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THE USE REGRESSION AND CORRELATION ANALYSIS IN GENERATIONAL STRATIFICATION AND CONSUMER BEHAVIOUR

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Abstract. We can definitely state that consumer behavior is influenced by many factors. Age is one of the most significant and important demographic indicators, which are reflected in changes in consumer behavior, primarily in the growth and transformation of the needs of individualists. The primary foundation and purpose of the paper is to determine the influence and dependence of individual generational cohorts, respectively age, on the amount of money spent in the purchasing process, which will be enriched by a comparative analysis of the amount of money spent in retail and in the online space. Among the methods that we used in the article, we primarily include the graph analysis method supplemented by correlation analysis and linear regression. Primary data were obtained from a questionnaire survey of Slovak retail consumers. The last method used was the method of comparing results. We consider the model as a whole to be statistically significant in the case of Gen X, who makes purchases online, and the younger Gen Z in both variants of purchases (physical and online). The contribution is a suitable basis for further research.

Keywords: generation stratification, consumer behaviour, correlation, regression, Slovak Republic.

JEL Classification: M31, D11, D12.

Introduction

Consumer behavior in the study sense is a topic characterized by diversity. This is primarily due to the fact that consumption as such is not only an output of economic behavior, but also largely reflects the social behavior of consumers in society (Henry, 1991; Slaton et al., 2020).

Thus, the study of consumer behavior is a very complex interdisciplinary topic involving many other disciplines (Helgeson et al., 1984). Consumer behavior includes shopping, collecting information, passing on to sellers and mental activities such as information analysis, comparison, purchase decision (Al-Jeraisy, 2008), but also the phase of post-purchase behavior (Samli, 2015).

Understanding consumer behavior and clearly predicting its subsequent direction is a complex process. We can often see significant differences between how a consumer behaves in a given market and what his attitudes, needs, or expectations are. It is very important to place much more emphasis on the area of consumer behavior than on the individual, to meet his needs and wishes as much as possible (Tesarova & Krizanova, 2022).

The field of this scientific discipline from the point of view of marketing is still young compared to others. Most of the significant researches began to emerge from the 1970s. Since then, the field of consumer behavior research has experienced even greater acceleration and has recently become the largest empirical focus of the marketing discipline (Kollat et al., 1970).

However, the empirical analysis of consumer behavior has a much longer history (Stigler, 1954) with gradual consideration of income, considerations about the future use of products, education, or demand depending on the size of the family (Nevo, 2011).

The research and analysis of traditional and online retail is devoted to authors such as Chen et al. (2020), Singh and Thirumoorthi (2019), who discussed the impact of disruptive digital technologies on customer preferences in their paper. The issue of the dependence of generations on consumer behavior and changes in purchasing patterns in individual generational groups is still a current topic of research in the field of modern marketing. In the modern environment, experts not only in marketing, but also in HR, psychology, and last but not least, we can see the intersection with the practical

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level, especially in terms of market segmentation. If we want to characterize individual generational groups of consumers, we must be able to accurately characterize and be able to name their preferences, as well as needs and requirements. It is important to remember that these characteristics are influenced by the external environment, which includes cultural, economic, political or social aspects, as well as the internal environment of the consumer, representing his own personality, motivation and attitudes in connection with the influences that are the result of the situation.

1. Literature review

Within the scientific field and the academic community, there are many authors, not only domestic, but also foreign, who deal with the issues we are researching. Smolka (2019) dealt with generations as such, their characterization and division in the conditions of the Slovak and Czech Republics. We further divide the basic division into generations X, Y and Z. However, we can also meet the so-called intermediate generations Baby boomers, Husák children, millennials, snowflakes or Alpha.

Gen X has the highest repeat purchase behavior. Multigenerational marketing is the practice of tapping into the unique wants, desires, and preferences of consumers within more than one specific generational group. Gen X has different characteristics, behaviors, beliefs and attitudes. The main feature is the effort to harmonize aspects and find an intersection between family, life and work. Their needs can be defined as diverse and at the same time they are characterized by greater financial ties, in general they often make purchases at value-oriented retailers. They have a preference for a useful and practical approach to shopping and engage in safe shopping behavior (Chakraborty & Balakrishnan, 2017). Characteristic features of the analysis of the market behavior of generation X are high media competences manifested by criticism and irony on the part of receiving content (Lipowski, 2017).

While members of Generation Y (millennials) are dependent on technology and social networks, members of the older generation are at a different stage in their lives and are therefore calmer and more family-oriented individuals (Kolnhofer-Derecskei et al., 2017). Taking into account this fact, in their research, various scientific authors focused on the history of retailing of the three generations Y, X and baby boomers and found the intersection and connection between values, attitudes and beliefs (Brosdahl & Carpenter, 2012; Dabija et al., 2017).

Unlike their parents and older brothers who belong to Generation X or Millennials, Generation Z individuals have completely different behaviors. They want to be more ecological with an orientation towards sustainability. They are characterized by technical and technological prowess, taking into account above all those companies and especially brands that can connect with them and improve their experiences and feelings. When designing their offers and promoting their brands, retailers need to be more aware of the preferences and expectations of the young generation Z consumers (Dabija et al., 2019).

Gen Y shoppers are recognized as an important and distinctive market segment and demonstrate differences in shopping styles compared to previous generational cohorts (Bakewell & Mitchell, 2003; Carpenter et al., 2005; Seock & Bailey, 2008; Pentecost & Andrews, 2010). While the first steps have been taken to understand Gen Y shoppers, few existing studies empirically link shopping orientation to specific patronage behaviors within this large and important market segment. A study by Zhang et al. (2011) examines shopping orientations and retail format choice among a sample of Generation Y apparel shoppers in the US. The research examines the effects of shopping orientations such as shopping enjoyment, price awareness, shopping confidence, convenience/time awareness, fashion/brand awareness, propensity to shop at home, brand/store loyalty on retail format choice across seven different retail formats, among which are upscale department stores, traditional department stores, value department stores, specialty stores, fast fashion stores, discount stores, discount stores, outlet stores. Although Generation Y, characterized by its hedonism, extravagance and high connectivity, is in many ways considered a more attractive target population for businesses, it is important to direct marketing efforts to Generation X, who, according to the literature, buy more due to higher disposable income and a larger time pool at their disposal (Lissitsa & Kol, 2016). Generation Y has been found to be the most extensively studied generation.

A study by Pentecost and Andrews (2010) examining the influence of demographic (eg gender and generational cohort) and psychographic (eg fashion fan, attitudes and impulse buying) factors on the frequency and levels of expenditure on fashion purchases. In particular, Gen-Z has unique characteristics related primarily to consumer habits that set them apart from the powerhouses of Gen X and Y. These emerging generations shared four distinct characteristics: more interested in exploring new technologies, persistent in the ease of use of devices, they have a desire to feel safe and prefer a temporary escape from reality whenever they face challenges (Wood, 2013). Because of these four characteristics, Gen-Z is considered a priority clientele that marketers should actively address and adapt marketing functions accordingly (Roblek et al., 2019; Ng et al., 2019).

2. Research methodology

The research methodology includes data evaluation and determination of the statistical significance of the set using regression. The sample of primary data, which we further evaluated statistically, consisted of respondents to a questionnaire survey that we conducted on a sample of 450 Slovak consumers within the Slovak Republic. The questionnaire was distributed partly physically and on social platforms to random respondents. For regression

analysis, it is important to define the independent variable x and the dependent variable y. In our case, we chose as the variable x the amount of money paid when making purchases in a physical retail store, respectively in an online store, and we substituted the age of the respondents as the variable y. Regression analysis is a statistical tool for examining relationships between variables. Typically, the investigator seeks to establish the causal effect of one variable on another (Sykes, 1993). This was followed by the construction of a correlation (point graph) and the execution of a correlation analysis, since we decided to investigate the relationships between two quantitative signs. The methodological apparatus in the paper, which we considered to be appropriately chosen, was the addition of statistical calculations to graphic data analysis. It is impossible but to agree that the use of graphic methods in data analysis is beneficial, especially in the case of searching for basic properties of data, such as the existence of natural clusters, different relationships between quantities in different categories, the occurrence of outlier observations, verification of the shape of the distribution or the relationship between variables (Vlach & Plašil, 2006). With the help of graphical analysis, we can detect extremes as well as outliers. The most suitable graph for detecting such values and directly comparing data sets is the boxplot. It has become a standard technique to present a 5-number summary consisting of minimum and maximum range, upper and lower quartile, and median values (Potter et al., 2006). All statistical operations were performed in IBM SPSS Statistics 25.

3. Results

The following Table 1 shows us a sample of heterogeneous respondents who took part in the questionnaire survey in the proportion of 53.11% women and 46.89% men. This was followed by the division of the members of the questionnaire into the generation groups Baby Bommers (14% share), Gen X (10% share), Gen Y (27.78% share) and the most represented generation was the younger generation Z with a share of 48.22%.

Table 1. Shares of generations (source: own survey)

	Female (abs. value)	%	Male (abs. value)	%
BB	27	6.00	36	8.00
X	23	5.11	22	4.89
Y	72	16.00	53	11.78
Z	117	26.00	100	22.22
Sum	239	53.11	211	46.89

In the Results section, the statistical analysis of the basic set originating from the sample of participants of a questionnaire survey focused on shopping behavior in the conditions of the Slovak Republic, in which we were interested in how much money the Slovak consumer spends in physical and online retail, is further elaborated.

We divided the sample into subgroups according to age, respectively the generation axis, and then examined the dependence of the amount of money spent in retail, respectively on the Internet, on the age group. As part of the statistics, we primarily tested the normality of the files (values are shown in Table 2).

Table 2. Test of normality (source: own survey (SPSS)

Test of normality		
Age_BB	0.001	H_0 reject
Retail_BB	0.009	
Age_BB	0.207	H_0 retain
Internet_BB	0.232	
Age_X	0.001	H_0 reject
Retail_X	0.000	
Age_X	0.000	H_0 reject
Internet_X	0.000	
Age_Y	0.000	H_0 reject
Retail_Y	0.000	
Age_Y	0.000	H_0 reject
Internet_Y	0.000	
Age_Z	0.000	H_0 reject
Retail_Z	0.000	
Age_Z	0.000	H_0 reject
Internet_Z	0.000	

Correlation analysis through the Test of linear independence of variables X and Y determines statistical significance and linear dependence, when we established in the null hypothesis that the variables are not statistically significant, on the contrary, when accepting the alternative hypothesis, we establish statistical significance between the variables. We can calculate the correlation of two variables using Spearman's or Pearson's correlation test, depending on the form of data distribution of our sample. We use parametric tests of the statistical significance of the correlation coefficient if the variables have a normal distribution. In this case, we use the Pearson correlation coefficient, which is currently the most important and most used correlation coefficient (Hendl, 2015). This is listed in the SPSS program as Bivariate Correlation. In case the distribution of our data is not normal, or we cannot verify it, we have to use non-parametric correlation coefficient tests. In research, there has been a long-standing debate about what type of correlation analysis to use for data.

According to correctness, Spearman's correlation should be used, but even in the most renowned journals in the world, Pearson's correlation coefficient is commonly used (Hanák, 2016; Pacáková et al., 2009). When examining the null and alternative hypothesis, we found that the variables of generation groups X (for online shopping) and Z (in both cases of completed purchases, that is, in retail and online) are statistically significant. It is these groups that show a moderately strong linear

dependence between age and the amount of cash. Addiction reaches 50.8% in Gen X; 60.4% of Gen Z in retail and 59.1% of Gen Z in online shopping. Other calculation results are presented in the table, in which we also note negative values of the correlation coefficient with low linear dependence.

Table 3. Correlation (source: own survey (SPSS)

Correlation					
	Pearson Correlation	Sig.	Spearman's Rho	Sig.	$H_{\acute{e}}$
R_BB	−0.201	0.114	−0.041	0.750	retain
I_BB	−0.176	0.389	–	–	retain
R_X	0.076	0.618	−0.084	0.584	retain
I_X˙	0.398	0.033	0.508	0.005	reject
R_Y	0.054	0.549	−0.057	0.527	retain
I_Y	0.117	0.212	0.048	0.609	retain
R_Z	0.594	0.000	0.604	0.000	reject
I_Z˙	0.530	0.000	0.591	0.000	reject

Correlation analysis will tell us if there is a certain dependence between the variables, but we cannot quantify what specific relationship exists between the variables. It indicates a certain possibility of prediction, but only general and not unequivocal. We also cannot predict the values of another variable from the values of one variable during correlation analysis (Table 3).

Linear regression analysis removes these shortcomings in determining the relationships between variables, namely, it is a statistical method with which we can examine the causal relationship between two or more variables and we can calculate it exactly. We can determine the size of the influence and even determine the expected values of the dependent variable if we know the value of the independent variable. In regression, we assume that one variable depends on another variable. There can be, and in practice usually always are, several independent variables that affect the dependent variable. The more independent variables, the more precisely we can describe the development of the dependent variable (Hanák, 2016).

The Table 4 entitled Model Summary (Model Summary) describes the regression model. The meaning of the individual coefficients is as follows: R denotes the correlation coefficient between the number of open entrepreneurial characteristics and the scale of intuition. In our case, there is only a moderately strong relationship between our variables for Generation X in online shopping and Generation Z in both physical and online shopping. Other variables have a weak relationship with each other. R Square is the coefficient of determination. It is the square of the correlation R and explains how much percent of the variability of the dependent variable Y – the amount of minute funds is affected by the independent variable X – age. In our case, we see that the values are mostly lower. In other words, age affects the

amount of minute funds when making a purchase in a retail store with gen BB only 4%, on the Internet it was 3.1%. In the case of gen X, a slightly higher variability was recorded, i.e. 15.8% when making purchases online. In the case of gene Y, we can again observe low values of variability. On the contrary, for Gen Z, the variability values increased by a few percentage points to 35.3% in the case of purchases in retail stores and 28.1% in the case of online purchases of the aforementioned generation.

The ANOVA Table 5 indicates how well the regression model describes the data. The last column gives the value of p. We consider the model as a whole to be statistically significant and accept the alternative hypothesis H1 in the case of gen X, who makes purchases online and gen Z in both variants of purchases (physical and online).

The last Table 6 shows the coefficients of the regression equation. We can construct a regression equation from these coefficients.

Table 4. Regression Model Summary (source: own survey (SPSS)

Regression Model Summary				
	R	R Square	Adj. R Square	Std. Error of the Estimate
R_BB	0.201	0.040	0.025	59.05539
I_BB	0.176	0.031	−0.009	26.00262
R_X	0.076	0.006	−0.017	67.64148
I_X	0.398	0.158	0.127	23.43066
R_Y	0.054	0.003	−0.005	60.86461
I_Y	0.117	0.014	0.005	43.89633
R_Z	0.594	0.353	0.350	64.89477
I_Z	0.530	0.281	0.278	25.54698

Table 5. Regression ANOVA (source: own survey (SPSS)

Regression ANOVA				
	Sum of Sq. (Mean Square)	df	F	Sig.
R_BB	8958.537	1	2.569	0.114
I_BB	519.850	1	0.769	0.389
R_X	1156.875	1	0.253	0.618
I_X	2782.282	1	5.068	0.033
R_Y	1335.217	1	0.360	0.549
I_Y	3036.418	1	1.576	0.212
R_Z	494532.794	1	117.429	0.000
I_Z	53313.463	1	81.688	0.000

Table 6. Regression coefficients (source: own survey (SPSS)

Regression COEFFICIENTS		
	Constant	Age
R_BB	403.484	−3.152
I_BB	164.353	−1.113

Regression COEFFICIENTS		
	Constant	Age
R_X	181.752	2.016
I_X	−101.095	3.687
R_Y	275.578	−0.565
I_Y	70.392	0.921
R_Z	317.042	19.176
I_Z	−84.715	6.442

4. Discussion

Desfontaines et al. (2020) addresses fundamental considerations for retail. Retail businesses today have a unique opportunity to use technology to understand customers in a more meaningful way. The key goal of the paper was to determine the main directions of digitization in retail. The perception of shopping in an online store has a significant impact on customers' approach to multichannel shopping behavior, regardless of whether they search or buy through an online channel. Shoppers who are more open to multi-channel shopping behavior will show greater intentions with future spending if a brick-and-mortar store decides to open its store online. Those who prefer brick-and-mortar stores both when searching for information and when buying a product represent a lower amount of funds that they spend in a given retail store (Chiou et al., 2017).

The results of the study by Dabija et al. (2019) showed that consumers from baby boomer groups were not the same as the results of generation X consumers in that older groups of consumers wanted more convenience, higher values, but also quality, for example, when buying clothes, and at the same time there was a demand for products that stood out authenticity compared to younger consumers from Generation X.

In his study, Parment (2013) compares two significant generational cohorts: baby boomers with Generation Y in terms of their purchasing behavior and purchases of food, clothing and automobiles. For these three product types, Baby Boomers value the retail experience and in-store service more than Gen Y. For Baby Boomers, the purchase process begins with a retailer that the consumer trusts to provide guidance on choosing the right product, while for Gen Y, the process purchase begins with product selection. This study presents implications for retail strategies that appeal to different generational cohorts and considers how retailers should address customer relationship building. Based on extensive annual social surveys in Israel, the current study uses generational cohort theory as a framework to conduct an investigation of trends in Internet adaptation and adoption and online shopping behavior between Generation X and Generation Y over the past decade. Over the course of the decade, internet access and online shopping rates have steadily increased for both generations, but internet users have not been taking advantage of the full potential of online shopping. The findings of the aforementioned research support the use of generational cohort theory as a market segmentation tool: although the rate of Internet access was higher in Generation Y, the percentage evaluation indicated that Generation X respondents purchased electrical appliances, furniture or vacations online to a greater extent. rate than the younger Generation Y. Researchers found support for using generational cohorts to expand market boundaries.

Pentecost and Andrews (2010) found that there were gender and generational cohort differences as well as psychographic differences (fashion fans, attitudes and impulsive behavior) in their study of frequency of fashion spending. Generation Y made more frequent and impulsive purchases than Generation X, Baby Boomer consumers (Brosdahl & Carpenter, 2012). On the contrary, they showed a more limited interest in wearing fashionable clothes. All respondents placed increased emphasis on the fair trade philosophy focused on wages, the workplace and the environment. For all generational cohorts, their propensity to wear ethnic clothing had the strongest influence on future intentions to purchase fair trade clothing (Littrell et al., 2005). Using regression analysis, the results of the paper by Pentecost and Andrews (2010) indicated that gender and fashion had significant effects on weekly and monthly spending, while gender and impulse buying had significant effects on annual spending. Attitude towards fashion did not have a significant effect on expenditure. Women shop more often and differed significantly from men in annual spending, fashion fans, attitudes and impulse buying. Compared to the other studied cohorts, Generation Y has a more significant influence in terms of frequency of purchases, fashion fans, attitudes and impulse buying. Findings show that there is a difference between exploratory tendencies in consumer behavior across different generations (Chacraborty & Balakrishnan, 2017).

Conclusions

The conclusion of the paper is the fact that marketing today is in the feasibility phase of surveys focusing on consumer behavior. Each such behavior is individual for a specific person based on their gender, income and related determinants such as economic status, level of education, environment in which they live, but also age. It is this kind of behavior that plays a central role for businesses that offer your products or services.

Nowadays, the so-called generational marketing is very popular, which examines individual generations of consumers, which differ from each other not only in value orientation, but also in expectations, needs, lifestyle and, last but not least, demographic differences that affect the way they shop. A practical consequence of the research may be the establishment of certain

recommendations for business enterprises that would lead to an increase in the competitiveness of a specific enterprise, or an increase in profit on the one hand and, on the other hand, to satisfaction and repeat purchase of products by consumers. Companies should design strategies to understand the nature of generations regarding product exploratory tendencies in physical and online stores. They should focus on research that would reveal what each generation needs, wants and what their expectations are. Subsequently, it is necessary to incorporate these findings into the company's business strategy.

For Gen Z, it should be products that are characterized by their sustainability. For Gen X, which is characterized by repeat purchases, the business strategy should include activities that ultimately lead to repeated purchases from the same retailer.

We see the limits and limitations of the study primarily in the focus on correlation and regression analysis with absent analysis of factors that are important for individual generational cohorts when choosing a retail format. That is why future research would go in the direction of analyzing individual factors within 4 generational cohorts (Baby boomers, X, Y and Z).

The practical implications of the research would provide marketers with better insight into the important factors behind generational survey tendencies and more customized websites, reviews, innovative products targeted at specific generations, offers and discounts to encourage repeat purchase, product comparability and continuously convert surveys into real purchase.

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