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**The influence of the social media on the priorities of customers
and their decision making**

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Abstract

In the modern world when buying products the average consumer is surrounded by huge loads of choices and information. Therefore, for brands it is crucial to understand his habits and preferences to successfully sell their products. The purpose of this research is to identify and explore the factors that influence consumer's decision-making process for household appliances. In this paper we analyze the consumers behavior and preferences and try to explain the reasons for their decisions by evaluating the data collected by the investigation. The research was conducted using a quantitative approach, to test objective theories and examine the relationship between obtained variables, that relies on cross-sectional data that was gained by conducting surveys among the randomly chosen participants that provides quantitative description of trends and opinions of population by studying a sample of that population. Furthermore, the data gathered will be regressed to determine the values of dependent and independent variables so that the outcome will allow making interpretations.

Keywords: consumer, behaviour, data, household appliances

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Introduction

The market offers its people vast amounts of goods and the decision to whether to buy it is up to consumer's preferences and desires. Nowadays in conditions of perfect competition companies pursue consumer's preferences to precisely meet their demands. In today's digital world, brands are more than just their goods. Prominent brands are those that understand how to effectively communicate with their target audience through social media platforms. In the era of digitalization social media has a huge influence and it is used as a convenient tool to advertise products and services in order to attract potential consumers. For retail brands social media has rapidly become the go-to tool for modern marketing and communications. It sends your message directly to the target audience and it is often accessible and simple to use for consumers also it is always free — all of which schools appreciate when it comes to marketing their culture, community, activities, and more. Ads almost guarantee that anyone watching a brand's Facebook or Twitter feed would see the content it wants them to see, even more so than if the content were published in a normal post within a daily stream of a dozen or so other posts. The significance of social media in retail is periodically neglected in favor of traditional marketing channels. This type of management puts companies in considerable disadvantage in competition, in the view of the fact that in this way stores and brands deny themselves a serious opportunity to attract new customers. It seems clear that it is essential to take advantage of social media to remain relevant and use it as a considerable opportunity to generate more sales, thus increasing revenue. Leading household appliances retail chains advertise their products in the most used social medias that are: Instagram, Facebook, Twitter and YouTube. It is not mandatory to be active on all social media platforms. Nonetheless, it is crucial to be effective in at least one of them. Many brands have inspired us with their effective social media campaigns. They have the potential to launch a campaign, raise awareness, and alter people's purchasing habits. Today, almost 4 billion people use social media around the world. That fact

demonstrates the enormous potential for reaching out to customers of the companies. Organic social media, paid social media, group management, social listening, feed-based/interactive advertising, Facebook ads, Twitter ads, Instagram ads, YouTube ads, Tiktok ads, and so on are all examples of social media marketing services.

Though, in recent years TikTok rapidly peaked in popularity and became the third most downloaded app by users only behind WhatsApp and Telegram. Currently Tik Tok has a significant number of active users which is approximately over 800 million. The platform attracted interests of the largest brands such as Netflix and McDonalds that were the first brands to exploit TikTok's prompt rise in users numbers. The main advantage of TikTok is that its format is perfectly suitable for brands to promote their products due to the shortness of videos and high probability of their virality.

Moreover, due to the COVID-19 global pandemic brands necessity in promotion in social media suddenly appeared.

However, brands are dependent on consumer's behavior and their decision making. Consumer's behavior can vary due to each person's individuality. Although, it is possible to have a slight comprehension if we segment the population by groups. There are 4 main types of marketing segmentations: geographic, demographic, psychographic and behavioral. Each type has its own preferences due to the factors like age, income level, cultural and geographical background. If we consider the market of household appliances, there is a significant supply coming out from producers. Nevertheless, there are several factors that influence a customer's decision in order to buy goods.

To develop the topic, the outline of two topics is done. Firstly, to think of how consumer behaviour has changed since social media became a huge tool in marketing. Secondly, to define the priorities different social media users exactly have while buying advertised products?

Marketing is a great tool of increasing the revenue of the company. There are a lot of business cases when the company becomes the leader of the industry building correct marketing strategies. For example, Apple, an American technology manufacturer, before turning to global benchmarks in this sphere became widely known due to Steve Jobs' presentation campaigns and his strategy in general (O'Reilly, 2011). Developing the marketing strategy you can never ignore the decision-making process in consumer behaviour.

In the era of digitalization, social media is an integral part of working processes. It also offers many opportunities for everyone interested in starting their own business.

The influence of social media is undeniable, since you can reach a great amount of people by seconds of publishing an advertisement, lowering your costs and ensuring that your ads reach your target audience through these social media advertisements (Gary Henderson, 2020).

"All marketing decisions are based on assumptions and knowledge of consumer behaviour." (Hawkins, Mothersbaugh & Best, 2007). That is why the concept of decision-making process in consumer behavior using social media is crucial. Decision-making is a process of identifying the decision made by a person related to different things in their lives. By researching how the consumers act, the company can increase profit and become more successful (Stankevich, Akhunjonov, Obrenovich, 2017).

With the arrival of social networks in marketing, the strategies of companies began to adapt to this trend. Many companies that have managed to adapt to the changes of the digitalization era have made strong social media marketing campaigns their advantage. For example, the largest manufacturer of sportswear Nike, which to date have developed a very strong marketing strategy in social networks. They were among the first to react to the importance of self-isolation through their "Play for the World" campaign, which included athletes and other influencers, which certainly affects brand awareness (Gilliland, 2020).

There are a lot of other cases when correct marketing campaigns in social media increase the chances to increase brand recognition in a proper way. Nowadays, effective digital marketing can be enough to increase a company's profitability.

As for the relationship between consumer behavior and social networks, there are the topics that are now closely interrelated. This is due to the increase in the time spent by people in social networks, the launch and virality of new social networks (Instagram, Youtube, Tik Tok), and changes in the avatar of the average user of social networks. For example, if previously large brands could perceive the audience of social networks as insolvent, the second decade of the 20th century completely refutes this prejudice.

In connection with such global changes in marketing, new professions related to this trend are constantly being created and developed (social media manager, brand manager, and so on). They are all closely related to the study of consumer behavior and building relationships to further increase profits or reach other goals of a given company.

Making the research while preparing the project, we assigned our main research question. By looking for the answers to these questions, some interesting points were found. It was related to changes in decision-making before the social media boom and after.

The decision-making process related to specific items was previously carried out through offline selection. For instance, to buy a new refrigerator, customers had to go to stores in the district to choose. Often their choice and their knowledge were limited to the shops of their city. Due to limited information about the product, the product satisfaction could be low in comparison to our days. The age of digitalization that we have already mentioned gives the buyer unlimited choice, consumers can order the right refrigerator from anywhere in the world after they watched all reviews on YouTube, read the discussion of it on Reddit, and looked through technology blogs on Instagram. A point worth mentioning is also that since the arrival of Internet platforms it expanded the opportunities of customers with any budget. Therefore,

the assumption that satisfaction with the product and its quality are now more important than the availability of the product in comparison to times where social media had no place while a purchase cycle is done.

The second innovation that came with the era of social networks is making the becoming brand associations clearer. Of course, even before the advent of the Internet, many brands used other advertising channels and also created a reputation for achieving the company's missions. However, since social networks remove the borders and create a connection between all segments of customers, this certainly has a more positive effect on brand loyalty among consumers.

Making an analysis on the second research question related to what exact priorities of the customers are, the presence of a chance to look through the company's social media is an option. For example, seeing a product on a shelf of the shop, people are more likely to scroll the Internet to gather more information and real reviews of other users. This can be a reason for companies to create an image of a brand and its product in social media.

Literature review

According to the Merriam-Webster dictionary, social media / networks are forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos). The popular social networks as Facebook, Twitter, Instagram and Youtube fall under this definition.

Today, social media is not only a communication tool, but also an active tool for marketing and online sales. Over the past 5 years, social media has dramatically changed the way the market operates. Social media has transformed communication practices between manufacturing companies and customers (Aral, Dellarcas, & Godes, 2013). Moreover, social

media is also transforming marketing approaches allowing businesses to influence consumer behavior in both forecasting and shaping (Hill, Provost, & Volinsky, 2006; Trusov, Bodapati, & Bucklin, 2010).

According to numerous studies, many customers now rely on information from social networks - reviews and comments about products and services as reliable information that can be used when people need to buy a certain product (Kapoor et al., 2018), as well as connect their needs and problems (Abed et al., 2015). Social media even creates communities to exchange opinions between consumers of certain categories of goods (cosmetics, clothing, household appliances, etc.), brands, products or services (Culnan, McHugh, & Zubillaga, 2010).

Consumers as a whole category belong to different online groups that can change their behavior when making a purchase decision. According to Evans, et al (2009), collaborative decision making is a process in which consumers make decisions based on their environment, such as family members, friends, and colleagues. Traditionally, consumers make purchasing decisions formulated on information they get from the media (such as television commentary), but nowadays social media has a significant impact on consumers' buying decisions (Solomon et al., 2010).

Consumers can search for the information needed and share experiences about products or services with other consumers. This experience is one of the reasons why social media influences purchasing decisions. Consumers also purchase products based on recommendations from social media (Leon, Sebastian, 2014).

Social media has become a more reliable and relevant source of information than direct information from companies. Therefore, consumers tend to look for products and companies on social media. Moreover, consumers enjoy interacting and communicating with each other, and receive positive or negative advice about various products or services, virtual communities influence consumer purchasing decisions (Ayda.D & Wei Li, 2012).

The influence of social media on buying behavior is a fairly new directional research study concentrating on analyzing the factors of such influence and determining the variables of buying behavior in the online environment (Vithayathil et. al., 2020).

This study contributes to an area of research on the impact of social media on consumer purchasing priorities for home appliances.

Methodology

While the research is based on data analysis, this study uses a quantitative research approach. The numbered data gathered by the conducted survey will be analyzed with statistical procedures as regressions. Furthermore, a quantitative approach is more relevant for inspecting interrelation between the variables of objective theories. The aim of this research is to determine the correlation between the dependent and independent variables within the sample of a survey. Within the framework of the study, the following set of methods was selected: statistical analysis - to consider statistics of Internet users and indicators of social media's influence on purchasing behavior; case analysis - consideration of examples of social media's impacts on consumer behavior when buying household appliances; work with literature on purchasing behavior.

The population of a sample refers to the total number of people in the context of a comprehensive headcount of all elements that the study's results are intended to reflect (Sekaran, 2003). A precisely identified population guarantees that the results and observations are applicable to the correct category of societal elements. This study assesses the factors that affect consumers' decision making process regarding household appliances in Kazakhstan. The population of the study is average middle and higher income consumers.

Findings & Discussion

At the beginning of 2021, the number of social media users worldwide was 3.96 billion, i.e. more than half of the entire population of the Earth. On average, everyone has 8.6 social media accounts in 2020.

50.64% of the 7.77 billion people in the world use social networks at the age of 13 and 63% are active users. 83.36% of Internet users use social networks; at the same time, those who use social networks via mobile Internet predominate - 90.71%.

99% of the 3.96 billion social media users access websites or applications via a mobile device, and only 1.32% access platforms exclusively via a computer.

Globally, the average time a person spends on social networks per day is 2 hours 24 minutes, and often this time is associated with viewing advertising posts of bloggers or viewing advertised products.

Facebook is the leading social network with 2.7 billion monthly active users. Next applications are YouTube (2 billion), WhatsApp (2 billion), FB Messenger (1.3 billion) and WeChat (1.2 billion).

Since social media is used to exchange ideas and reviews for a specific product / service or a specific brand or to gather information and generate ideas and to make the right buying decision, these platforms have become an effective email marketing tool. Quite often, opinion leaders who broadcast family values on the Internet are involved in the promotion of a specific electronic device (household appliances).

Social media has two ways of influencing the purchase of home appliances. One direction is the purchase of computer and mobile household appliances, which are subsequently used to access social networks. That is, social networks create a need for such electronics. As a result, when social networks became popular in a certain country / region, users often bought new devices (in particular mobile ones) in order to use social networks more conveniently. Actually,

social networks generate user's interest and demand for certain household products, so that they provide people with more efficient access to social networks - phones with better cameras and new functionality, etc.

Another aspect of the influence of social media on the purchase of home appliances is advertising or recommendations on social media. So during the period of the pandemic due to advertising on social networks with the involvement of opinion leaders, various partings for the home were effectively sold - an air humidifier, robotic suckers, blenders, etc. The target audience trusts the bloggers, they follow and their recommendations within the framework of advertising posts.

Another interesting aspect of the influence of social networks on the purchase of household appliances is the purchase of goods of certain brands. For example, the iPhone remains the most popular phone model for a long time. Not only because it is actively promoted by the manufacturing company, but also because these phones appear in users' selfies the most. That is, it seems that these phones are the best for selfies. Another example, in the Russian audience last year, opinion leaders among the female audience actively advertised Dyson devices (vertical vacuum cleaners, hair dryers, etc.). These products were also actively raffled off in various giveaways, so they became very popular and sales increased.

Case of Cuisinart

The American company Cuisinart produces a full range of small household appliances, from food processors to ice cream makers and yogurt makers. In 2003, the Cuisinart brand made a name for itself in Europe. Its main representative was Paul Bocuse, one of the most famous chefs in the world, a trendsetter of French cuisine and winner of 3 Michelin stars.

While the site for the CIS countries was under development, to get acquainted with the Ukrainian consumer, the company chose social networks. It was Facebook that was supposed

to play the role of the main communication channel between the brand and the Ukrainian consumer.

Project goal: popularization of the brand among a wide audience of social media users and stimulating interest in the brand's products. Attracting new customers and increasing sales.

Project objectives: creation and design of the brand page on the Facebook social network; filling the page with thematic content; attracting target audience to the page before the start of the promotion.

How the competition was held: the mechanics for the promotion was simple - a recipe competition "Edible Masterpieces with Cuisinart". Each participant had to upload an ice cream or smoothie recipe to the brand's page, which would later be included in the Cuisinart cookbook. The competition lasted from August 20, 2013 to the end of September 2013. Three prizes were determined by the client based on the most interesting recipe. Out of the three winners, using a special service, a participant was randomly identified who received the main prize - the Cuisinart ice cream maker. The second and third places were also prize-winning - the winners received Cuisinart electric salt and pepper mills.

Before the action:

Active group Cuisinart Ukraine on Facebook:

33 posts in the group before the start of the promotion;

119 participants in the group before the start of the promotion.

Results:

35 recipes from users;

295 new members of the Cuisinart Ukraine group on Facebook; There were 414 people in the group at the end of the action.

Increase brand awareness. Sales growth relative to the initial advertising period is approximately 2 times.

Secondary data

The topic of the thesis is the identification of how social networks affect the priorities of customers and their decision-making during purchases of household appliances, as well as marketing research: review and collection of data on household appliances, on the global volumes of the world market, the Kazakhstani market of household appliances and electronics. For complete results: analyzed the market, included primary and secondary data, studied quantitative and qualitative research and used statistics.

Based on order volumes, e-commerce is the most popular way to buy a product these days. Household appliances are no exception, on the contrary, they are gaining momentum every year and are noticeably involved by buyers, both individuals and legal entities. Basically, large orders fall on representatives of small and medium-sized businesses, as well as organizations. The number of small and medium enterprises in Kazakhstan is 1.6 million. Quarantine, lockdown, and the COVID-19 pandemic have increased the growth of online purchases and increased sales through B2C channels. People began to actively use the Internet, online shopping and increasingly order goods online, which was followed by a high growth in online shopping and sales. Based on the data provided by Kazpost JSC, the volume of the retail e-commerce market in the first half of 2020 amounted to more than 400 billion tenge, and at the end of the year it was about 900 billion tenge. The average check in tenge increased by 63%, and the number of transactions - by 18%. The main players in the e-commerce market in Kazakhstan are Mechta.kz, Technodom, Sulpak, Kaspi.kz, Evrika (Prime Minister, 2020).

The driving factors behind the growth of each brand of household appliances are purchasing power, an increase in the overall growth of the human population, new sales channels and an improvement in the quality of life of the people. Innovations and technologies are being introduced into each product of a particular brand of household appliances, the quality of the product, functionality, appearance, and various choices are improving. The market for

household appliances will noticeably grow, as technological and innovative achievements are introduced, thereby improving the quality of life, comfort, convenience of customers and, due to the simplicity and ease of use of household appliances, will stimulate the e-commerce market.

Research Examples.

In 2013, Vision Critical conducted a study on how social media affects shopping activity. About 6,000 respondents in North America and Australia were surveyed to study the impact of social media on consumer behavior, their priorities and decision making when shopping. The most important facts were highlighted, which was noted by the marketing company Vision Critical (Ava Seave, 2013).

- social media influence shopper behavior
- the success of the promotion depends on the product category
- 2/3 of buyers via social media are male
- 1/2 purchases are made within a week after viewing this product
- likes secure the purchase of a product

Vision Critical research confirms the impact of social media on customer priorities and purchasing decisions. In particular, by putting a like, reposting, or saving a particular product, in most cases it will encourage consumers to purchase the product.

In 2015, Deloitte conducted a study on how social media affects consumer behavior of different ages and races. It turned out that the content (product) that is distributed through social networks effectively encourages people to buy this or that product, which has a positive effect

on business owners. This study used a different age group, different demographic groups, and different products. The results of the study showed that social media reaches almost all groups, but in most cases with millennials. A report from Deloitte found that millennials are influenced by social media by 47 percent when shopping, compared to 19 percent for the rest of the age bracket. Research has shown that one in three consumers in the United States makes purchases using social media. Deloitte's report highlighted certain product categories that sell best through social media. Based on statistics, 56 percent are baby products, compared with 40 percent of household appliances and household goods, 33 percent of health and 32 percent of cars. Deloitte has clearly shown how social networks influence consumer behavior when making purchasing decisions for a particular product, and consumers are definitely under the influence of the Internet (Peter Roesler, 2015).

Research conducted by IBM in 2012 shows the relationship between social media and online shopping. Andrew Stephen's team surveyed 1,000 respondents in order to influence social media sales. Participants in the study found the relationship between the use of social networks and online shopping throughout the year. The study proved that the more people used social networks and the more the volume of purchases on the Internet increased. People who spend enough time on the Internet are more likely to shop online. It has been proven that these purchases were mostly impulsive, that is, spending time on social networks, bloggers' advice, company pages, encouraged people to buy a variety of products and in different volumes. The conclusion of the study is that the impact of social media carries both positive and negative online shopping experiences (Andrew T.Stephen, 2012)

Observational Study

The purpose of this experiment is to understand the behavior of users of the popular social media services (hereinafter – users) based on the set of specific factors. Particularly, this part investigates how often the user of social media apps is likely to make a purchase of a good or service based on their pattern of usage of the online service. One of the simple, yet powerful and representative ways to investigate the user behavior based on multiple parameters can be accessed by using the multiple linear regression method.

The following factors (parameters) will be used to construct the regression model:

1) Our explained (response) variable Y is the number representing the frequency of purchasing the goods and services based on the ads and recommendations from the social media services.

Assumption: Based on the conducted survey, the Y parameter ranges from zero to one, where 0 corresponds to “very frequently” or every day / multiple times per day, 0.75 corresponds to a “few times times per week”, 0.25 – “few times per month” and 0 – very rarely.

2) Combination of social networking services that a person uses on a regular basis.

Assumption: Based on the survey, it is considered that 1 corresponds to regular usage of 4 very popular social media services (Facebook, Instagram, YouTube and Tik-Tok). Then, the value of 0.75 corresponds to usage of 3 out of the suggested 4 social media services. Following that, the value of 0.5 indicates that only 2 popular services (or apps) are used on a regular basis. Finally, the value of 0.25 indicates that the user interacts only on the YouTube platform, as this service usually comes pre-installed on any modern smartphone and is known ubiquitously.

3) Number of minutes spent on the social media services daily

Assumption: Based on the survey results, the number of minutes spent on social media apps daily are converted to the specific scores. In this way, if a respondent spends up to 30 minutes on the social networking website per day, the score of 0.25 is assigned. Next, if the person spends up to 1 hour per day, the score of 0.5 is assigned. For the case, when the user spends 2 hours or more on the social media services daily, the maximum score of 1 is assigned.

4) Amount of impactful ads/recommendations /posts on the Instagram platform

Assumption: According to the survey, it is considered that the impactful recommendation or advertisement post on Instagram is the one that encourages the user to purchase the product. In quantitative terms, the value of 0.8 corresponds to “very frequent encounter with impactful ads or post” (several times per day), while the value of 0.5 or “periodic encounter with impactful ads and posts” corresponds to several times per week. In case, if the respondent selects “several times per month” then the weighting score of 0.25 is assigned. Finally, the score is 0 if the user never gets to see meaningful ads that would motivate them to purchase that good or service.

5) Amount of impactful ads/recommendations /posts on the YouTube platform

Assumption: While it might seem counterintuitive at first glance, the YouTube nowadays is actually considered the social media platform, as it not only provides video services but also allows users of the network to interact with each other in different ways, and furthermore constantly targets the billions of users with ads on the daily basis. Based on the survey, the scoring system will be the same with the Instagram platform.

In this survey, 59 responses were gathered, and 28 of the survey participants are not subscribed to any pages of the social media services, while the rest (or 31 respondents) do have some subscription to the commercial pages that advertise goods or services on any of the four

popular social media services. Therefore, two scenarios for multiple linear regression models will be considered: one of them refers only to the people who follow any commercial pages and the second scenario is for the people who do not have such a subscription.

Let's consider the main questions that I participate in regression in simple words and why we chose them.

1) "Which combo of social networks do you use to spend more time at?"

In this section, the most popular social networks are selected and the purpose of this question was to determine how many social networks are simultaneously used by one user

2) "Number of minutes spent on the social media services daily"

Here we want to find out the amount of time spent on social networks, which directly affects the amount of displayed ads.

3) "Amount of impactful ads / recommendations / posts on the Instagram platform" in this section, we evaluate not the total number of advertisements shown, but how effectively this advertisement is selected.

4) "Amount of impactful ads / recommendations / posts on the YouTube platform" here is considered the amount of effective advertising on YouTube, since it is a social network that is used by 100% of users, therefore they all see ads

Now, let's build the regression model for the scenario #1 using the parameters described above. The equation for the multiple linear regression is as follows:

In the above expression, the coefficients β_1 to β_4 represent slopes of the four control variables. In turn, the variables correspond to the following parameters:

1. *YI* – tendency to purchase the goods and services based on the ads and recommendations from the social media services
2. *sncombo* – combination of social networking services that person uses on a regular basis
3. *hspent* – number of minutes spent on the social media services daily
4. *inst* – frequency of impactful ads/recommendations /posts seen on the Instagram
5. *yout* – frequency of impactful ads/recommendations /posts seen on the YouTube

Using the survey data, we have divided the dataset into two parts: one part contains only those respondents who are subscribed to any commercial pages on the social media apps (Dataset 1), and another part is known to have no such subscriptions (Dataset 0). As only about 60 responses were gathered it is difficult to judge whether the obtained results can be extrapolated to the population. However, as the survey included college students of middle-income families with an age of 18 and older as well as well-educated adults (with an age range of 30 to 65 years old), it should be reasonable to assume that the regression results can be generalized towards the middle-income families and individuals with an age spanning from 18 to 65 years

Using the RStudio tools, the regression model for the first scenario was constructed and then analyzed. From the summary of the regression model that is based on the four control variables, the next results were obtained:

```

Call:
lm(formula = onbuy1ln ~ sncombo1 + hspent1 + inst1 + yout1)

Residuals:
    Min       1Q   Median       3Q      Max
-0.4468 -0.0608  0.0008  0.1117  0.2352

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -1.5984     0.1146  -13.951 1.39e-13 ***
sncombo1      0.3977     0.1833   2.169  0.03939 *
hspent1       0.5386     0.1915   2.813  0.00922 **
inst1         0.5219     0.2439   2.140  0.04190 *
yout1         0.3898     0.2273   1.715  0.09820 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.183 on 26 degrees of freedom
Multiple R-squared:  0.8163,    Adjusted R-squared:  0.7881
F-statistic: 28.89 on 4 and 26 DF,  p-value: 3.145e-09

```

Figure 1: Summary of the Scenario #1 multiple linear regression model

From the above table we can see that all the variables except for the “yout1” or impact of the YouTube ads are statistically significant, as the p-value in those variables is less than five percent. As for the *yout1* variable, this parameter is considered to be on the verge of significance as it lies in the 10% interval of p-value. The possible explanation to the “lack of statistical significance” of the result is that YouTube advertisement algorithms are not as targeted and user-driven compared to the user-centric Instagram algorithms. It is worth mentioning that the value of the adjusted R-squared is 0.78 in this scenario, which indicates that the model should be checked for the multicollinearity issues later.

Following that, this study investigates the dependence of the outcome variable Y, which is the tendency to purchase goods and services online based on the suggestions and ads from any of the four most popular social media services (with scores ranging from 0 to 1) on the variable *hspent* which represents the amount of minutes user spends on social media services daily (converted to scores ranging from 0 to 1). Simultaneously, the model investigates the

relationship for another control variable, which is the *sncombo* or combination of social media services used by the respondents.

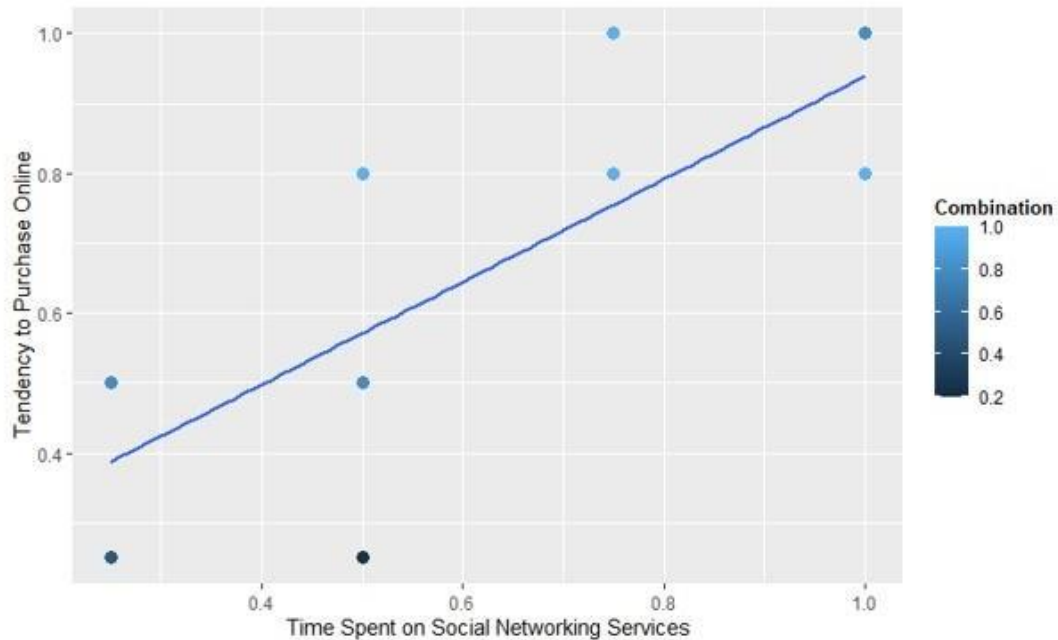


Figure 2: Plot of the multiple linear regression model for the Scenario #1

From Fig. 2 one can notice that there is a straight linear relation between the time spent on social networking services and tendency to purchase goods and services online. Otherwise, those users who use social media services heavily are more likely to make purchases of goods and services based on the ads and recommendations of those services. In addition, the more services a single user is using on a regular basis, the more likely it is that she or he will end up purchasing the goods or services based on the ad or suggestion. This behavior is noticed by looking at the color scale of the scatter plot represented in the set of blue points.

As the next step, it is useful to approach the Scenario #1 from a different angle. In this case, the tendency of users to make purchases of goods or services can be evaluated as the function of the frequency of the impactful Instagram ads or suggestions. At the same time, the

relationship with the frequency of impactful YouTube ads and suggestions is considered via the scatter plot.

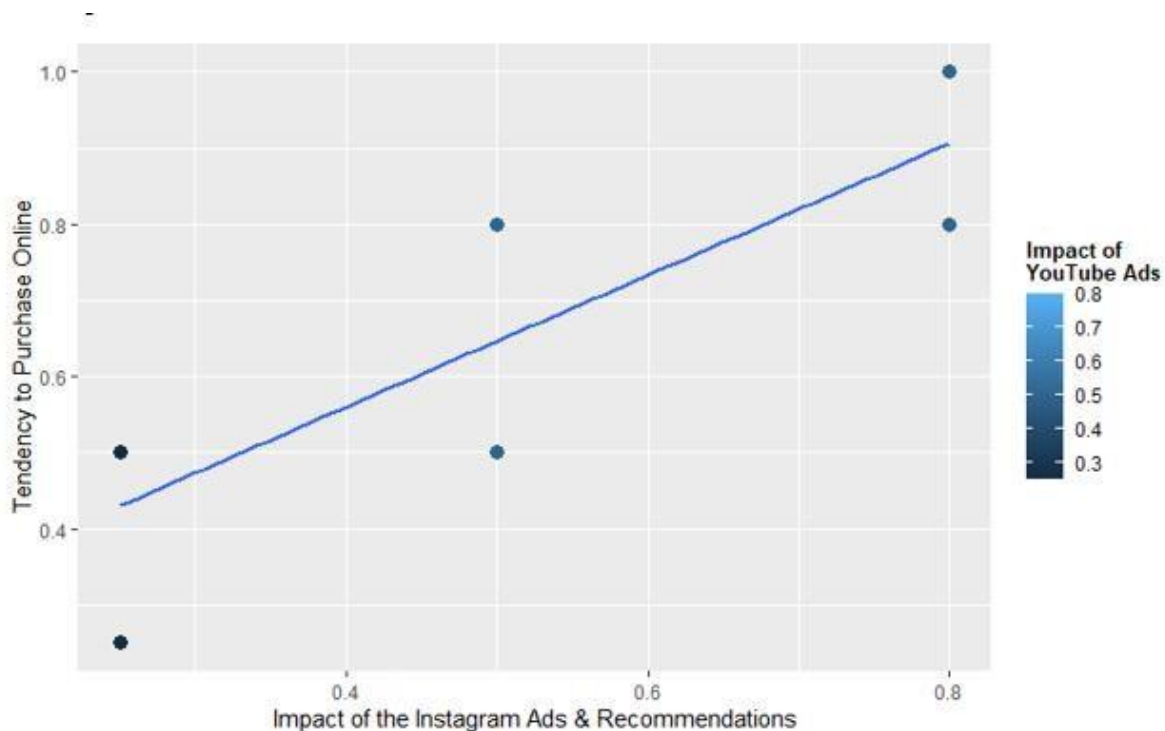


Figure 3: Plot of the multiple linear regression model for the Scenario #1

From Figure 3, you can see that there is a direct linear relationship between the frequency of the impactful Instagram ads and recommendations, and the tendency to buy goods and services on the Internet. YouTube advertising is not very important here - we understand this by looking at the blue dots. Otherwise, there is no definite pattern among the users of the survey sample that would allow us to argue that more effective YouTube ads that users encounter will lead to a higher frequency of purchases of goods or services. This can be explained by the difference in ad selection algorithms between YouTube and Instagram. Although YouTube is considered a social network, it is still a service for watching videos, and not for sharing them, this can explain the fact that you do not have to register for viewing. This means that YouTube only knows about the type of content that you are watching, which cannot

fully say what you would like to buy, therefore YouTube advertising is configured to reach a different audience. While Instagram can be said to "listen" to you. Instagram knows where you live, how you make money, your political views and sexual preferences, who are your friends, as well as your likes, etc. All this data is collected based on what you report online, what type of content you are interacting with, including on other sites.

At this point, the second scenario can be considered. By using the alternative dataset that includes only the respondents that do not follow any commercial pages, the new regression model can be constructed. Again, there is one outcome variable Y_2 , and four control variables x_1 to x_4 . Below, is the summary of the model obtained via RStudio:

```
Call:
lm(formula = onbuy0ln ~ sncombo0 + hspent0 + inst0 + yout0)

Residuals:
    Min       1Q   Median       3Q      Max
-0.47219 -0.12630 -0.00818  0.05183  0.69986

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  -1.8818     0.1626  -11.576 4.51e-11 ***
sncombo0      0.7196     0.3053   2.357  0.0273 *
hspent0       0.5504     0.2864   1.922  0.0671 .
inst0         0.3723     0.2787   1.336  0.1947
yout0         0.4079     0.1716   2.377  0.0261 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2456 on 23 degrees of freedom
Multiple R-squared:  0.6938,    Adjusted R-squared:  0.6405
F-statistic: 13.03 on 4 and 23 DF,  p-value: 1.102e-05
```

Figure 4: Summary of the multiple linear regression model for the Scenario #2

As can be noticed from the above summary, the variable corresponding to the time spent on the social media services (*hspnet*) lies within the 10% interval of significance in this scenario (according to the p-value). Otherwise, there is 90 percent chance that *spent* behaves as it is not due to the random chance. However, it is conventional that 95% is considered to be

a significant result. Furthermore, the amount of impactful ads on Instagram is not even close to being a significant factor this time. It can be explained by the assumption that the people who do not follow any pages of online shopping services are likely to use Instagram less actively and therefore encounter much less of the ads and suggestions there.

Considering such a result, the adjusted multiple linear regression model can be produced for the second scenario. This time, the factor of Instagram ads and suggestions is removed, which leaves only 3 control variables, as represented on Figure 5. As represented below, the adjusted multiple linear regression model demonstrates the high level of statistical significance for all the parameters. One can notice that the value of the adjusted R-squared is 0.62, which indicates that the model should be checked for the multicollinearity issues as well.

```
Call:
lm(formula = onbuy0ln ~ sncombo0 + hspent0 + yout0)

Residuals:
    Min       1Q   Median       3Q      Max
-0.59463 -0.13110  0.01544  0.10554  0.67455

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -1.7842     0.1476  -12.091 1.07e-11 ***
sncombo0      0.8719     0.2878   3.030  0.00578 **
hspent0       0.6007     0.2886   2.082  0.04819 *
yout0         0.4241     0.1739   2.439  0.02251 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2495 on 24 degrees of freedom
Multiple R-squared:  0.6701,    Adjusted R-squared:  0.6288
F-statistic: 16.25 on 3 and 24 DF,  p-value: 5.593e-06
```

Figure 5: Summary of the adjusted multiple linear regression model for the Scenario #2

At this point, it is possible to investigate how the tendency to purchase the goods or services online by the people who do not follow online store pages on the social media services is different from the first scenario. In order to understand that, the following plot is produced:

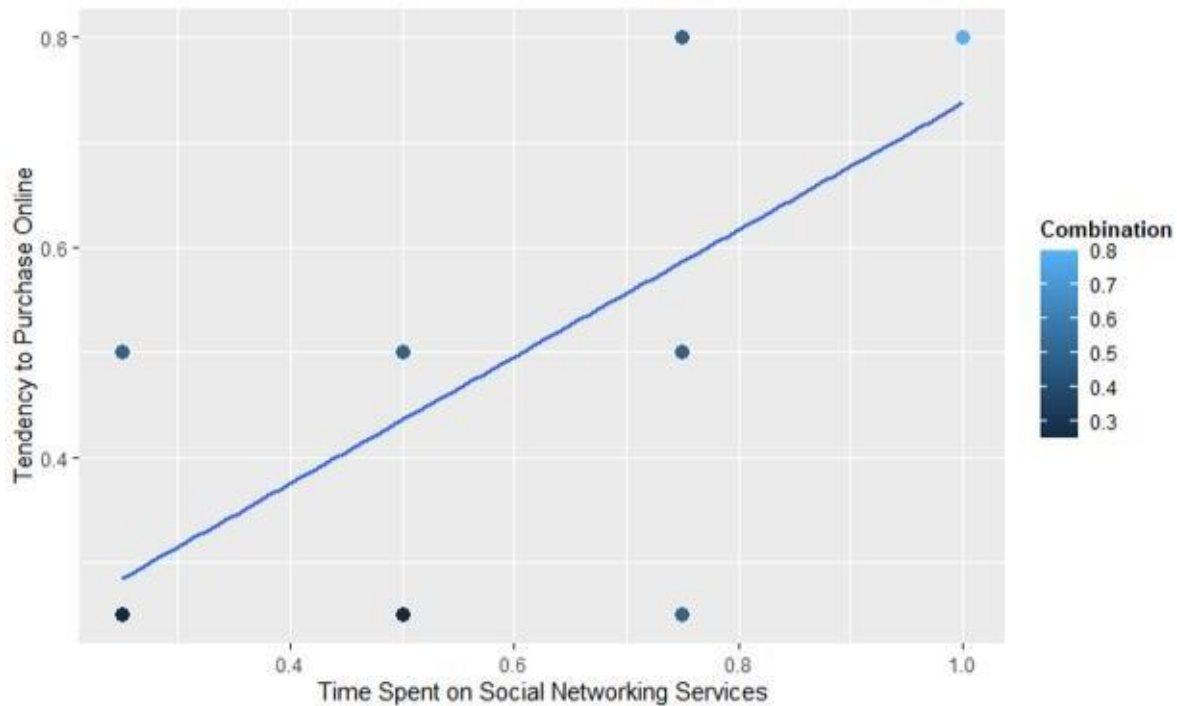


Figure 6: Plot of the multiple linear regression model for the Scenario #2

As we can see, there is a direct linear relationship between time spent on social media and the more services one user uses on a regular basis, the more likely he or she will end up buying a product or service based on an advertisement or offer.

While the obtained pattern is quite similar to the one obtained in the Scenario #1, there is one notable difference. In order to observe this difference, the Mean Absolute Error method can be utilized. Mean absolute error (MAE) is a measure of errors between paired observations expressing the same phenomenon. . This method will allow to observe, how the tendency to purchase products and services online (represented by the outcome variable Y_1) differs from that tendency in the Scenario #2, where the users have no subscription to the commercial pages on the social media (represented by the outcome variable Y_2). Using the RStudio tools, it was computed that survey respondents that are subscribed to the pages of online shopping service

on the social media apps are likely to purchase goods or services 27% more frequently compared to those users that do not follow any commercial pages.

As the next step, the Scenario #2 can be evaluated with regards to the amount of impactful YouTube ads. The corresponding plot can be seen below:

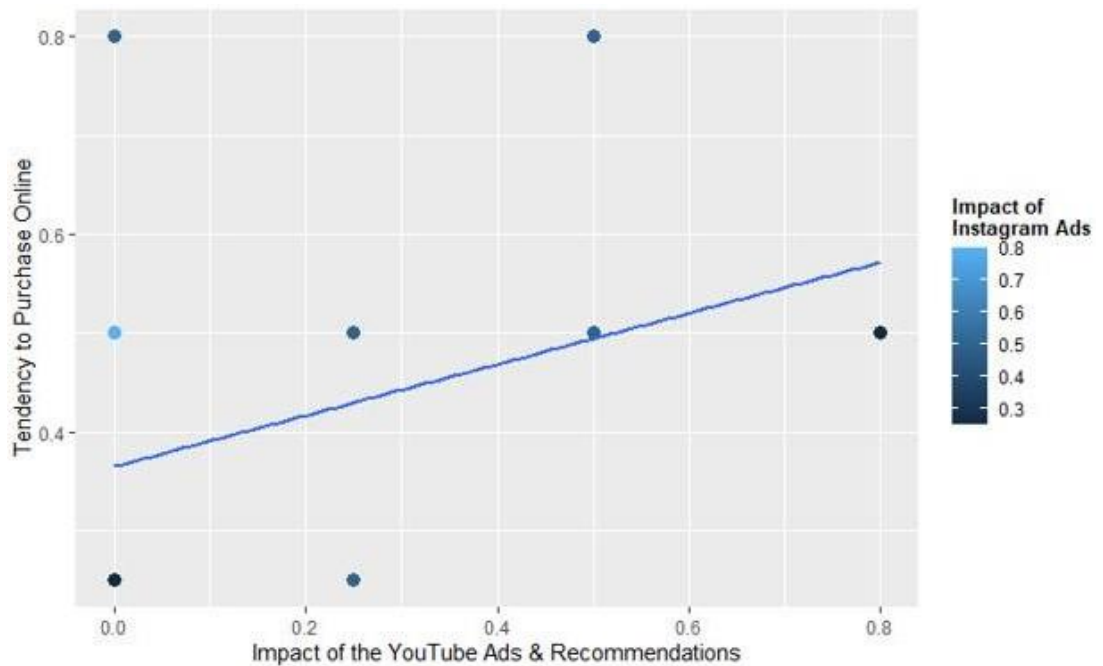


Figure 7: Plot of the multiple linear regression model for the Scenario #2

We can see that there is a direct linear relationship between the frequency of the impactful Youtube ads and recommendations, and the tendency to buy goods and services on the Internet.. Instagram does not show a linear relationship with the online shopping trend - this is because the result is not statistically significant for the Insta variable, as we could see it in Figure 4, and also because people who do not have online shopping subscriptions are less likely to use Instagram. This means that Instagram does not have complete information about the user, so this does not have a significant impact on the results of our model.

In order to check the two obtained models for the multicollinearity issues, it is useful to start with building the correlation matrices. Using the access RStudio tools the following table of correlation was obtained for the first scenario:

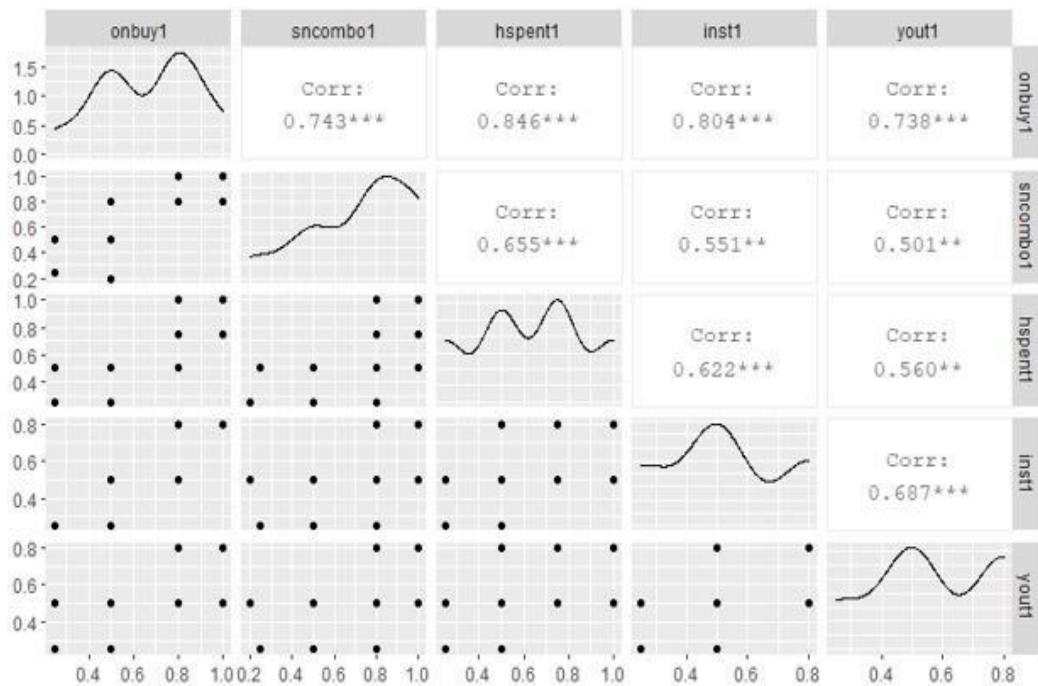


Figure 8: Table of correlation pairs for the multiple linear regression model (Scenario #1)

1) # For Scenario 1 (subscribed to online stores)

we identified 4 high-correlated pairs for X variables ($\text{corr} > 0.7$)

also, there are 6 medium-correlated variable pairs ($0.5 < \text{corr} < 0.7$)

2) The amount of highly correlated pairs of variables is less than 50% of all the variables (only 4 out of 10 variables are significantly correlated) and therefore it is safe to assume that the set of control variables selected for this model is robust and the obtained model is reasonably significant.

However, in order to directly check the linear regression model for the multicollinearity issues, it is reasonable to use the *mctest* using the RStudio tools.

```

All Individual Multicollinearity Diagnostics in 0 or 1
      VIF TOL Wi Fi Leamer CVIF Klein IND1 IND2
sncomb1  0  0  0  1      0    0    0    0    1
hspent1  0  0  1  1      0    0    0    0    1
inst1    0  0  1  1      0    0    0    0    1
yout1    0  0  1  1      0    0    0    0    1

1 --> COLLINEARITY is detected by the test
0 --> COLLINEARITY is not detected by the test

yout1 , coefficient(s) are non-significant may be due to multicollinearity
R-square of y on all x: 0.8163

```

Figure 9: Multicollinearity test for the MLR model #1 (Scenario #1)

By its nature, the *mctest* function allows to check the possible multicollinearity via a set of 7 tests and 2 indicators for highly correlated pairs (which already were reviewed). In the first scenario, the widely popular VIF or Variance Inflation Factor test failed to detect any multicollinearity issues. On the other hand, the Farrar Chi-Square Test is the only one that indicates that all the variables face the possible multicollinearity issues. Due to the fact that only one out of 7 tests detect multicollinearity, while the rule of thumb is that at least 3 tests should confirm such issues, this experiment concludes that multicollinearity is not a significant issue in the regression model for the first scenario.

In order to investigate whether there are any multicollinearity issues in the adjusted multiple linear regression model of the second scenario, the *mctest* can be conducted again. Based on the results obtained on the Fig. 10 one can claim that only Farrar’s Chi-Square test indicates the possible multicollinearity issues. All the other tests, including the two indicators for highly correlated pairs, failed to detect the possible issues. This findings allows to conclude

that in the Scenario #2 The multicollinearity is not an issue, and the results obtained for that particular sample are statistically significant and reasonable.

```

All Individual Multicollinearity Diagnostics in 0 or 1
      VIF  TOL  Wi  Fi  Leamer  CVIF  Klein  IND1  IND2
sncombo0  0  0  0  1      0      0      0  0  0
hspent0   0  0  0  1      0      0      0  0  0
yout0     0  0  0  1      0      0      0  0  0

1 --> COLLINEARITY is detected by the test
0 --> COLLINEARITY is not detected by the test

* all coefficients have significant t-ratios

R-square of y on all x: 0.6701

```

Figure 10: Multicollinearity test for the MLR model #2 (Scenario #2)

After running the test for two scenarios, we can say that both scenarios do not have multicollinearity issues, in this regard, we can confidently say that our regression can be used in larger studies to conduct accurate statistical analysis.

Conclusion

Thus, social networks are a full-fledged platform for promotion and online sales. Many modern studies have already proven that social networks have a significant impact on consumer behavior on the Internet. Social networks exert the most important influence on the choice of a certain product by a buyer through: advertising posts in the accounts of opinion leaders, recommendations and reviews. With regard to consumer behavior while buying household appliances, social networks have the following forms of influence: 1) create a need / demand for household appliances that provide access to social networks (computers, tablets, mobile phones); 2) promote the promotion of certain household products through advertisements and recommendations (household appliances for the home and kitchen). Using certain marketing tools to promote a particular product, it is possible to achieve the company's success, implement your plans, achieve good financial performance, and increase customer interest. Marketing tools such as: SMM, Google analytics, SEO, content marketing, email and messenger marketing are an effective impetus for the competent promotion of goods through social networks. Based on the analysis, social networks are an ideal platform for selling your goods. Nowadays, the Internet provides a lot of opportunities for promoting a company, attracting potential customers. Based on the questionnaire, the conclusion is that social media influences the priorities of customers and their decision-making when shopping for household appliances. There is a link between the influence of social media and consumer purchasing decisions. The importance of social networks for e-commerce is felt, because brand awareness and demand for the product increase, more and more online purchases are made, new potential customers are attracted, and thus the social network stimulates the consumer to make this purchase.

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