websites and social networks, but it has been shown that social networks are more effective tools than websites (Lincényi–Bulanda 2023).

Kingsnorth (2022) suggests that pressure from digital technologies influences consumer behavior. Technological advancements such as smartphones and tablets significantly change consumer attitudes. On the other hand, it holds that no consumer can be labelled as entirely digital or, conversely, non-digital, as each of us falls somewhere on a digital spectrum. It is crucial to understand the unique nature of each individual and consider their desires and interests. According to Janouch (2020), modern marketing communication extensively utilizes insights from psychology because consumers are influenced by rational factors such as price, quality, availability, and functionality. However, significant impact is attributed to irrational factors, including emotions, impulses, and current trends.

Karabová (2021) explains that the customer's buying journey has become more complex in recent years. The customer responds to different stimuli at each purchase stage, is interested in different product information, spends time on different channels and has different motivations for choosing a particular brand. This complicates the buying journey, which influences purchasing behavior, and is described by the STDC marketing framework as follows:

SEE – the stage where people come into contact with the company or product for the first time. In this phase, it is essential to capture their interest and move them to the next stage;

THINK – at this stage, people are deciding whether they truly want to buy the product or if they can do without it; it is important to increase their awareness and remind them through appropriate methods via relevant channels;

DO – customers are deciding where to buy the product; this decision is influenced by various factors such as price, quality, service, and website speed, among other things, to which the seller should appeal;

CARE – Customers have already made purchases in the store, and it is the seller's task to take care of them and their shopping activities further (for example, offering them additional services).

Digital trends have a significant impact on the overall functioning of companies. They influence marketing, business philosophy and enterprise activities (Blazheska et al. 2020).

Májek (2023) argues that companies must strive to adopt new technologies and tools and develop marketing efforts to gain an edge over their competitors. Verma et al. (2021) state that artificial intelligence is considered a new technological trend with enormous potential for marketing transformation. Artificial intelligence is becoming increasingly popular in digital marketing (Májek 2023).

Slovíková (2023) states that this trend can improve content optimization, analyzing customer behavior or targeting in online advertising. However, the greatest risk is that artificial intelligence can be used to manipulate customers and intrude into their privacy.

Čiernik (2023) states that the market for foods produced with artificial intelligence will reach a value of $35 billion by 2028, according to analysts. Foods are already being designed now. For instance, Coca-Cola has created a new beverage in collaboration with artificial intelligence. It is designed to taste like a beverage from the year 3000. The Chinese ice cream manufacturer Zhong Xue Gao used artificial intelligence to design and create a new affordable ice cream launched in Shanghai in 2023. It is only available in the Chinese market.

Another digital trend is augmented reality. According to the VR Zone (2019), augmented reality is the projection or addition of a layer of digital content into the real physical environment in real time. Augmented reality bridges the real world with the virtual world. The real world is extended or enhanced with digital information. Advancements in augmented reality have led to an interest in its application in marketing strategy, giving rise to augmented reality marketing (Chylinski et al. 2020). Experts characterize it as a new strategic sub-discipline of marketing (Rauschnabel et al. 2022).

Berman and Pollack (2021) identify the advantages of augmented reality for customers as the high level of interactivity, high quality of customer support and service, and better integration between online and in-store shopping.

Berčík (2018) explains the implementation process of augmented reality in practice. It operates by scanning a predefined code through the camera of a device. Subsequently, the programmed object is displayed on the screen of a smartphone or tablet. In the food market, brands like Magnum have already utilized augmented reality. For instance, in Singapore, they launched the "Make My Magnum" campaign, which allows customers to design and create their own Magnum ice cream using augmented reality through their smartphones' cameras. Customers can purchase their creations at selected stores with a discount (Marketing-interactive.com 2018).

During the 2019 Singapore F1 event, Heineken launched a campaign where customers could win tickets to an exclusive pre-race party, tickets to the race and other prizes. The campaign operated on the principle of augmented reality. Participants were tasked to scan two bottles or glasses with the Heineken logo using an application. If the app recognized the logo as valid, it initiated a short F1-themed game. If the players succeeded, they won a prize (Just after midnight.com 2019).

2. Goals and research methodology

The present paper aims to highlight the importance of digital marketing, especially digital trends in marketing communication and determine their influence on consumer behavior in the context of rationality and irrationality in creating consumer preferences.

In connection with the aim of the paper, we have established the following hypotheses:

Hypothesis 1: We assume that more than 30% of respondents would use Magnum Company's AR application.

Hypothesis 2: We assume that there is a dependency between the age group of respondents and their opinions on food created by artificial intelligence.

We found out that customers in Singapore can create their own ice cream through the Magnum augmented reality-based application (Marketing-interactive.com 2018). We established the first hypothesis because we were interested in whether customers in Slovakia would use a similar application if they had the opportunity. We established the second hypothesis because we believe that the opinions of the older and younger generation on artificial intelligence differ, and, therefore, we decided to identify the possible differences.

Primary and secondary sources of information were collected and used to achieve the stated objective. Secondary data was obtained from studies and papers by domestic and foreign authors and WoS and SCOPUS databases.

Our study is based on a questionnaire survey. The questionnaire was processed in Google Forms, and the respondents were asked to participate in the study through personal social networks Facebook and Instagram and via e-mails. The questions focused on consumer's perceptions of digital marketing and trends, particularly in the food market. The final sample consisted of 764 respondents from the Slovak Republic who are food consumers and use digital technologies. We can see the sociodemographic characteristics of respondents in Table 1.

Table 1. Sociodemographic characteristics of the respondents

Characteristic	Category	Absolute frequency	Relative frequency
Gender	Female	409	53.5%
	Male	355	46.5%
Age group	Generation Z	277	36.3%
	Generation Y	210	27.5%
	Generation X	207	27.1%
	Baby boomers	70	9.2%
Residence	Cities	462	60.5%
	Countryside	302	39.5%
Education	Primary education	48	6.3%
	Secondary education without A-levels	79	10.3%
	Secondary education	323	42.3%
	Bachelor's degree	138	18.1%
	Master's degree	162	21.2%
	PhD	14	1.8%
Economic activity	Student	213	27.9%
	Self-employed	106	13.9%
	Employed	350	45.8%
	Unemployed	14	1.8%
	On maternity leave	29	3.8%
	Retiree/Disabled retiree	52	6.8%

Source: own construction

We further processed data from the questionnaire survey into tables and graphs and interpreted the results.

The first step was to verify the representativeness of the sample according to the gender of the respondents using the Chi-square test of good agreement. However, in order to conduct this test, we first had to obtain information about the current number of women and men in the Slovak Republic. We obtained this data from the website of the Statistical Office of the Slovak Republic.

The Chi-square test of good agreement tests nominal data within a single sample. It is used to determine whether empirical values are sufficiently different from theoretical ones that characterize the baseline dataset (Lyócsa et al. 2013).

The formulation of hypotheses looks as follows:

H_0: The sample is representative.

H_1: The sample is not representative.

We calculate the test statistic according to formula (1):

(1)

$$\chi^2 = \sum_{i=1}^{k} \frac{(E_i - T_i)^2}{T_i}$$

Where:
x2 – test statistic,
E_i – empirical frequencies,
T_i – theoretical frequencies.

In Microsoft Office Excel, using the CHIINV function at a significance level of $\alpha = 0.05$, we calculate the critical value and compare it with the test statistic. If the test statistic is less than the critical value, we do not reject H_0. However, if the opposite occurs, we reject H_0 and accept H_1 (Matejková et al. 2018).

Since we aimed for a deeper analysis of the results, the established hypotheses were tested using the Chi-square test of independence, which, according to Matejková et al. (2018), is a test for nominal data. Using this test, we investigate whether the differences between empirical and theoretical frequencies are only random (variables are not dependent) or statistically significant (variables are dependent). We formulate the null and alternative hypotheses as follows:

H_0: There are no differences (dependence) between qualitative characteristics.
H_1: There are differences (dependence) between qualitative characteristics.
We calculate the test statistic according to formula (2):

(2)

$$\chi^2 = \sum_{i=1}^{m}\sum_{j=1}^{k} \frac{(E_{ij} - T_{ij})^2}{T_{ij}}$$

Where:
x_2 – test statistic,
m – number of rows,
k – number of columns,
E_{ij} – empirical frequencies,
T_{ij} – theoretical frequencies

In Microsoft Office Excel, using the CHIINV function at the significance level $\alpha = 0.05$, we calculate the critical value and compare it with the test statistic. We accept the null hypothesis if the test statistic is less than the critical value. We accept the alternative hypothesis if the test statistic is greater than the critical value.

The authors add that if statistical dependence is found among the examined characteristics, it is necessary to determine its strength using Cramer's V coefficient. We will use formula (3) for calculation:

(3)

$$V = \sqrt{\frac{\chi^2}{n \cdot h}}$$

Where:
x_2 – test statistic,
n – number of observations (respondents),
h – interval range, calculated as min((m-1), (k-1)).

The coefficient can take values in the range from 0 to 1. The closer the value is to 1, the stronger the examined dependence.

The next test is the Share test with known constant (Right-tailed test). We use a Right-tailed test when deciding whether the parameter value is greater than expected (Math.sk 2017). The null hypothesis H_0: $\theta = \theta_0$ is posed against the alternative hypothesis H_1: $\theta > \theta_0$ (Statumeconomy.sk 2017).

We will use the formula (4) for calculation:

(4)

$$u = \frac{p - \pi_0}{\sigma_p} \quad \sigma_p = \sqrt{\frac{\pi(1-\pi)}{n-1}}$$

u – N (0,1) distribution
The test evaluation is as follows:
If $|u| < u_{1-\alpha}$, we do not reject H_0
If $|u| > u_{1-\alpha}$, we reject H_0 and accept H_1 (Matejková et al. 2018).

3. Results and Discussion

Our study was conducted to determine the importance of digital marketing and digital trends such as artificial intelligence and augmented reality in marketing communication and determine their influence on rational and irrational consumer behavior.

At first, we decided to verify the representativeness of the sample by the gender of respondents (Table 2). We used the Chi-square test of good agreement and established these hypotheses:

H_0: The sample is representative by the gender of respondents.
H_1: The sample is not representative by the gender of respondents.

Table 2. Chi-square test of good agreement

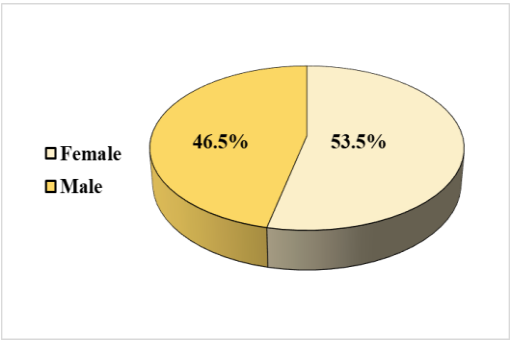
Source: own construction

Based on empirical and theoretical frequencies, we have determined a test

Gender	Baseline dataset	Empirical frequencies (Sample dataset)	Theoretical frequencies (Sample dataset)	$(E-T)^2/T$
Female	2,773,698	409	390.35	0.89
Male	2,655,094	355	373.65	0.93
Total	5,428,792	764	764	1.82

statistic. Its value is 1.82. The test statistic is smaller than the critical value. Therefore, we do not reject H_0, meaning the sample is representative by gender respondents. Sample representativeness is also demonstrated in Figure 1.

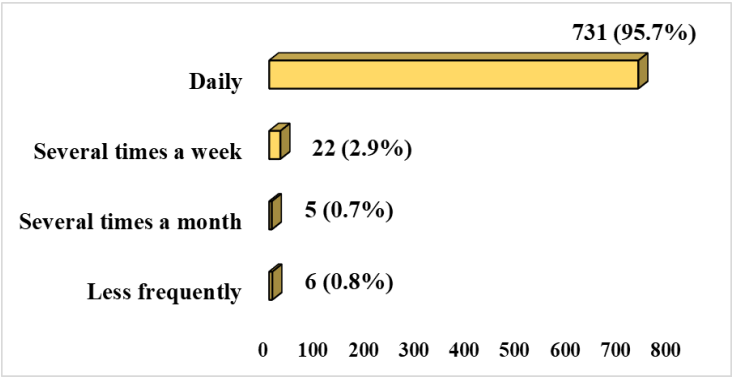
Figure 1. Gender of respondents



Source: own construction

The first part of our study focused on the online habits of the respondents. We asked them how often they use the Internet and digital technologies (Figure 2).

Figure 2. The use of internet and digital technologies



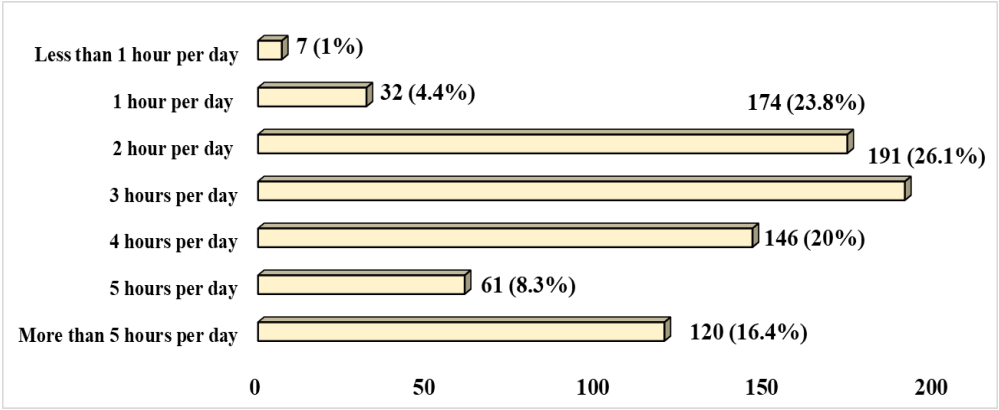
Source: own construction

Up to 95.7% of the 764 respondents said they use the Internet and digital technologies daily. We were also interested in the ways the Internet is utilized. The results indicate that respondents most frequently visit websites related to their interests (63.7%), surf on social networks and utilize them for communication with their family

and friends (57.3%). Additionally, it is worth noting that digital technologies and the Internet are considered work tools for 3.3% of respondents.

Among respondents who use the Internet daily (731), we examined the number of hours spent online per day (Figure 3).

Figure 3. Daily time spent online

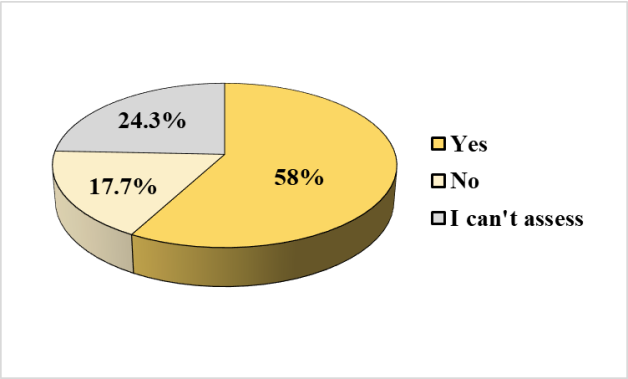


Source: own construction

Most respondents spend 3 hours online daily (26.1%). However, only 1% spend less than 1 hour online daily.

The most important question in the first part, pivotal for further research, was: "Do you think that the Internet and digital technologies influence your consumer behavior?" (Figure 4).

Figure 4. The influence of the internet and digital technologies on the customer Behavior



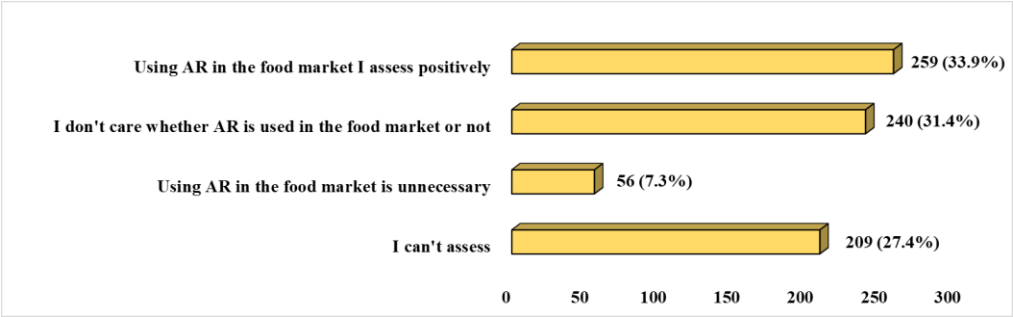
Source: own construction

A total of 58% of respondents know the impact of the Internet and digital technologies on consumer behavior. Under the influence of these factors, rational decision-making often shifts to irrational. On the other hand, 17.7% of respondents

do not believe that the Internet and digital technologies influence them, and 24.3% cannot assess the impact.

The next part of our study focused on today's popular digital trends, which are augmented reality and artificial intelligence. We investigated consumer opinions about implementing augmented reality in digital marketing within the food market (Figure 5).

Figure 5. AR as a marketing communication tool in the food market



Source: own construction

In Figure 5, we can see that 33.9% of respondents assess the use of AR in the food market positively, while only 7.3% consider it unnecessary.

In connection with this finding, we establish hypothesis 1: we assume that more than 30% of respondents would use Magnum Company's AR application.

Currently, this application is only accessible to customers in Singapore, and we were interested in whether Slovak consumers would utilize it if it became available in Slovakia. The Share test with known constant (Right-tailed test) was used to confirm or refute the assumption.

We have established a null and alternative hypothesis:

H_0: Less than 30% of respondents would use Magnum Company's AR application.

H_1: More than 30% of respondents would use Magnum Company's AR application.

The comparison between the test statistic and the critical value is in Table 3.

Table 3. Share test with known constant (Right-tailed test)

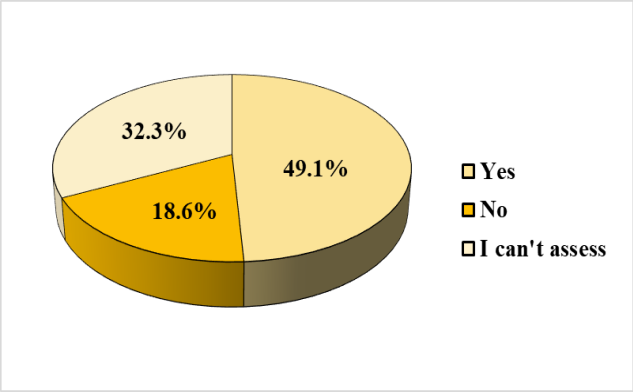
Test statistic |u|	>	**Critical value $u_{1-\alpha}$**
11.50	>	1.64

Source: own calculation

The test statistic is greater than the critical value, so we accept the alternative hypothesis. The first established hypothesis has been confirmed. Magnum Company's AR application would be used by more than 30% of respondents.

Figure 6 shows that up to 49.1% of all respondents would utilize the application.

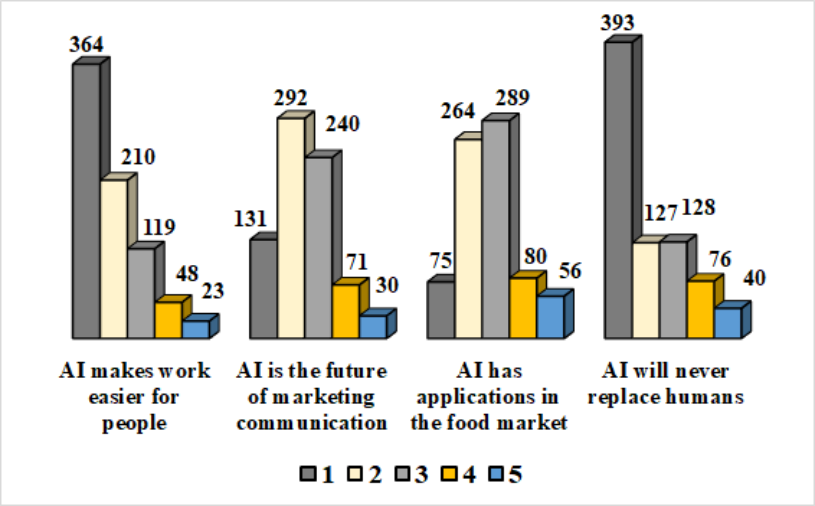
Figure 6. Magnum company's AR application



Source: own construction

Furthermore, we focused on artificial intelligence. Respondents evaluated several statements about artificial intelligence on a 5-point scale (1 – completely agree, 2 – somewhat agree, 3 – cannot assess, 4 – somewhat disagree, 5 – completely disagree) (Figure 7).

Figure 7. Artificial Intelligence



Source: own construction

A total of 364 out of 764 respondents completely agree that AI makes work easier for people, but at the same time, most respondents believe that AI will never replace humans. Many respondents also believe that AI represents the future of marketing communication and has applications in the food market. The relationship between the age group of respondents and their opinion on the fact that AI can create food was examined in the second hypothesis.

We assume that there is a dependency between the age group of respondents and their opinions on food created by artificial intelligence. This hypothesis was analyzed using the Chi-square test of independence.

We have established a null and alternative hypothesis:

H_0: There is no dependency between the age group of respondents and their opinions on food created by artificial intelligence.

H_1: There is a dependency between the age group of respondents and their opinions on food created by artificial intelligence.

Using a contingency table, we compared empirical and theoretical frequencies to determine the test characteristic. We then compared this characteristic with the critical value (Table 4).

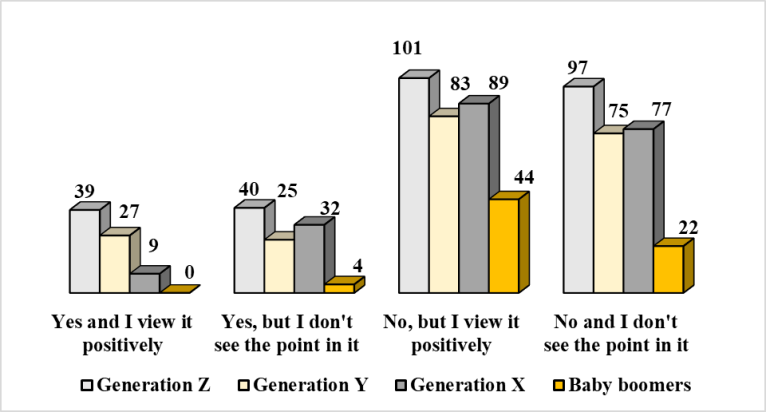
Table 4. Chi-Square test of independence

Test statistic	>	**Critical value**
34.85	>	16.92

Source: own calculation

The test statistic is greater than the critical value, so we accept the alternative hypothesis. The second established hypothesis has been confirmed. This means that there is a dependency between the age group of respondents and their opinion on food created by artificial intelligence. The Cramer's V coefficient was used to assess the strength of this dependency. Its value of 0.12 indicates a very weak dependency.

Figure 8. "Do you know that AI creates food? What do you think about it?"



Source: own construction

The Internet and digital technologies are part of our everyday life. This statement is supported by the results of our research, in which 95.7% of respondents stated that they are online daily.

Almost identical findings are presented by Krnáčová and Benkőová (2016); according to their study, as many as 96% of users utilize the Internet multiple times a day. Through the mentioned study, we also analyzed users' most frequent internet

activities. According to the findings of Krnáčová and Benkőová (2016), people mostly use the Internet for browsing social networks in Slovakia. Similar findings were confirmed based on our research, where social networks ranked second among activities.

Our next significant finding is that more than half of the respondents know the impact of the Internet and digital technologies on their consumer behavior. The impact of the Internet is also evidenced by the Digital Conzoomer survey conducted by the Mark BBDO agency in 2018, with a sample of 2000 Slovak consumers. One of the key findings of this survey is that the Internet has become a determinant in decision-making for more than a quarter of Slovak consumers (Mark BBDO.sk, 2018).

On the other hand, according to the study by Fedorko and Mihal (2017), respondents feel relatively uninfluenced by online advertising. This fact is surprising for us. As Nöjd et al. (2020) state, research shows that digital technologies and trends enhance customer experiences.

According to the results of our study, we can assert that AR is perceived positively by consumers as a tool for marketing communication. Its potential is mainly in applications that can help customers better understand the product and thus significantly ease purchasing.

Berman and Pollack (2021) found that an effective AR strategy allows consumers to skip steps in the typical purchase process by going from awareness directly to purchase and making a purchase decision online without going to the store.

Artificial intelligence is also the subject of study for many authors. Many people who participated in our study consider AI to be part of the future of marketing communication.

Lee (2020) examined the application of chatbots, currently the most well-known form of artificial intelligence. Chatbots are already effectively used today to provide useful information to customers, quickly resolve customer issues, and gather customer information suitable for marketing purposes.

According to a survey conducted by Median SK in 2023 with a sample of 1,003 respondents over 18, nearly half of the respondents believe that artificial intelligence sometimes helps, while at other times, it lacks a human touch (Trend.sk 2023). This opinion likely prevails in Slovak society today, as we presented similar results.

4. Conclusion

Our study has aimed to identify the impact of the Internet and digital technologies on consumer behavior, determine the significance of digital marketing as a tool of marketing communication, and also explore the importance of utilizing artificial intelligence and augmented reality in marketing communication in the food market in the context of rationality and irrationality in creating consumer preferences.

The increasing digitalization opens up new opportunities and challenges, becoming integral to our daily lives. The results of our research show that the majority of Slovaks we surveyed spend time online daily. They utilize digital technologies for

various activities. The Internet has become a determinant factor in purchasing decisions and can influence consumer behavior.

According to our results, consumers perceive AI and AR as marketing communication tools in the food market quite positively. Therefore, food retailers and grocery chains should use them more. We have the following recommendations to improve digital marketing communication in the food market in three ways.

First, in creating quality and interactive content on social networks. Since our findings have shown that social networks are among the most frequent internet activities, food retailers should focus on this tool and utilize it even more. Interactive content tailored to customer needs will help build a long-term relationship and trust between the retailer and the customer.

Second, in utilizing an AR-based application for food delivery e-shops and restaurants. Customers could create their meals according to their preferences and tastes, and thanks to the AR application, they would see what it looks like. Then, they would decide whether to order it or not.

And third, in the utilization of chatbots in grocery retail chains and the healthy nutrition segment. Retail chains could utilize chatbots to communicate with customers and inform them, for example, about current offers and discounts. E-commerce platforms specializing in healthy nutrition could utilize chatbots by allowing customers to provide information about the products they seek. The chatbot could then offer advice and suggest appropriate products. For example, if a customer aims to lose weight, the chatbot could offer weight loss advice while recommending the top weight loss products in the e-shop.

Our research has shown that artificial intelligence and augmented reality are the future of marketing communication. However, their potential in marketing has not yet been fully uncovered and utilized, and thus, in the coming years, they will undoubtedly become the subject of much more research.

Acknowledgements

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