Preface

Special Issue on Management Studies

This special issue of Acta Polytechnica Hungarica analyses the economic and social changes that are affecting our everyday lives from the perspective of management, business and marketing, and project thinking. Mega-trends such as globalisation, digitalisation and urbanisation have transformed many areas of management in a pervasive way, prompting practitioners and researchers alike to find new and innovative solutions and methods to meet the challenges. This special issue offers insights into economic, social and human policy changes in business.

The volume presents studies that address current research issues and provide theoretical and practical support for a multidisciplinary approach to management, integrating technical and economic content. All of the manuscripts are excellent for broadening the reader's knowledge and for increasing the practical orientation of the educational content. Numerous empirical studies complement the wide range of literature, making the research areas under study more experiential and lifelike, presenting relevant conclusions and professional observations that can be used in practice.

The majority of the manuscripts presented in this special issue present a consumer-oriented approach to analysis from a practical perspective. The consumer-orientation is due to the fact that the main focus of each study is on the end-user, whose decision and preference factors are analysed in detail by the authors in order to explain the expected response to each trend effect. The volume also includes evergreen research topics such as CSR, employer branding or CSR activities, the analysis and evaluation of which through international examples is an excellent way to learn about good practices, and the useful conclusions drawn by the authors can stimulate the reader to generate new research topic ideas.

In addition to descriptive research on the effectiveness of small and medium-sized enterprises, the practical aspects of project management are also explored, with studies on this topic focusing on the parallel between practice and science, examining the economic aspects of management and evaluating project-based process models to introduce the reader to the possibilities for practical adaptation of the topics under study. Several studies touch on the much-mentioned area of consumer behaviour and marketing: generational research. Differences in values, mindsets and attitudes between generations have inspired a range of research. The studies provide a comprehensive analysis of the causes of intergenerational differences, the indicators of differentiation in consumer choices and preferences of each generation from the perspective of HR, marketing and management.

Digitalisation and its complex impact analysis is also an indispensable theme in the volume. The authors explore how the relationship between the young generation and digitalisation is complemented by the dimension of financial decisions. The impact of digitalisation on consumer habits and the way we make decisions is unquestionable and provides a good research base for a wide range of consumer analyses. The impact of the pandemic, the coronavirus, is also covered. The dominant macro-environmental impact of recent years has forced humanity to adapt on a complex and unprecedented scale, with significant limits to its freedom. This phenomenon will be a relevant topic for a broad spectrum of consumer research for a long time to come. The book offers a versatile and colourful palette for researchers, teachers and students interested in the fields of economics and social sciences.

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Guest Editors

Multivariate Optimization of PMBOK, Version 6 Project Process Relevance

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Abstract: This article examines the use of multivariate optimization, as a method, to improve the success of project management tasks. The optimization approach is founded on 8 selected continuous project processes of the execution phase of the PMBOK project management framework. Using a custom-developed, online portal, 103 data sets were collected from project management practitioners, indicating their individual distribution of effort and focus on the selected project processes, as well as, the current health status of their project. Based on this dataset, stepwise regression combined with optimization applying a sequential quadratic programming method was used to define the distribution of project process relevance thereby maximizing the project health.

Keywords: Process Optimization; Multivariate Optimization; Project Management; PMBOK

1 Introduction

Managing a project involves a versatile approach and related skillsets. Although every project is said to be different and unique, project management frameworks like the project management body of knowledge (PMBOK) [1], ICB4 of the International Project Management Association [2], or PRINCE2 framework of Axelos [3] push towards a standardized project management approach by providing certifications and guidelines on how to act as a successful project manager. The basic question underlying this research article is the field of tension between a rigid standardized guideline and framework of how to manage a project and the uniqueness of projects and the individuality of project managers.

Project management frameworks provide different guidelines on how to successfully manage a project. They do not indicate the scope of the different tasks. This situation provides freedom for experienced project managers, but at the same time it can make decisions harder for unexperienced project managers [4],

particularly in agile managed IT projects [5]. The fact that decisions are challenging for project managers is also highlighted by the Chaos Report [6] detailing that IT projects only have success rates between 11% in case of waterfall development and 39% in case of agile development.

2 Definitions based on Literature Review

This research uses mathematical methods of multivariate regression and optimization as an attempt to define the most successful way of managing different kinds of projects. In contrast to a dynamic modeling and optimization of project processes based on ER methodologies as described by Kukushkin and Zykov [7], the optimization relies on collected data of project management practitioners. However, before describing in detail how these methods are used, several definitions and terms need to be explained:

Project Process

PMBOK as a project management framework defines in its sixth version 49 project processes. These processes are tasks and activities a project manager has to perform and cover in his or her daily work, such as doing a risk analysis with sophisticated approaches like fuzzy [8] or PRISM [9] based decision-making methods, controlling the budget or keeping the stakeholders engaged. In other words, project processes can be seen as a toolbox of activities a project manager can choose from.

Project Process Relevance

The hypothesis underlying the present research claims, that project managers may decide individually how much focus and time they devote to certain project processes. The amount of focus and time a project manager puts into a certain project process is defined as "project process relevance" is in this research. Using such an approach, business process management (BPM) practices [10] can be applied. The project manager then also covers the role of a process analyst [11] being responsible for monitoring, measuring and optimizing his or her own way of working [12].

Project Process Relevance Distribution

Project process relevance distributions are the input of the multivariate optimization. In the survey, project managers are asked to distribute their individual project process relevance in a specific project of their choosing. As a project is structured in phases, starting at the initiation phase and ending at the closing phase, not all 49 project processes defined in the PMBOK are relevant at the same time. This research shall only act as a proof of concept and therefore,

only uses continuous project processes of the execution phase. The advantage of this restriction is a drastic reduction of complexity in the optimization.

Project Health Factors

Project Health Factors are used as the output side of the optimization, measuring the current "health" of a project. The term "success" of a project is not used, because a lot of the datasets are related to ongoing projects, which have not achieved success yet. However, project managers can often provide an indication of the current status regarding budget, scope, schedule and people [13] or more specific, customer satisfaction. Combing these four project health factors to one single output value provides the necessary output side of the optimization. The approach of converting multiple responses to a single response is based on the idea described by Khuri and Conlon [14]. However, a complex vector-distance based model did not seem necessary for the simple goal of combining result variables. Consequently, a amalgamation approach, as in signal noise ratio research [15], was selected. Constrained optimization, defining one single output factor as leading and the others as constraints [16] is not used, because all project health factors are considered equally important for overall project success.

3   Methodology

3.1   Definition of Optimization Focus

To prove that multivariate optimization can be used to optimize the way project managers work, a project management framework was chosen. PMBOK by PMI organization is, with over 500,000 members [17] and its focus on clear tasks, documentation and processes [18], the chosen framework for this research rather than soft skill-related activities that are hard to evaluate.

As many of the survey participants are currently working in a specific project, a project phase was selected. Although planning as a phase is mentioned as a critical success factor [19], the execution phase, which can have quite a long duration comprising the bulk of the project work [20], was selected for this research. The execution phase contains 10 processes, 8 of which are continuous processes, and the scope of the optimization approach.

Below a brief description of continuous processes and their ID of the selected execution phase can be seen [1]:

- **P1 = Direct and Manage Project Work** - the process of leading and performing the work defined in the project management plan and implementing approved changes to achieve the project objectives.

- **P2 = Manage Project Knowledge** - the process of using existing knowledge and creating new knowledge to achieve the project objectives and contribute to organizational learning.

- **P3 = Manage Quality** - the process of translating the quality management plan into executable quality activities that incorporate the organization's quality policies into the project.

- **P4 = Develop Team** - the process of improving competencies, team member interaction, and overall team environment to enhance project performance.

- **P5 = Manage Team** - the process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance.

- **P6 = Manage Communications** - the process of ensuring timely and appropriate collection, creation, distribution, storage, retrieval, management, monitoring, and the ultimate disposition of project information.

- **P7 = Implement Risk Responses** - the process of implementing agreed-upon risk response plans.

- **P8 = Manage Stakeholder Engagement** - the process of communicating and working with stakeholders to meet their needs and expectations, address issues, and foster appropriate stakeholder involvement.

Four project health factors have been selected as the optimization output. The classical project success triangle of budget, scope and schedule [21] has been enriched based on the concept of van Wyngaard et al. [22] with an additional factor of customer satisfaction, since especially in IT projects high customer satisfaction and resulting project success are possible even without keeping the initially defined scope, budget or schedule.

3.2   Sampling Procedures

Sample selection was performed by disseminating the invitation for participation of project management practitioners on social networks like LinkedIn or Facebook, sending emails to a network of former Technical Management students at the UAS "FH Campus Wien" in Vienna and addressing suitable participants directly in networking events and conferences. All persons previously or currently involved in project management in different roles were able to participate. An estimated number of 600 invitations sent over a period of 18 months, led to 103 actual and valid, survey completions.

Additionally, current students at the involved universities (Vienna/Budapest) with previous work experience in those fields were invited to participate even if they did not work in management; basic knowledge of project work and PMI project processes was sufficient. This ensured that participants with various levels of experience were included in the study, thus allowing candidates with different perceptions of project management to contribute to ensure a wide variety of insights.

3.3   Questionaire Design

The actual data collection was implemented using a custom-programmed data collection cloud-based web portal [23], since out of the box survey software solutions did not provide the specific capability of distributing relevance factors.

Link: https://agile-projects-survey.herokuapp.com/home

Besides distributing project process relevance distributions as the input parameter and project health factors as the output parameter, the survey participants also entered characteristics of their background and projects. These additional characteristics are not interpreted in the research results as such, other than in the following chapter summarizing the respondents' characteristics.

3.4   Respondents

Of the 103 people who answered the survey, 73% are male, 27% are female. 45% of the participants are aged between 20 and 30 years, 33% between 30 and 40 years and the remaining participants are of older age. A majority of 86 people has completed university education, and half of the participants (51%) are experienced as project managers or project sponsors. Most participants (51%) work in Management and Business, IT and Financial related industries.

52% of the participants work with agile [24] or at least hybrid [25] project management frameworks.

3.5   Initial Statistical Analysis

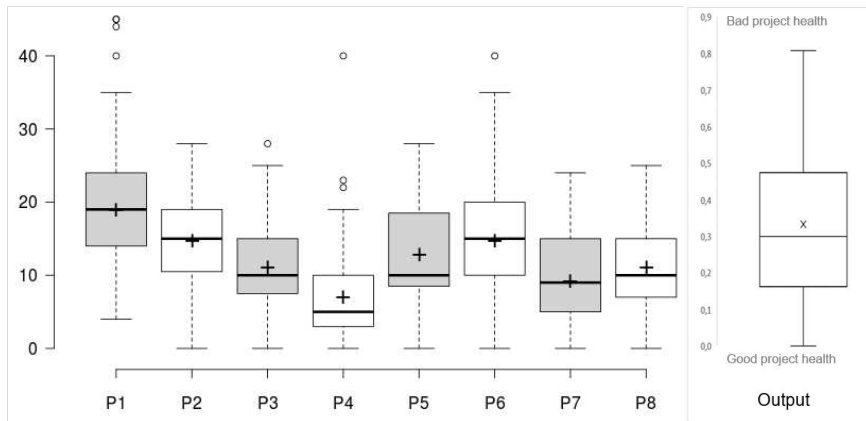A basic statistical analysis of the input and output factors resulted in below average and standard deviation results:

Figure 1

Box Plot Statistics

Source: self-edited

Table 1

Box Plot Statistics

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Output**
Upper whisker	35.00	28.00	25.00	19.00	28.00	35.00	24.00	25.00	9.00
3rd quartile	24.00	19.00	15.00	10.00	18.50	20.00	15.00	15.00	6.00
Median	19.00	15.00	10.00	5.00	10.00	15.00	9.00	10.00	4.00
1st quartile	4.00	10.50	7.50	3.00	8.50	10.00	5.00	7.00	3.00
Lower whisker	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
N	103	103	103	103	103	103	103	103	103

Source: self-edited

3.6 Selection of Suitable Multivariate Regression Methods and Optimization Approaches

The next step, after the successful collection of data, is to select the most suitable multivariate regression and optimization approach for the data and its conditions.

Optimization consists of two steps, the first being regression of data points on the input side. The second step is the actual optimization. Depending on the nature of the data and the underlying conditions, different regression approaches need to be evaluated for applicability. Nine different regression methods were selected for evaluation. The table below outlines the methods, a brief introduction and reason for selection or dismissal of the method.

Table 2
Regression Method Selection

Regression Method	Description	Applicability for data set
Least Square	One of the oldest and most used regression methods. Can be used when there is a linear relationship between the dependent and independent variables.[26].	**Dismissed**. Scatterplot analysis indicates a nonlinear nature of the data.
Partial Least Square	This method uses the same approach as normal least square method; it does not address the original data, but uncorrelated variables instead. The main advantage of this method lies in the possibility to address multiple output variables if necessary [27].	**Dismissed**. Multiple output variables are not needed.
Polynomial Regression	This method creates a polynomial function with the following structure [28]: $p(x) = p_1 x^n + p_2 x^{n-1} + \cdots + p_n x + p_{n+1}$	**Dismissed.** Scatterplot analysis indicates a nonlinear behavior.
Logistic Regression	This method can be used if a categorical output is available and to make the output categories comparable with each other. This is especially helpful if future predictions are needed about how the input will be assigned to a specific output category [29] .	**Dismissed**. The output variable is a single value of the combined sum of project health factors. It is not a categorical output (like yes or no)
Kernel Smoothing	This non-parametric method determines a density function to forecast the probability at which input variables reside in a certain area. The advantage of this method is the capability to identify nonlinear relations between input and out variables [30].	**Dismissed**. The goal of the regression step is to create an actual regression function suitable for optimization. Probabilities of input variable locations is not in focus.
Stepwise Regression	This method uses an iterative approach where variables can be added or deleted in each iteration [26]. In each iteration, the variable with the highest correlation to the output variable is identified using the p-values of the variables.	**Used**. A second-degree polynomial regression function generates a satisfying result.
Lasso Regression	Lasso stands for least absolute shrinkage and selection operator. This iterative method minimizes variables which are not relevant until they are zero [31].	**Dismissed.** Increased complexity in this regression approach is not necessary as a suitable regression with

		acceptable p-values result can be obtained with stepwise regression.
Ridge Regression	Lasso Regression, it is. a selection-based regression method. In contrast to Lasso, ridge regression never sets the value of coefficients to absolute zero [32].	**Dismissed.** Not all coefficients are necessary.

Source: self-edited

After evaluating the different regression methods and selecting step-wise regression as the most applicable, a nonlinear optimization approach including additional constraints was chosen to identify a suitable maximum of combined project health factors in relation to the best distribution of project process relevance factors.

The Matlab solver *fmincon,* finds the minimum of a problem, with these constraints:

$$\min_{x} f(x) \text{ such that} \begin{cases} c(x) \leq 0 \\ ceq(x) = 0 \\ A \cdot x \leq b \\ Aeq \cdot x = beq \\ lb \leq x \leq ub \end{cases} \tag{1}$$

b and *beq* are vectors, *A* and *Aeq* are matrices, *c(x)* and *ceq(x)* are functions that return vectors, and *f(x)* is a function that returns a scalar. *f(x), c(x),* and *ceq(x)* can be nonlinear functions [33].

For the optimization approach the following constraints were defined:

- The initial starting point for the iterative optimization method was defined as the average values of project process relevance's, ensuring that the result stays close to a common distribution defined by the survey participants.

- The sum of all project process relevance's needed to be 100%.

- Upper and lower bounds of project process relevance's were defined with +/-10% of the average values. This ensures that the optimization avoids extreme results, for example maximizing one project process to 100% and minimizing all other project process relevance's to 0%.

- No linear inequality constraints were defined.

It has to be noted that the solver can only optimize through minimizing, so the reciprocal values of the output variable is used.

3.7 Regression including Fine Tuning

After defining how to optimize the actual optimization in MATLAB, R2018a was performed including data cleaning. Based on the input data, an initial import to MS Excel was used, converting the textual structure of the raw data into table form suitable for MATLAB import. The result of this import can be seen as an example below in form of a table for the first 8 data sets.

It needs to be noted that the four project health factors were added up to a single output value, divided by 400 and then inverted and the reciprocal value taken to utilize the minimization solver of MATLAB for the maximization of project health.

Table 3
Example of 8 Data Sets after Data Cleaning in MS Excel

P1	P2	P3	P4	P5	P6	P7	P8	Budget	Scope	Schedule	Customer	Output
14	20	18	14	28	1	3	2	19	21	14	23	0,8
19	9	6	4	8	35	7	12	92	100	87	100	0,1
14	20	18	14	28	1	3	2	19	21	14	23	0,8
20	13	17	0	15	13	4	18	53	100	30	100	0,3
45	10	10	10	10	5	5	5	100	80	80	90	0,1
15	5	10	5	20	15	10	20	85	70	70	70	0,3
24	15	12	11	20	11	0	7	88	52	61	77	0,3
5	20	20	5	5	25	5	15	100	60	85	85	0,2

Source: self-edited

After import of the cleaned data into MATLAB, the nonlinear stepwise regression approach second order was used to determine a suitable regression function:

```
>> mdl=stepwiselm(Input,Output,'poly22222222')                    (2)
```

Where:

Input = the input matrix of process 1 to 8

Output = the single column output matrix

As a result of this regression, MATLAB estimates these coefficients and statistical values for the regress function:

The p-values of the sixth process x6 and the combined factor x2*x8 are too high based on the 5% proposed p-value cutoff [34] with values of 13% and 8%. This indicates that there might be a critical collinearity of the sixth process in

relation to the output. Therefore, an additional correlation matrix was developed to ensure that all the processes are within acceptable correlation boundaries regarding correlation.

```
Linear regression model:
    y ~ [Linear formula with 19 terms in 7 predictors]

Estimated Coefficients:
                    Estimate          SE         tStat        pValue
                   _____     _____    _____     _____

    (Intercept)        2.5665        0.36019      7.1252     3.3076e-10
    x2              -0.093719        0.018019     -5.2012     1.3745e-06
    x3              -0.032841       0.0065094     -5.0451     2.5826e-06
    x4              -0.068186        0.013673     -4.9869     3.2601e-06
    x5               -0.13995        0.024853      -5.631     2.3202e-07
    x6               0.011896       0.0077462      1.5357        0.12837
    x7              -0.012796       0.0061187     -2.0913       0.039521
    x8              -0.047325         0.01442     -3.2819       0.001503
    x2^2            0.0014954      0.00042943      3.4823     0.00079162
    x2:x4            0.001958      0.00052507      3.7291       0.000348
    x2:x5           0.0022529      0.00051424       4.381     3.3908e-05
    x3:x5           0.0022308      0.00048064      4.6414     1.2633e-05
    x4:x5           0.0018265      0.00050092      3.6462     0.00046034
    x5^2             0.001424      0.00040481      3.5177     0.00070503
    x6^2          -0.00066448       0.0002251     -2.9519      0.0040932
    x5:x7           0.0015826      0.00040548       3.903     0.00019101
    x2:x8           0.0010058      0.00057961      1.7352       0.086365
    x4:x8           0.0014672      0.00044572      3.2917      0.0014578
    x5:x8           0.0016849      0.00054847       3.072       0.002866


Number of observations: 103, Error degrees of freedom: 84
Root Mean Squared Error: 0.149
R-squared: 0.606,  Adjusted R-Squared: 0.522
F-statistic vs. constant model: 7.18, p-value = 1.12e-10
```

Figure 2

Project Regression Result

Source: self-edited

As highlighted with red boxes in figure 3, the process 6, Manage Communications, indicates a high p-value with 0.128, above 0.05 non-significance. Consequently, the influence of the P6 process on the overall model needs to be investigated in detail.

The correlation matrix in table 4 shows that the absolute value of Pearson correlation coefficient is with a maximum of 0.36 less than 0.8, so multi-collinearity is less likely to exist [35].

Table 4

Correlation Matrix with all Variables

		P1	P2	P3	P4	P5	P6	P7	P8
P2	Correlation	-0.128							
	Significance	0.240							
	N	86							
P3	Correlation	0.020	0.005						
	Significance	0.858	0.967						
	N	86	86						
P4	Correlation	-0.356**	-0.003	0.057					
	Significance	0.001	0.979	0.605					
	N	86	86	86					
P5	Correlation	-0.322**	-0.211	-0.083	0.291**				
	Significance	0.002	0.051	0.449	0.007				
	N	86	86	86	86				
P6	Correlation	-0.043	-0.309**	-0.288**	**-0.360****	-0.298**			
	Significance	0.696	0.004	0.007	0.001	0.005			
	N	86	86	86	86	86			
P7	Correlation	-0.243*	0.019	-0.270*	-0.123	-0.159	-0.136		
	Significance	0.024	0.861	0.012	0.261	0.144	0.212		
	N	86	86	86	86	86	86		
P8	Correlation	-0.254*	-0.114	-0.284**	-0.340**	-0.202	0.136	0.127	
	Significance	0.018	0.298	0.008	0.001	0.062	0.212	0.244	
	N	86	86	86	86	86	86	86	
Output	Correlation	0.022	-0.291**	0.111	-0.112	-0.208	0.357**	-0.125	0.137
	Significance	0.837	0.007	0.308	0.303	0.055	0.001	0.252	0.207
	N	86	86	86	86	86	86	86	86
** $p < 0.01$ (two-tailed)									
* $p < 0.05$ (two-tailed)									

Source: self-edited

Keeping the critical process P6 static, the partial correlation matrix in table 5 also indicates no critical collinearity between the other input variables and the output variable.

Table 5

Partial Correlation with P6 as Control Variable

			P1	P2	P3	P4	P5	P7	P8
P6	P2	Correlation	-0.149						
		Significance	0.174						
		Degrees of freedom	83						
	P3	Correlation	0.008	-0.093					
		Significance	0.945	0.398					
		Degrees of	83	83					

		freedom						
P4	Correlation	-0.399**	-0.129	-0.053				
	Significance	0.000	0.241	0.632				
	Degrees of freedom	83	83	83				
P5	Correlation	-0.351**	-0.334**	-0.185	0.207			
	Significance	0.001	0.002	0.091	0.058			
	Degrees of freedom	83	83	83	83			
P7	Correlation	-0.252*	-0.024	-0.326**	-0.186	-0.211		
	Significance	0.020	0.826	0.002	0.089	0.053		
	Degrees of freedom	83	83	83	83	83		
P8	Correlation	-0.250*	-0.076	-0.258*	-0.315**	-0.171	0.148	
	Significance	0.021	0.490	0.017	0.003	0.118	0.176	
	Degrees of freedom	83	83	83	83	83	83	
Output	Correlation	0.040	-0.203	0.239*	0.018	-0.114	-0.082	0.096
	Significance	0.714	0.062	0.028	0.868	0.299	0.453	0.382
	Degrees of freedom	83	83	83	83	83	83	83
** $p < 0.01$ (two-tailed)								
* $p < 0.05$ (two-tailed)								

Source: self-edited

It can be concluded, that the high p-values may not be critical in regards to the validity of the regression model. In the case combining x2 and x8 factors, the significance level is with 0.086 not as critical as the previously proven uncritical P6 process. For further analysis, the model is accepted as the basis for optimization even at this significance level.

3.8   Optimization of Process Relevance Factors

As a last step, the polynomial regression function is maximized under certain boundaries and conditions to propose an optimum distribution of project process relevance factors.

Using the developed regression coefficients, the following regression function is defined as:

fun=@(x)+2.5665-0.093719*x(2)-0.032841*x(3)-0.068186*x(4)-0.13995*x(5)+0.011896*x(6)-0.012796*x(7)-0.047325*x(8)+0.0014954*x(2)^2+0.001958*x(2)*x(4)+0.0022529*x(2)*x(5)+0.0022308*x(3)*x(5)+0.0018265*x(4)*x(5)+0.001424*x(5)^2-0.00066448*x(6)^2+0.0015826*x(5)*x(7)+0.0010058*x(2)*x(8)+0.0014672*x(4)*x(8)+0.0016849*x(5)*x(8)   (3)

As initial starting point for the optimization, the average project process relevance factors are used:

$$x0=[18.9;14.7;11.1;7.1;12.9;14.7;9.3;11.2] \tag{4}$$

The constraint effecting that all input variables add up to 100 is defined as such:

$$Aeq=[1\ 1\ 1\ 1\ 1\ 1\ 1\ 1]$$

$$beq=[100] \tag{5}$$

The constraint defining the upper and lower bounds of the process relevance factors with +/- 10% of the average value is defined as such:

$$ub=[28.9\ 24.7\ 21.1\ 17.1\ 22.9\ 24.7\ 19.3\ 21.2]$$

$$lb=[8.9\ 4.7\ 1.1\ 0\ 2.9\ 4.7\ 0\ 1.2] \tag{6}$$

Linear inequality constraints are defined as such:

$$A=[]$$

$$b=[] \tag{7}$$

The optimization solver x=fmincon(fun,x0,A,b,Aeq,beq,lb,ub) uses a sequential quadratic programming method [36] [37] and generates a suitable optimization result.

4 Results and Discussion

As the overall result of the optimization phase, it can be concluded that the best distribution of project process relevance factors for the defined scope and boundaries based on the currently collected data looks as such:

Table 6
Result of Optimization

Project Process	Optimized Project Process Relevance
P1: Direct and Manage Project Work	28.3%
P2: Manage Project Knowledge	4.7%
P3: Manage Quality	1.1%
P4: Develop Team	17.1%
P5: Manage Team	22.9%
P6: Manage Communications	24.7%
P7: Implement Risk Responses	0%
P8: Manage Stakeholder Engagement	1.2%

Source: self-edited

Interpreting the results, it is clearly obvious that defining the upper and lower boundaries as constraints has a large influence on the optimization value. All final values, except the Process Direct and Manage Project Work, which is only 0.6% below the upper bounder, are situated either in an upper or lower boundary. This indicates that the optimization step would bring some project processes to zero and continue maximizing other project processes even more. To get a better understanding of these trends, it is helpful to repeat the optimization without upper and lower boundaries.

Table 7 shows that the optimization without boundaries maximizes only two project processes and sets all other project processes to 0%. This approach suggests putting 87.5% of focus or relevance on the process of Manage Communications. Naturally, these values are far from realistic and usable. Yet, however they can visualize the importance of Communication for project success [38].

It is obvious that the selected boundaries of +/-10% of the average value are open for discussion or change. These boundaries can also be seen as a damper protecting the optimization from being too radical and therefore proposing unrealistic values to project managers.

Table 7

Result of Optimization Considering Boundaries

Project Process	Optimized Project Process Relevance with Upper and Lower Boundaries	Optimized Project Process Relevance without Upper and Lower Boundaries
Direct and Manage Project Work	28.3%	0%
Manage Project Knowledge	4.7%	0%
Manage Quality	1.1%	0%
Develop Team	17.1%	0%
Manage Team	22.9%	12.5%
Manage Communications	24.7%	87.5%
Implement Risk Responses	0%	0%
Manage Stakeholder Engagement	1.2%	0%

Source: self-edited

With regard to the general overview, the following description of the individual processes can be presented:

Direct and Manage Project Work is the process of actually implementing and doing the work defined in the project plan [39]. In the boundary restricted result this process shows the highest relevance with 28.3%, indicating that a lot of successful project managers put much focus and effort in this project process.

Manage Communications has the second highest relevance with 24.7%. Looking at the unconstrained optimization, the relevance even increases to 87.5%. This indicates high relevance of communication for project health in the execution phase of projects. The importance of successful communication as critical factor for project success is also a widespread result in project management research. [40] [41] [42]

Manage Team is the process of tracking and optimizing the project team performance. With 22.9%, this process shows a high relevance in the work of successful project managers.

Developing the team by improving competences and interaction is also of high importance for project success [43]. The value of 17.1% is the defined upper boundary of the optimization. However, without boundaries, the process moves towards zero due to increasing importance of the project process Manage Communications.

To sum up the project processes **Manage Project Knowledge, Manage Quality, Implement Risk Responses** and **Manage Stakeholder Engagement** it can be said that they show low relevance in the optimized relevance distribution. Explaining this behavior is not within the scope of this research yet. As a hypothesis, it can be suggested that a healthy project needs less of the troubleshooting-oriented project processes, like managing quality, risks, engagement and knowledge about the project. One could argue that a project manager can move towards a positive circle within the project. So, if he or she is not busy implementing risk responses for example, more time for communication, managing the team and the project work can keep the project healthy and successful.

Conclusions

The goal of this research was to show that multivariate optimization methods can be applied, for proposing optimized work flow processes, for project managers. This approach can reduce the tendency of the project management profession of being subjective, individualistic and hard to capture. Each and every project is unique, and it is a highly important competence, for project managers, to adapt and react in a flexible way, with the different challenges, that occur in the daily work of project management. It has to be noted, that this research does not suggest following the optimized relevance factors exactly. Knowing about an optimized distribution, based on data and not on subjective interpretations and recommendations, could help to highlight how successful project managers do their work and therefore, act as guides for all other project management

practitioners. The result of this research is a proof of concept, showing the potential of an optimization approach and the challenges involved in using constraints, to adapt unrealistic results, if needed.

Several limitations need to be mentioned in order to prevent potential misinterpretation. The most important factor is the relatively small set of heterogenic survey participants and the resulting data. For more reliable results, the additional project and personal characteristics should be used to filter and preselect data sets for optimization. In order to create a reliable result, for example, only small, agile developed projects, in the financial industry, managed by less-experienced project managers, might be selected. With such specific selection of categories, many additional aspects and insights could emerge from the data, after optimization.

Another limitation that should be mentioned is the fact that many survey participants learned about this research and gave their input during the flow of their projects. There was no phase of introduction about this research from the beginning of their project onwards. Knowing in advance that project process relevance is in focus and measured by a survey application, could lead to less subjective values, increasing the overall quality of the data.

Last but not least, a gap in the nature of input and output variables needs to be mentioned. The project health factors are overall values, which are valid for all project phases from the start. Therefore, positive project health could already be transmitted into other project phases. The survey on the input side completely focusses on the execution phase, not considering results of previous phases. This additional influence on the output factors, which overlap with project phases, reduces the significance of the optimization result.

Perspectives for Future Research

To tackle the mentioned limitation and increase the reliability of the data and the optimization result [13], several improvements are planned for future research.

One approach is the automation of data collection. To reduce the subjective human factor, additional data sources can be used [44], like measured times in certain software programs. For example, the screen time could be measured with MS Project and connected to project plan-related project processes, at least giving survey participants the change to categorize activities on a daily basis. Like not collecting data once per participant, but ongoing, over the whole project. Simply adding the possibility of categorizing meetings in regards to project processes directly in outlook would increase the quality of data drastically.

Another approach, to reduce the subjective nature of the result, is to shorten the research phase in the project. Especially agile frameworks, like SCRUM are perfect candidates for such measures, due to their iterative nature. Thus, a next step could be moving away from PMBOK project processes, towards activities and tasks during sprints. Using the proof of concept of this research as a guideline,

optimizing the work in sprints for the different roles in traditional SCRUM based organizations could be a useful goal for further research activities.

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European Motor Vehicle Manufacturers' CSR Trends – The Effect of the Emission Scandal

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Abstract: The Automotive industry plays an important role in the European economy, however, it is also responsible for environmental pollution – by manufacturing and during the lifetime of the vehicles. To decrease air pollution, industrialized countries determine stricter regulations for carmakers. In addition, those consumers who want to be environmentally conscious, are seeking "greener" cars. Unfortunately, the "Volkswagen scandal" in 2015, drew attention to the unfair behavior of car manufacturers and to greenwashing. The rising trend toward corporate social responsibility and stricter regulation policies have put pressure on the automotive industry. This article concentrates on the corporate social responsibility practices of car manufacturers, following the VW cheating software scandal, in order to identify which elements of their CSR policy have been strengthened. The research investigates how the emphasis on the different elements of CSR activities has changed following the VW scandal. To answer the question, a quantitative analysis is made on the CSR data of 15 companies (7 from Germany, 2 from Italy, 2 from Sweden, 3 from France and 1 from the UK), whose primary industry is motor vehicle manufacturing in Europe and CSRHub provides detailed information on them. The analysis examines how the ratings of these companies has changed in the four main categories of CSR (namely: Community, Employees, Environment and Governance) during the period of 2011-2019, which can be sub-divided into two periods: 4 years before and 4 years after the scandal. The analysis shows that VW's overall CSR rating has decreased for the period of 2015-2019. Results also indicate - contrary to expectations, that Volkswagen could not improve its CSR-ratings for Product and for Environment subcategories, after the scandal.

Keywords: automotive industry; CSR; emission scandal

1   Introduction

Global warming has been identified as the most frightening global environmental problem, and its causes can be traced back to the agriculture, deforestation and fossil fuel combustion [1].

Among the sources of greenhouse gases, transportation is responsible for nearly one-third of the EU's total CO_2 emissions, and almost three-quarter of it comes from road transportation [2]. Based on the data from 2016, 60.7% of it is generated by passenger cars, 11.9% by light-duty trucks, and 26.2% by heavy-duty trucks [2]. Intentions are clear in the EU to decrease the emission of greenhouse gases. Energy, residential and agricultural sectors have cut emissions back since 1990, but as more people become more mobile, CO_2 emissions from transport are increasing. Another reason is that newly registered cars emitted on average 0.4 grams of CO_2 per kilometer more in 2017 than in 2016. EU wants to turn this trend into a positive direction and introduces new CO_2 emission targets for new cars and vans [2]

About 181,000 people, worldwide, died prematurely in 2015 due to air pollution from vehicle exhaust (mainly PM2.5 and ozone) coming from diesel engines, according to a study published by ICCT (The International Council on Clean Transportation) in February 2019 [3]. The most effected countries are France, Germany, Italy and India, as most vehicles are diesel-powered. Diesel pollution would cost for EU taxpayers nearly 56 billion euros in health and non-health related expenses. This was more than five times the amount of petrol pollution costs [4].

However, the automotive companies have significant positive contribution to the economy and to the society as well. Automotive industry plays an important role in the European economy: the turnover of it represents approximately 7% of the EU GDP and the full vertical value-chain provides work for almost 14 million people, and motor vehicles account for €428 billion in taxes in the EU15 countries alone [5]. Therefore, it is a social interest that car manufacturers continue their business but with respect to society goals and needs.

Unfortunately, the Volkswagen scandal in 2015 showed that tighter regulation does not necessarily lead to positive change. The Volkswagen scandal (also called Dieselgate) reflects to the deliberate misleading action of Volkswagen: Volkswagen Group of America has developed and installed emissions control system 'defeat devices' (software) in model year 2009-2015 vehicles with 2.0 liter diesel engines. Defeat software was designed to detect when emissions tests were being run and turn on pollution controls so that a vehicle can meet air quality standards. During normal road use, the pollution controls are disabled to enhance engine performance and fuel economy, but these changes also increase emissions, of nitrogen oxides (NOx) for example. On-road emissions testing suggests that in-

use NOx emissions for these vehicles are a factor of 10x to 40x above the EPA standard [6].

In September 2015, Volkswagen officially announced that it had falsified emissions from diesel engines and exceeded the limit by 40-50 times. Later on, Audi and Porsche were also accused for such a misleading behavior. Sources [7] point out that VW cheating behavior was not the first one in the automotive industry. Moreover, some scandals happened afterwards at Fiat Chrysler, Nissan and Daimler. In addition, since 2016, 38 out of 40 diesel cars tested by ADAC failed an NOx-test [8].

Consequently, Volkswagen has recalled 11 million cars worldwide – a majority of the recalls in the EU - and was also heavily fined. Company director Martin Winterkorn resigned after the scandal, but consistently denied knowing anything about cheating on the measurement. Criminally, only James Liang, an engineer was convicted and sentenced to 40 months in prison [9]. Later, in 2017 Oliver Schmidt, the company's CEO of the U.S. division was sentenced to 7 years in prison with a $ 400,000 sentence. In the wake of the scandal, an investigation was launched in addition to Opel and for some Daimler and BMW models. On October 19, 2018, nearly 100,000 Opel were recalled as the manufacturer cheated on the Insignia, Cascada and Zafira models with Euro 6 environmental rating [9].

That highlight the confirmation of the suspicion that maybe not only VW cheated but other companies followed a similar practice. These events question the credibility of big car manufacturers, and we can ask, how honest the green initiatives of these companies are and whether they continue a real dialog with the stakeholders or not. As Corporate Social Responsibility is a complex phenomenon, we need to analyze CSR actions in a broader perspective – both in time and in space, therefore, in this study we included other car-manufacture companies and a time series of data to understand the processes.

The aims of this study are:

(1)   Examine the CSR activity of Volkswagen in details before and after the scandal in comparison with the industry average.

(2)   Analyze the evolution of different subgroups of CSR activity by time for Volkswagen.

The structure of this study is the following: Section 2 provides literature background for hypotheses; Section 3 describes the methodology and data sources; Section 4 introduces the empirical results and Section 5 summarizes the conclusions.

2   Literature Review

The European Commission [10] defined CSR as "the responsibility of enterprises for their impacts on society". This wording has interrupted with the previous definition in which CSR was a 'volunteer' action of the companies. Nowadays there is more pressure on bigger companies to share information on their socially responsible behavior, and therefore realize real contribution to social goals. In the European Union, the importance of Corporate Social Responsibility reporting is increasing, because 2017 is the year in which the CSR reporting of large companies passes from the voluntary, to the mandatory stage, according to the requirements of the European Directive 2014/95/EU [11].

Stakeholder theory [12] emphasizes that a socially responsible company pays attention simultaneously, to the interests of all stakeholders. A socially responsible firm needs to identify these stakeholders, analyze their interests and examine them from different aspects: mainly their power and interests. Automotive industry has lots of different stakeholders: dealer/retailer, insurance companies, car owners and lenders, fleet management companies, car-sharing passengers, academia, telecom and tech companies, independent repair shops, after-market, government and public organizations, recycling companies, financial institutions [13]. The whole industry has significant role in the economic growth, on labor market and in environmental pollution – directly and indirectly. Surprisingly, even the latest studies do not mention the natural environment as one of the stakeholders of the automotive industry [13].

The growing number of CSR literature, makes it possible to create subgroups of studies and concentrate at a higher level on given topics or areas. One obvious subgroup of literature is based on the geographical criteria while another one divides the groups according to the industries of the companies. Geographical criteria may reflect to legal or cultural peculiarities.

More researcher argue that industry-specific analysis can lead to higher internal validation of models and more precise conclusions because special sectorial conditions, different legislations, the given market structure have significant effect on relative importance of elements of CSR policy and the actual performance of the companies in these areas [14]. Dabic et al. [15] also emphasize that each sector has its special rules, norms, practices and trends. Social problems and public scandals turned attention to petroleum, financial and textile industries, while essential consumer needs highlighted the CSR actions of food, beverage and pharmaceutical sectors.

Tarabella and Burchi [16] tried to identify the main economic benefits from CSR activities that are more relevant for the chemical industry - assuming that only CSR activities related to environmental management improve economic and financial performance of chemical firms, not global CSR strategy. They also analyzed the sector-specific dimensions of CSR, which have the greatest effects

on business performance of chemical companies. They found evidence to support their hypothesis, namely that environmental initiatives effectively improve economic results of these firms.

Russo-Spena, Tregua and De Chiara [17] analyzed automotive industry firms' disclosure practices in a longitudinal study, focusing on the period of 2010-2014. Their focus was on the reporting activity itself, while this article focuses on the CSR performance of the automotive firms. The base sample consisted of 26 firms, but later only 15 companies had enough data for the analysis. Automotive firms payed the most attention to environmental issues, to community issues and labor practices, and with an increasing trend between 2010-2012, however, community issues and labor practices have lost a bit from their citation rate in the following years.

They found that automotive firms showed an increased intention to report on environmental and social issues and they tried to harmonize and standardize their reports – due to the normative pressure. In line with other studies [18], Russo-Spena et al. [17] identified environmental issues as the most prominent topic in CSR reports of motor vehicle manufacturers.

Teck et al. [19] examined the organizational change and moral transpose of the Diesel Gate. Their study shows that VW applied a triple bottom line positivistic approach before the scandal, but it showed a gradual recession of ethical values over time and had a peek when their scandal exposed in 2015, therefore, VW experienced an ethical dissonance between their idealized and realized values and behavior. VW then engaged in a reflexive organizational change with refreshing their business ethics commitment. The authors think that VW materializes a higher level of CSR after the crisis.

Based on this logic and based on the expectation on the society, we can formulate our first (alternative) hypothesis:

H11: VW's CSR activity and its rating has changed positively following the Diesel Scandal in 2015.

Analyzing only the CSR reports of firms could be misleading, because firms report intentions more than real actions and performance. Reporting standards, like GRI can help to make CSR reports more transparent and comparable to each other.

In the critical view of CSR, there is a going debate on whether CSR is just a public relation activity of the companies which tries to minimize the risk [20] or it is proactive action which is integrated into the strategy of companies [21].

Supposing that VW shows a real engagement toward social goals and the cleaner future, the firm should focus more on the environmental issues related to its activity. Moreover, as the scandal focus was on the product features, the company

should take big steps in improving its product features. Therefore, the second alternative hypothesis is the following:

H12: Significant positive change can be experienced at the "Environment" and "Product" aspects among VW's CSR activities after the scandal.

3   Methodology

Based on the focus of this study, our aim was to use a complex measurement of CSR activity, which can be subdivided into different areas. Among existing aggregated measures, we chose CSRHub database based on three main reasons: (1) systematic and broad data collection; (2) time series of data; (3) quantitative, comparable measurements for the subcategories of CSR. CSRHub has been gathering information systematically on companies' CSR activity and they use multiple sources to collect data. CSRHub relies on broad variety of data sources: sustainability reports, sustainability indices (MSCI, VigeoEiris), media, (like Newsweek, Thomson Reuters), sources focusing on given topic (Glassdoor, Clean Clothes Accord). Moreover, distinct sources track different group of companies, because there are industry or country specific sources. CSRHub has been gathering information from 2008, on a monthly basis. That makes possible to identify and analyze trends based on the data. Majority of information sources update their data only once a year – e.g. sustainability reports or awards, however not at the same time.

CSRHub unifies the data from different sources, as data can be numerical score (between 0.0-1.0 or e.g. amount of money spent on charity), can be measured on ordinal scale (from A++ to C --), or can be binary data (the company is an award winner or not). They use their own weights for the data sources based on the biases identified among data coming from different sources. Then combines, all of the available data on a company and generates base ratings at the subcategory level – followed by the aggregation of these ratings to the category level.

CSRHub have categorized more than 5000 data-element into the twelve CSR subcategories. They evaluate companies' CSR performance grouped into four main categories, namely: Community, Employees, Environment and Governance (Figure 1). Each main category is divided into 3 subcategories, which helps to understand the background of the changes of the evaluation within the topics. CSRHub uses a rating scale of 0-100, which makes the comparison of companies' CSR performance within or between the industries and/or between countries/regions possible.
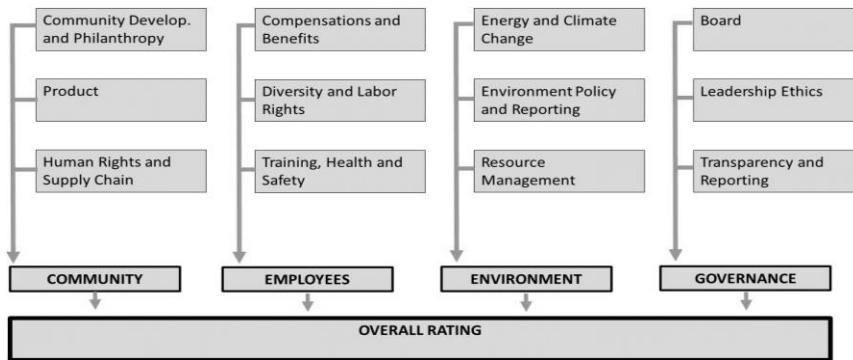
Figure 1
Description of CSRHub rating system
Source: https://esg.csrhub.com/csrhub-esg-data-schema, own illustration

From the point of view of the selected industry, it is a challenge to distinguish companies based on their countries because car manufacturers are typically multi-national companies with different subsidiaries. CSRHub tries to give rating at a parent level of the company, however it acknowledges that "it is difficult to fit together sometimes conflicting ratings on a company's subsidiaries or on its products" [1].

Data have been collected in December 2019, therefore data reflects "2019" in the research means the data from August, 2019, which was the newest data available at CSRHub in December. Also, a filter was used to select only fully rated companies and eliminate only those partially rated – in order to get a broad and full picture. However, CSRHub supports using partially rated companies in creating the country and industry average ratings, as "partially rated companies have slightly better than average scores for the area they report. Therefore, including them in our averages raises those averages slightly. We believe this makes sense. Companies tend to report their more positive information and suppress data that could make them look bad." [2] Considering this claim, industry average is also used as a benchmark in this study to highlight the differences in trends.

3.1   Sample Description

Data search focused on the European region, and on motor vehicle manufacturing within the durable goods category. Fifteen companies have been selected, from which 10 operates on B2C markets and other five mainly relevant in B2B

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[1]   https://esg.csrhub.com/csrhub-ratings-methodology, retrieved 03 April 2021
[2]   https://esg.csrhub.com/partially-rated-companies, retrieved 03 April 2021

business. Their attributes are collected in the table below (Table 1), mentioning also those special issues that are relevant from CSR point of view. Some of them are political issues (Iran or Burma involvement), some are related to social problems (child labor).

Bengtsen and Kelly [22] published that some of the world's biggest carmakers including Vauxhall, BMW, Volkswagen and Audi were accused of using minerals for car paint, which were mined in illegal mines, using child labor. Volkswagen (which owns Audi) and BMW reacted to the allegations and communicated that child labor is prohibited by their sustainability standards and is not tolerated, so they started investigations to know whether any corrective action plan is needed.

Beside the selected B2B and B2C motor vehicle manufacturers, we are going to use the world industry average provided by CSRHub as a benchmark for some of the following analyses.

Table 1

Sample characteristic description of selected motor vehicle manufacturing companies from Europe – based on CSRHub database   Note: * provides full data from 2012 ** provides full data from 2015 *** primary industry is machinery manufacturing in pairs with the final result

Primary business focus	Motor Vehicle Manufacturer	Country	Number of total sources (2008-2019)	Number of active sources (2019)	Special Issues
B2C "10 European Motor Vehicle Manufacturers"	Audi AG *	Germany	35	12	
	BMW	Germany	118	33	
	Daimler AG	Germany	125	31	
	Ferrari SpA **	Italy	22	14	Iran involved
	Fiat Auto	Italy	110	23	
	Porsche Automobil Holding Preference SE	Germany	42	15	Burma, Sudan, Iran involved Child labour involved
	PSA Peugeot Citroën	France	83	27	Iran involved
	Renault SA	France	89	24	Iran involved
	Volkswagen AG	Germany	122	27	Child labour involved
	Volvo AB ***	Sweden	93	38	
B2B "5 B2B Motor Vehicle Manufacturers"	Autoliv Asp, Inc.	Sweden	41	19	
	KION GROUP AG **	Germany	12	13	
	Lookers PLC	United Kingdom	16	8	
	Plastic Omnium	France	25	9	
	Rheinmetall AG	Germany	27	11	Labour unions supporter

Source: CSRHub database, own compilation

4 Results

4.1 Overall CSR Rating of B2C and B2B European Motor Vehicle Manufacturers

In the first phase of the analysis, we calculated the 10 B2C and the 5 B2B motor vehicle manufacturers' overall CSR ratings for the 2011-2019 period. This period shows 4 years before and after the VW scandal, which is long enough to evaluate CSR trends.

The results show that B2C companies' overall CSR score is significantly higher than for B2B companies' values, but the latter shows high volatility (Figure 2). The differentiation of companies based on their main business area is relevant because those companies who operate in B2C business are more frequently engage in attention-grabbing CSR actions and better exposed to criticism of consumers or civil organizations. This probably motivates them to perform better.

Unfortunately, a slight negative trend in the overall CSR rating can be detected both for the 10 B2C carmakers and for the world industry average since 2016.
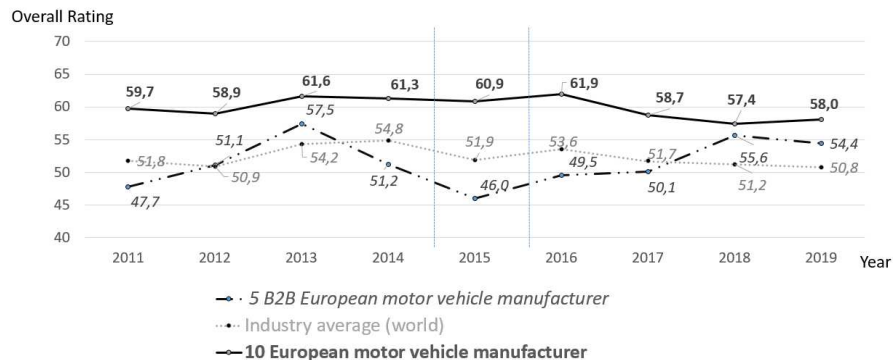
Overall Rating

Figure 2

Overall CSR rating of European motor vehicle manufacturers in comparison with the world industry average in the period of 2011-2019

Source: own calculation from CSRHub database

The five companies, which play dominant role on the B2B market show completely different trend in their CSR performance during the examined period than the B2C firms. Concerning that difference together with the focus of the research, we have decided to concentrate on the 10 motor vehicle manufacturers whose main focus of business is B2C.

4.2   Overall CSR Rating of the 10 European Motor Vehicle Manufacturer and Volkswagen

Volkswagen Group is a leading automobile manufacturer, and operates 61 production plants all over the world. Its product range consists of models from low-consumption small cars (Volkswagen, SEAT) to luxury high-end vehicles such as Bugatti and Lamborghini, and commercial vehicles (e.g. Scania). According to Fortune Global 500 list, Volkswagen was the largest car manufacturing company both in 2019 and in 2020 based on its revenue. These facts underline the relevance of the behavior of the market-leader, especially because it can serve as a role model to the followers.

Therefore, at the next step of the analysis, Volkswagen's overall CSR rating is compared to the CSR performance of the 10 European carmakers and to the world industry average (Figure 3). In the period of 2011-2015 VW's CSR rating was very close to the selected 10 European carmakers' average. However, following the year of the scandal, VW has been showing a negative trend in its CSR rating. Consequently, the 10 carmakers average has been also decreasing. As other car manufacturers were involved in the usage of cheating methods, the skepticism of consumers and decision makers have become stronger. The credibility-loss effected the whole automotive industry and their stakeholders.
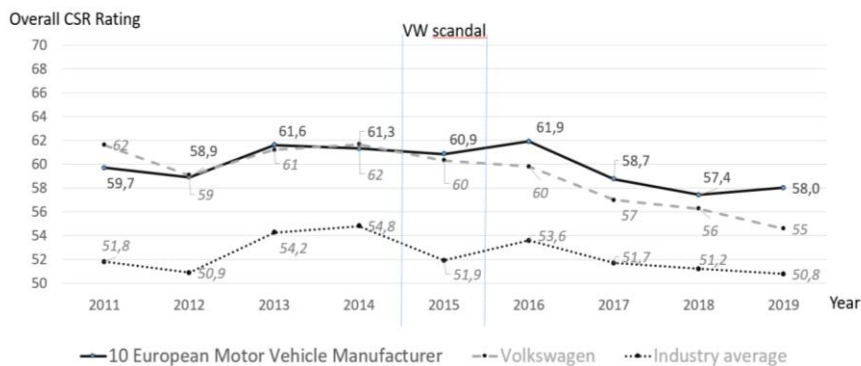
Figure 3

Overall CSR ratings of the 10 European motor vehicle manufacturers, Volkswagen and the industry average between 2011-2019

Source: own calculation from CSRHub database

The company started using the misleading software in its cars before 2011 [23], so it could communicate its business success because of its sustainable solutions for many years. It was not just one mistake, but also a deliberate, systematic, long-term practice. The major contradiction of this case, is that VW advertised itself as a leader in sustainable car making: the technology itself is named: TDI clean diesel. The greener solution was a competitive advantage of their diesel cars,

so the incorrect behavior happened in the front line. (However, we must add that VW's performance in other areas is great and other product features are very convincing for the consumers.)

Before the scandal, VW was said to be "the most sustainable carmaker' in the world according to the Dow Jones Sustainability Indices (DJSI), which is the most significant index for stock investors. The recognition was based on a review of ESG performance of a total of 31 automotive companies based on criteria such as environmental and climate protection strategy, innovation management and corporate social responsibility [24]. After the unfair behavior became known, VW investors suffered heavy losses through the decrease of share prices, and fines and compensation payment claims affects profitability negatively for years.

Statistical analysis shows that none of the differences in the overall CSR rating of the 10 companies together is different from the overall CSR performance of VW at 95% reliability level, while world automotive industry average is significantly lower than the mean for the 10 European motor vehicle manufacturer in every year from 2011 till 2019.

4.3   Analysis of the CSR Subcategories at Volkswagen

The four CSRHub subcategories are Community, Employee, Environment and Governance. Concerning that the underreported emission practice was a greenwashing action, we may expect that the main difference will be shown in the Environment rating of VW before and after the scandal. Results show different pattern, and it is partly explained by the definition of the four subgroups of indicators (Figure 4).

Environment aspect includes company's resource management and its effect on the ecosystem, and practically, pollution prevention programs. Its subcategories are resource management, environmental policy and energy and climate change. Numbers show that environment rating of the company shows slight decrease in the period of 2014-2019, following a relatively high volatility 3-year period. Comparing this trend with the average of the 10 carmakers, we can conclude that very similar trends were realized for the other car manufacturers.

Community category includes the Product subcategory, which "reflects a company's capacity to reduce environmental costs, create new market opportunities through new sustainable technologies or processes, and produce or market goods and services that enhance the health and quality of life for consumers"[3]. This approach emphasizes the basic role of companies: to serve consumers need on a sustainable way.

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3   https://esg.csrhub.com/csrhub-esg-data-schema, retrieved 03 April 2021
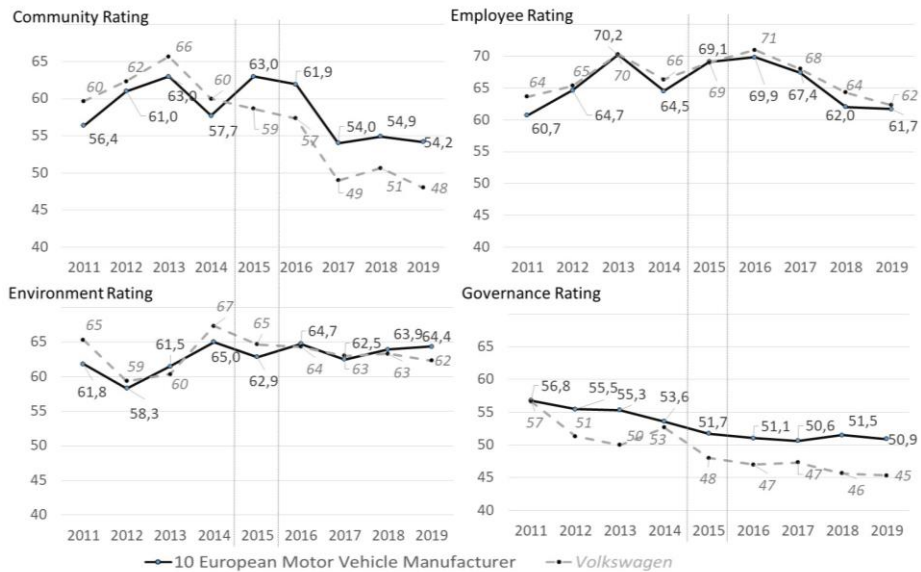
Figure 4

CSR category ratings of Volkswagen and the 10 European motor vehicle manufacturers in the period of 2011-2019

Source: own calculation from CSRHub database

As we have already mentioned at the sample description, child labor issues in the supply chain and political issues (Iran and Burma cases) can be connected to some of the selected carmakers.

The other area where VW's CSR rating is also lagging behind from the average of the 10 companies' is the Governance category. Governance aspect deals with leadership ethics, board composition, transparency and reporting practices. Although the CEO of VW, Martin Winterkorn – who has held this position from 2007 – has resigned following the scandal, he did not acknowledge his responsibility. An additional factor that weakens confidence is the reliability of external audit process of CSR reports. According to the Governance ratings VW's rating in majority of the examined period was below the average of the 10 companies' value.

Employee rating of VW shows no significant difference from the average of the 10 car manufacturers. However, decreasing value of the rating from 2016 reflects to the challenges of the industry.

4.4   Analysis of CSR Subcategories at Volkswagen

Analyzing the differences between the aggregated data of the 10 motor vehicle companies and VW, in 2011 we find statistically significant difference at $p<0.05$ level only at Product subcategory – in favor of the Volkswagen.

Product rating of VW has changed exactly the opposite direction compared to the average. In the period of 2011-2014, VW's product rating was higher than the average of the selected companies (in 2012 and 2014 the difference was not statistically significant). From 2015-2019 VW's Product rating was significantly lower than the average, and shows a dramatic decrease from 69 (2014) to 45 (2019). The Product rating for the 10 companies also shows a negative trend, but it reached a turning point in 2019.

However, in other relevant dimensions, like Environment Policy and Reporting and also in Energy and Climate Change the VW's rating was visibly higher than the average, and slightly higher at Community Development and Philanthropy, Human Rights and Resource Management dimensions, but differences were not statistically significant.

In 2018, the direction was just the opposite: VW's ratings were worse than the mean of the 10 companies – except the Environment Policy and Reporting subcategory. Only for the Product category evaluation we can say that the difference is statistically significant at $p<0.05$ level.

At this final step of the analysis, we just focus on the CSR performance of VW and compare it to its former performance (Figure 5). For comparison, we used years 2011 and 2018, especially because goal settings and strategic plans of VW was formulated for the 2008-2018 period, called Strategy 2018. "Our Strategy 2018 focuses on positioning the Volkswagen Group as a global economic and environmental leader among automobile manufacturers. We have defined four goals that are intended to make Volkswagen the most profitable, fascinating and sustainable automaker in the world by 2018" [25]. Second reason for using 2018 instead of 2019 is that we have a complete database for 2018.

Improving performance can be observed only at Compensation & Benefits subcategory, while CSRHub gave significantly worse ratings to VW at the following subcategories: Board, Leadership & Ethics, Transparency & Reporting and Product. Heavy credibility loss is reflected in the significant decrease of Governance sub-categories: trust in the honest communication and ethical behavior of the firm was harmed to a large extent.
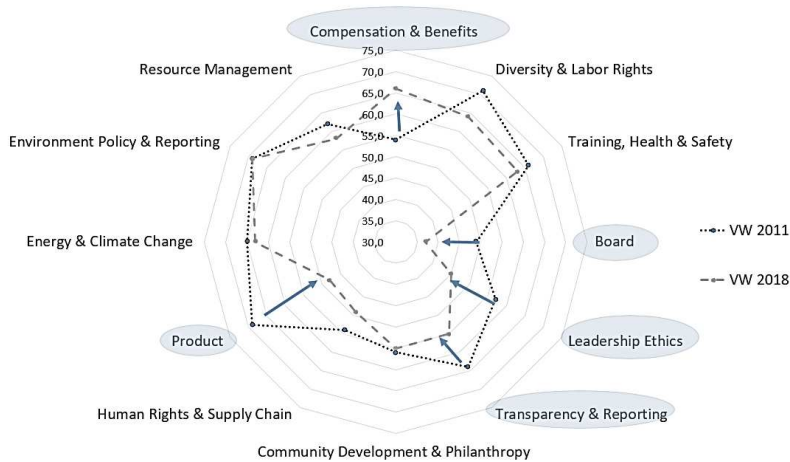
Figure 5

Comparison of CSR subcategory ratings of Volkswagen Group between 2011 and 2018. Arrows and circles show statistically significant difference at p<0.05 level

Source: own calculation from CSRHub database

5 Discussion

The VW scandal turned the attention again to the importance of recognizing and preventing greenwashing. The main features of greenwashing activity are: (1) an information disclosure decision, (2) deliberate, (3) initiated by companies, and (4) beneficial to firms and costly to society [26]. All of these features characterized the VW scandal in 2015.

Because of the long-term, misleading, deliberate action of VW, four questions need to be addressed:

(1) Why it seems to be more profitable to create and use technologies which cheat and risk the good reputation of the company than create real greener solutions?

(2) How this event effects the other car-manufacturers situation on the market?

(3) How much consumers and industries should rely on the reports of independent CSR rating companies and indices, and environmental awards?

(4) How the scandal effects the credibility of and future trust toward CSR actions of any company?

Actually, there were warning signs. VW argued the ambitious emission goals of the EU: the company opposed to the EU's emission target, describing it as not being based on "a realistic appreciation of the costs and technical progress necessary to meet the goal within the timescale. (...) Volkswagen is not only opposed to the 30% emissions reduction target – the company also argues that the EU's existing CO_2 reduction target for new cars sold by 2020, set at 95 $g/CO_2/km$, is too challenging. This target was adopted in 2009 as part of Europe's climate and energy legislation" [27]. That shows that the exaggerating targets may put too much pressure on market players. However, BMW and General Motors were ready to follow the new goals.

Consumers may think, that other carmakers, competitors of VW were aware of the details of the manufacturing process, and the use of the special software, so they should have known about the misleading practice. That had been proven by the investigations started at other carmakers and who had also been found guilty.

Another aspect is that the positive image of automotive firms via their CSR actions in general had a positive attitude toward the industry, so all the actors could have advantage from it. Widely known phenomenon when companies do small steps into the required direction to prevent the stricter legislation on a given issue. So the situation was also favorable for the competitors.

All stakeholder groups – especially external ones – must rely on the communication that is given by the firm or/and they can get information on official institutions (e.g. external audit of CSR reports) and third-party actors (like sustainability indices). These institutions can increase the credibility and trust toward the companies' CSR actions. Although the VW has been removed from the Dow Jones Sustainability Indices in 2015, which was just a necessary step following the emission test manipulation. Nevertheless, it could not detect the problems beforehand - even if Greenpeace published a detailed report in 2011 about "The Dark Side of Volkswagen" [27]. Greenpeace accused VW of exaggerating green record and resisting attempts to make popular models such as the market-leading Golf more fuel efficient. Greenpeace claimed that despite having an image as a family friendly, green brand, VW Group had made less progress on fuel efficiency than rivals such as BMW and Toyota. The report also mentioned that VW was opposing vital climate policies in Europe and was openly against the strong fuel efficiency standards.

The CSR ratings shows that the main sources of the problem were the product features and the lack of real engagement toward a more sustainable operation and product design. Therefore, the results of the analysis could not prove hypothesis 1: CSR rating of VW has not changed positively – just the opposite happened: overall CSR rating of VW has decreased slightly each following year after the scandal. The depth of the crisis is shown by the fact that not only VW CSR rating declined, but the 10 companies' average too. Despite showing and communicating regret after the scandal, analysis of the detailed ratings of CSR subcategories

could not support hypothesis 2. Product dimension (which includes product safety, sustainable technologies, and environmental cost reduction issues) shows significant decrease after the scandal, however rating for Environment category stays the same.

Governance category showed the critical dimension of CSR rating: credibility of management and real ethical standards have been questioned and VW has to fight hard to regain confidence. "In truth, our Company faces a dual challenge. We have not yet surmounted the diesel crisis for which we ourselves are responsible; its consequences will continue to weigh on us for the near future. We have taken significant steps to strengthen our internal processes and control mechanisms and to refocus on compliance and integrity" [28].

Conclusions

Under the Paris agreement on climate change, the EU committed to cut greenhouse gas emissions by at least 40% in all economic sectors by 2030 compared to 1990 levels [2]. While sectors like agriculture, energy and residential sector has been showing steps in this direction, transportation still show higher emission level than in 1990. Related to CO2 emissions, the EU has set a goal of reducing emissions from transport by 60% by 2050 compared to 1990 levels [2]. This ambitious goal cannot be reached without the intensive commitment of European car manufacturers.

The results of our study show that after the VW emission scandal, CSR ratings of big automotive companies show no improvement, but a slight decline – especially in Community related and Governance related issues. As Product subcategory of Community aspect of CSR reflects to the product safety and quality issues, we must mention that more and more cases of car recalls were announced in the last years in the automotive industry.

In 2019, 380 passenger car recalls were announced, which is 32% more than in the previous year. The number of models affected were also higher by 25%. Compared to 2018, there is an increase in the number of recalls, models affected and brands involved in recalls based on dangerous safety, health and environmental hazards. Most recalls were reported in 2019 by Mercedes-Benz (56), Citroën (25) and Peugeot (23). Volkswagen was also in the top ten with 17 recall cases.[5] Although the number of sold cars also increased during this period, the growing number of recalls, questions the effectiveness of quality management systems.

Limitations for our study, can be traced back to the limited access of the database, which, in our study, consisted of those car manufacture companies, which had detailed CSR ratings for the examined period of 2011-2019. The other limitation, stems from the fact that we focused on a single event, that received significant

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[5]   https://car-recalls.eu/2019-most-recall-car-europe/, retrieved 4 March, 2020

media attention, while other events also had positive or negative impact on the firms' CSR policies.

Majláth [29] has already pointed out that the lack of significant consumer boycotts toward VW, after the scandal in 2015, showed that even consumers themselves were not very much interested in the harmful emission of passenger cars.

Introducing the future perspective of the automotive industry, PWC [30] published its scenarios based on the latest automotive trends. According to this report, collaborations in different forms among carmakers help to share risks and investments needed for designing new solutions. However, both high and delayed investment scenarios into electric vehicles predict lower return on capital, for the entire auto industry.

Accepting the basic theory of marketing – as the main role of the company, is to identify and satisfy the needs of the consumers, in a profitable way – future research should also investigate how the attitude of potential consumers can be changed to a more socially responsible and more critical direction.

VW scandal received high media attention, therefore, its effects are more visible, but, there are other greenwashing actions, which still remain hidden. Discovering them is an extremely important step to a better future. Recently, De Freitas Nettó et al. [31] give a detailed review on greenwashing literature. Their work can summarize 13 different types of greenwashing actions, which shows that over time, various forms of greenwashing have flourished and even expanded. In addition to civil organization activity, institutional actions and more control is needed to filter and expose greenwashing actions more efficiently in the Automotive Industry.

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What has Become Important during the Pandemic? – Reassessing Preferences and Purchasing Habits as an Aftermath of the Coronavirus Epidemic through the Eyes of Different Generations

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Abstract: The pandemic, consumer preferences and the composition of the consumer basket changed. Each generation sees differently the impact of the virus on different areas of our lives, which is largely related to the general set of values that characterizes each generation. The focus of our research is the relationship between the generation-specific value system and the changes in consumer behaviour caused by the virus. In the primary data analysis, we focused on the examination of the consumer habits that were modified by the pandemic, the composition of the consumer basket, the customer habits, which differ for each generation and are related to the individual value system. In the light of the results, we were able to determine how the composition of the consumer basket changed, analysing, generation-specifically, which product and service purchase came to the forefront as a result of the crisis.

Keywords: financial awareness; consumer behavior; pandemic; crisis

1   Introduction

The 2008 crisis has taught all economic actors many lessons. We have had a much better sense of the true meaning of change, as this adverse process has had an impact on almost everyone in some form. We have learned lessons on how to manage and prevent these impacts and have experienced the changes in our daily lives as a consequence of the crisis. This was reflected, among other things, in labour markets, income trends and, not least, in our consumption habits. Following the 2008 crisis, we perhaps had no idea of the major challenges that lie ahead. After extraordinary efforts to recover around the world, markets seemed to calm down and indeed growth seemed to be sustained and expectations positive. This momentum was

interrupted by an unexpected event, the COVID-19 pandemic, which taught humanity a new lesson in so many ways. On the one hand, we had to admit that we are still not prepared enough to respond quickly and effectively to such events. There is also much to be learned for the crisis management profession, which has seen many good and bad solutions in the past. However, it is not only in terms of crisis management methodology that we have seen important lessons. We have learned how to work from home, remotely, in areas far from our workplace. We have learnt new ways of organising work and more and more people have started to use and apply digital solutions. We have developed new habits that rely heavily on the online space, overcoming all kinds of geographical and other barriers. We have truly reorganised our lives and introduced solutions that were previously unthinkable (e.g. Home Office or regular online ordering). During the pandemic, there were fewer opportunities for offline purchases, in addition to the restrictions. It was a period that showed which products were in greater demand, which generations were able to adapt more quickly to online 'everyday life' and how the pandemic influenced and shaped our habits and behaviour today. In our study, we seek to answer the question of whether the effects of the pandemic can really be felt in areas such as consumer behaviour and shopping habits. To this end, we have sought to identify the main factors influencing consumer behaviour. Drawing on previous literature and research, we have identified various variables that influence consumer behaviour. This is summarised in Figure 3. We consider globalisation to be important because it has enabled the expansion of international trade, the broadening of the consumption structure and the spread of new products and services around the world. Given that globalisation is a long-standing process, we felt it important to mention the impact of globalisation in the study and link it to changes in consumer behaviour. We have come to the emergence of a global consumer culture, to which many are becoming attached while others are becoming resistant. However, in addition to globalisation, we also had to consider other aspects. One is the impact of the pandemic, which makes the subject of this study extremely topical. The impact of COVID-19 can be seen in all aspects of life, and has of course had a significant impact on consumer behaviour, which will be examined in a separate section. Given that digital solutions have become more widespread as a result of the crisis event, it was of great interest to see which generation could adapt best. Also, which generation would experience the biggest changes in consumer preferences. Additionally, there was a need to take generational characteristics into account since it was strongly suspected that different generations would not adapt in the same way. It was also interesting to see how similar or different they were in terms of changes in consumer behaviour. Taking all these factors together, the research results that are presented in this paper have been developed. Looking at existing changes (e.g. the impact of COVID-19) and trends (globalisation, digitalisation), it is safe to say that further research on consumer behaviour will be much needed in the future. The pandemic and the crisis have a long-term impact on our habits and behaviour.

2   Literature Review

2.1   The Emergence of a Global Consumer Culture

Globalization is one of the most powerful shaping factors in our lives. Different views have emerged about the origins and characteristics of this process [1]. Globalization is interpreted in very different ways by different experts [2] who point out that there are many definitions of globalization, making it even more difficult to agree on its origins or measurement [3]. For the purpose of this paper, the definition of globalization is not the main objective, but it is important to mention its role in shaping consumer behavior. All this can be understood in an indirect way. After World War II, both international trade and world GDP volumes increased significantly. This is due to the fact that the GATT Agreement signed after World War II and the free trade and preferential agreements established along the way brought countries and economic operators closer together than ever before [4]. They have successfully removed many of the trade policy barriers that had hitherto hindered the growth of international trade (this was the impact of the GATT Agreement, as the reduction of tariffs has contributed significantly to the expansion of trade, and thus the emergence of new products in new markets). Moreover, since the 1960s, the number of multi- and transnational corporations (MNCs, TNCs) has soared, taking advantage of the gradual dismantling of barriers to international trade to expand consumption opportunities by creating trade and substitution in many areas of the world [5]. In 1995, there were only 38,541 transnational corporations, while by 2010 (in just 15 years) the number had risen to 103,786 [6]. The UNCTAD World Investment Report provides evidence of the changing number of multi and transnational corporations [7]. By internationalizing their supply chains, these companies have made the purchasing options available to consumers more colorful and diverse than ever before [8]. Consumption options have expanded, fundamentally reordering consumers' choice preferences. International trade has enabled us to consume more than ever before, as we did in previous decades or centuries. We have been introduced to products we had never heard of before. The process of globalization and the development of the market economy has created a consumer culture in which people are trying to satisfy their consumer needs as best they can [9]. Mass culture influences consumer behavior and its evolution and preferences. Globalization leads to structural changes in the economy and changes consumer preferences. This manifests itself as people in developing countries start to follow the consumption patterns of more developed countries [10]. Indeed, an important step in this process is to familiarize the population of less developed countries with the new consumption options. Here, international supply chains, large corporations and the breaking down of trade barriers have played a significant catalytic role, since one way of learning about new products is precisely by breaking into a new market. The rapid development of data innovation can also be highlighted. Previously unknown brands can also quickly become popular through media and new channels, so the spread of international companies is not

the only reason for the change in consumer habits. However, globalization can be
seen to be causing changes in the economy and altering consumer tastes and
lifestyles. This change in lifestyle is also responsible for the change in consumer
habits [11]. The reason for this can be seen in the fact that globalization is
fundamentally changing people's values, beliefs and behavior, which will affect
their consumption behavior [12]. Nowadays, people have many more opportunities
to learn about other cultures and customs (e.g. through travel, ICT, etc.), which may
later influence their behavior and subsequently their purchasing decisions. It is clear
that consumers are influenced by a variety of foreign and domestic products. They
are constantly exposed to media, brand and cultural influences and these
subsequently influence consumer decisions [13]. Globalization has also paved the
way for the free flow of products, the unrestricted spread of information or the
proliferation of media. The authors discuss the emergence of a global consumer
culture, in which certain consumer segments share similar characteristics,
regardless of where they are located in the world. The notion of homogeneous
groups of buyers and customers has emerged, while some people can now form
cultural communities based on their consumption habits. It can be said that we can
now belong to a culture on the basis of our buying habits or consumer behavior (e.g.
the Apple buying group). The emergence of the concept of global consumer culture
(GCC) is a good illustration of the link between globalization and consumer
behavior. Global consumer culture has a much broader meaning as it is not limited
to a single country. Local cultures are permeated by international capital (see earlier
on the role of multinational corporations), global information technologies and the
impact of the media (now mainly in the online space) [14]. However, globalization
has not only been able to have a profound impact on people's consumer preferences.
In additon, creating homogeneous consumer groups and creating a global consumer
culture, globalization has also brought nation states closer together than ever before,
so that they are indeed interdependent, not just in terms of consumer habits.
Unfortunately, the latter has also facilitated the spread of the pandemic, as there are
no longer any major barriers to the free movement of people.

2.2   Exogenous and Endogenous Dimensions of Consumer Behaviour

Consumer behavior, as part of human behavior, is a complex and complicated
process, and it is no coincidence that its study has been a major focus of marketing
for decades. Knowledge of consumer behavior and the purchase decision process is
essential for developing a competitive marketing concept and portfolio of products
and services that meets current expectations [15]. In order to create an attractive
offer that is appealing to the customers, it is important to understand how they make
their decision and the processes and mechanisms behind the decisions [16], [17].
According to the interdisciplinary approach to consumer behavior, consumer
behavior is a complex behavior that involves individual needs, the determinants of
one's environment, the information available to the buyer, the ability to evaluate

alternatives and the decision mechanism that subsequently satisfies or dissatisfies the customer. According to the schematic model of consumer choice (Figure 1), in addition to the effects of the familiar (endogenous) factors that are linked to the consumer, the influence of the wider environment (exogenous dimensions) that are independent of the consumer is also taken into account [18].
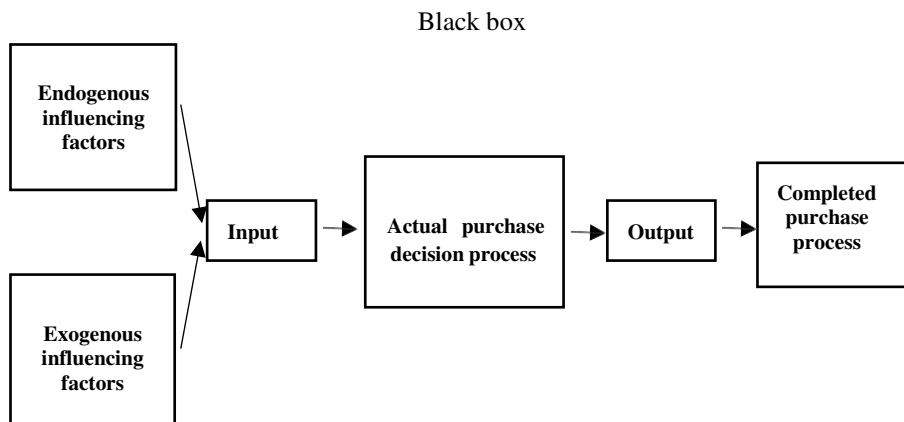
Black box

Figure 1

Schematic diagram of the consumer-customer decision process

Source: authors' own edition based on [61]

In our study, we focus on both endogenous and exogenous dimensions: in the latter case, we analyze the role of the coronavirus crisis as a multidimensional macro-factor that influences consumer behavior. As for the former, i.e., endogenous factors, we focus on generation-specific characteristics. In addition, the role of individual value orientation in the basic context of value-based models of consumer behavior is examined in order to gain a more nuanced understanding of individual consumer choice.

2.3   Impact of the COVID-19 Epidemic

Today, not only globalization, but also other globalizing processes are having a significant impact on shopping habits. The most recent of these is the COVID-19 pandemic, which has affected every aspect of our lives. We have changed our habits, our purchasing preferences and have sought more conscious ways to meet our needs [19]. Our shopping habits have changed and we have adapted to the new situation. The ban and restriction on visiting shops increased the traffic to online shops, i.e. the shop came to us [20]. Other aspects of adapting to new challenges are being further modified by digitalization, the spread of innovative solutions and the blurring of work-life boundaries, creating a new world of consumption. We have witnessed purchasing phenomena that are unusual in the modern world, but which have not been present in previous welfare societies and models in the recent past.

Panic buying, shocks caused by often unsubstantiated information generated by online sources has been repeatedly observed during the pandemic period [21].

The COVID-19 pandemic has fundamentally changed our perceptions not only in the workplace (Home Office) (we used to think that our work was only available from our workplace). There has also been a paradigm shift in commerce, finance and shopping. Our consumption patterns are fundamentally shaped by four contexts [20]. The first is the social context, in which life events, marriage, family, having children or moving house, occur. It also includes the workplace, which can also influence our purchasing decisions. The second context is technology. In recent years there have been a number of technological breakthroughs. Just think of the emergence of smart devices. They have radically changed our habits and therefore our purchasing preferences. It has also given way to a new era of shopping, online and digital. In the third context are the rules and regulations that can appear, for example, in public spaces, in public places. Alongside these, the fourth context is just as important, covering ad hoc, ad hoc phenomena or natural disasters. Examples include earthquakes, hurricanes, civil wars and, of course, the COVID-19 pandemic, which is still having an impact, not only on consumer behavior [20]. The pandemic has created an opportunity for retail to open up new opportunities. Customers have recognized the importance of retail in their daily lives [22]. During the pandemic, shopping baskets changed, the routine of running a household changed, the reasons for shopping and the availability of goods and services changed. The COVID-19 epidemic has also fundamentally affected the retail sector [23]. Countries had to diversify their trade to mitigate external shocks. People behave fundamentally differently during a negative event, as they are not all the same. In times of crisis, new trends in consumer behavior emerge. The main factors are crisis behavior, risk attitude and risk perception. Risk attitude reflects the consumer's interpretation of the content of the risk, while risk perception reflects the consumer's interpretation of how much exposure to risk he or she feels [24].
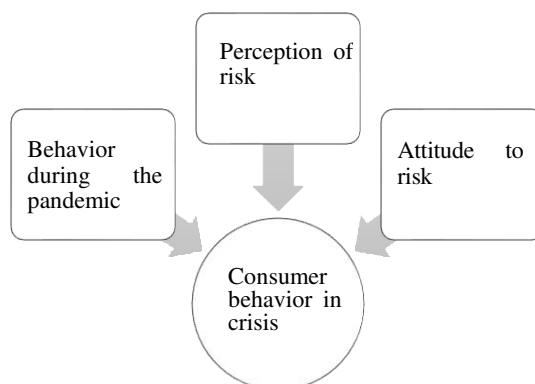

Figure 2

Components of consumer behavior during the crisis

Source: authors' own editing based on [62]

The impact of the crisis on consumer behavior has been described by some as critical. Crises can facilitate certain trends while others are completely slowed down and disappear. In general, consumer demand is for simplicity [25]. The process of digitalization that started before the pandemic, the hunger for information and the demand for information before the pandemic, opened up many new channels, with consumers looking for information that did not always give the truth. The distorted and false information triggered shocks in consumers due to artificially inflated fears. This shock was different from the others. Fear of loss of income, the expected disruption of supply chains, mobilized basic human motivations [26]. Although governments have tried to mitigate panic with bailouts, replacement of lost income, subsidies and other benefits, the phenomenon of panic buying among consumers has emerged from time to time [27]. In addition to panic buying, another well-observed phenomenon in similar situations is the restraint in spending by consumers, which is influenced by product categories, age, marital status, gender, place of residence and family structure [28], [29], [30]. In general, consumers are looking for value-oriented products and services that simplify their lives. The results of research by major market research organizations (BCG, KPMG, Deloitte) summaries the impact of the COVID-19 epidemic on consumer behavior [24]. All studies agreed that there is clear evidence of changes in consumer behavior. According to BCG, low-income and younger consumers showed a greater propensity to plan to reduce their spending [31]. However, KPMG also highlights that consumers have become more aware [32]. Consumers were also more attentive to price, origin and usefulness of products. Joining the previous organizations, Accenture came to the same conclusion. The latter mentions that consumer habits have not only changed in terms of awareness as a result of the coronavirus epidemic, but also that demand for certain products (such as hygiene products) has increased [33]. The epidemic has affected access to and purchasing behavior of food. Shopping trips, stocking and online shopping behavior have decreased [34]. The pattern of food consumption has also changed for different age groups. Some of the population started to eat more healthily and consciously, while others did so less [35] with increased snacking and less healthy food consumption [34]. Research by Accenture, KPMG and BCG confirms the emergence of awareness [31], [32], [33]. Following the COVID-19 epidemic, demand for some products increased, while others declined. The latter category includes clothing or luxury products. However, there is a clear increase in demand for durable food and health-related products. In addition, international market research organizations have also pointed out that changes in consumer behavior should be analyzed by age group and income level. The emergence of online and digital tools in the shopping process is of great importance [36]. However, it is also worth noting that while online solutions have been of significant help during the COVID-19 pandemic, they will not be able to fully replace physical shopping. For example, online stores will not be able to meet all consumer needs in the same way as traditional (offline, physical) stores. In fact, digital shopping does not allow the customer to touch, see and feel the quality of the product in person, which is an important part of the shopping process [36]. The study of consumer behavior is made even more nuanced by the fact that different

age groups in society also exhibit different consumer behavior. Income is not the only determinant, but it is important to look at the attitudes of different age groups and generations towards consumption and shopping. It is not difficult to see that economic globalization has contributed significantly to changing consumption patterns. International firms and global supply chains have expanded consumption opportunities, but the COVID-19 pandemic has also highlighted the continuing importance of retailing. In addition, we should also see that globalization is not the only factor in changing consumer behavior, as the aforementioned contexts, social age groups and natural disasters or pandemics can also change our preferences [20]
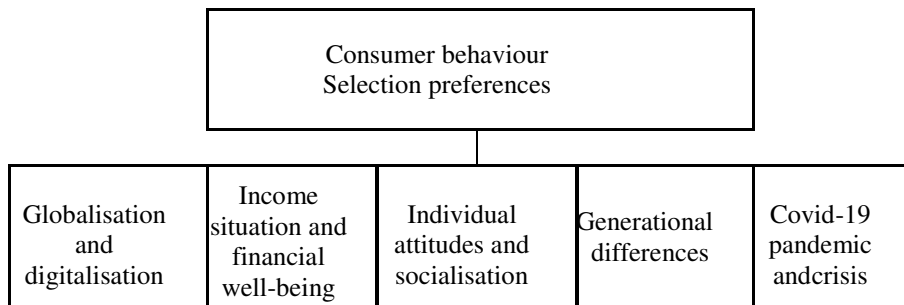

Figure 3

Megatrends that shape consumer behavior in 2021

Source: authors' own editing

2.4   The Role of Generational Differences in Consumer Choices

Generational differences have been successfully used as a segmentation criterion in marketing in many areas, as each generation is a bearer of differences that can be well characterized by common values, mindsets and behaviors that are specific to them. Values, shared experiences, are a sort of organizing principle and the identities found within generations frame the decisions of the people belonging to them and distinguish them from other generations [37]. The differences between generations, generational traits, go beyond simple age specificities. A generational approach is not equivalent to age segmentation. It is a more complex approach since the major events of the years they have lived through together – social, technological, cultural, etc. – shape those born at different times into generations with specific characteristics. These shared experiences and life experiences shape each generation, forming their specific consumer habits, mindsets and values. In our primary research, we touch on the baby boomer, generations X, Y, and Z, so we will describe in a few sentences the main general and consumer characteristics that characterize them. It is important to note that there is a lot of variation in the literature regarding the birth years of the people belonging to each generation, so not all age categories mentioned by the experts in the study show a complete overlap with the age of the subjects of the primary research.

Members of the baby boomer generation are important for them to build relationships. Members of this generation rejected their parents' rigid moral concepts, created a new culture for themselves, sought peace and greater freedom, and became more tolerant and curious than their predecessors. They are also committed and loyal customers who are not afraid of new challenges. They are slower to adapt to change, which explains the tension that often exists between them and younger generations [38].

Generation X is also referred to as the transition generation, as their value's reflect the older generation's respect for status, work and achievement, but also the need to develop as individuals, the preference for status symbols and the need for self-reward [39]. Generation X have already encountered the internet as almost adults, they see its benefits, they experience it as a privilege. They see how much easier it makes life, but it is not the only reality for them. They are able to take advantage of the benefits and turn them to their advantage [40]. Generation X has become perfectionists as a result of experiencing a deficit economy. In their childhood, almost everything was a scarcity item, members of Generation X experienced a deficit in communication tools, and this gives Generation Xers a special attitude [41]. This is the generation characterized by one of the greatest adaptability. This is no different in the field of shopping: they have adapted quickly to technological advances and represent one of the largest customer bases for online purchases [42].

Looking at the consumption habits of Generation Y, they are looking for novelty, new experiences and impulse buying. They prefer personalized options, convenience and flexibility in their decisions [43]. Generation Y members are already skeptical about digitalization and try to protect and limit their children from excessive internet use. They are immature about the opportunities offered by digitalization, they are wary of their data, they are not easily led in exchange for a discount or two. The dividing line between the two generations is 1995, which also marks the beginning of the Internet era [44]. Among the general characteristics of Generation Y, the literature mentions a strong social sensitivity alongside ambition and innovativeness. This generation is particularly keen on monitoring corporate social responsibility and is characterized by a "green consumerism" [45]. Another good characteristic of Generation Y members is considered by experts to be their love of shopping. It is no coincidence that many CRM and customer loyalty programs focus on this generation [46].

For Generation Z, shopping is an experience, and their consumption habits reflect the self-rewarding nature of this generation, they look for promotions and discounts, and like Generation Y, they prefer personalized offers. Generation Z are born into the online world, and have grown up with social media. The world is almost in their room, in the form of television, computer or even smartphones. One of the characteristics of this generation is their preference for online shopping, much more so than among the non-net generation. Adding to this, online shopping is now a growing form of shopping regardless of generation [47], which was particularly amplified by COVID-19. This fact is related to the generation's consumer

characteristics, given that in many cases they are more confident in moving in the online space than in reality [48]. If they need something, they can access it quickly and conveniently in the online world, which they perceive as much safer than the real world. This generation is referred to by various adjectives: bit generation, net generation (N-generation), D-generation (digital), but they are also called digital natives [49]. Due to the general hedonism that characterizes Generation Z, having children is postponed and they stay longer. In many cases, the focus on the individual, on self-interest, brings to the surface narcissistic characteristics that will affect their attitude towards work and even society [50]. A closer look at generations provides an opportunity to define habits more precisely, to understand why, when and how customers are likely to act. This is why we focus on this endogenous factor of consumer behavior analysis, in addition to an overview of global trends and the macro-environmental impact of the aging virus. Understanding the generational isms that are linked to the consumer gives us the opportunity to understand more precisely the motives and indicators behind consumer behavior and thus to offer marketing solutions that are even better adapted to consumer needs.

3   Material and Method

In this paper, we present a systematic review of relevant national and international literature and present partial results of our primary research. The primary data collection took place between May and October 2020, and involved quantitative research: a pre-tested, standardized online questionnaire survey. Subjects were recruited through a snowball sampling procedure, using our own active students as the first base, by sharing the online research tool directly to their email address. Subjects were recruited using a snowball sampling procedure, resulting in 6804 evaluable questionnaires. The research tool consisted exclusively of closed questions at nominal measurement level (single-choice and multiple-choice questions) and metric scales (Likert scale and semantic differential scale) to analyze consumer attitudes and values. The topics of the research tool were developed as a result of relevant secondary data analysis. Each response alternative – pre-testing of the research tool – was finalized in the light of qualitative results. In the framework of this qualitative research phase, 10 mini-focus group interviews were conducted, in which the subjects were also selected using the snowball method, with our own active students as the sampling frame. The call for qualitative research was distributed among them and the first ten respondents remained in the final sample, and the snowball sampling technique continued with their inclusion until the final number of interviewees was reached.

The mini focuses were guided group discussions with 3-4 participants each, with a heterogeneous composition in terms of gender and age. The main objective of the qualitative research was to establish the quantitative research, finalize the standardized questionnaire and outline the research hypotheses.

In the qualitative phase, a semi-structured guide was used, the main topics of which were: knowledge and perception of the different crises, analysis of the impact of the coronavirus crisis on consumer behavior, the impact of the crises on the perception of competences (what knowledge and skills have been revalued as a result of the crises. In a separate theme, we analyzed the different banking services, banking preferences and the demand for digital banking services, which formed the basis for the analysis of customer preferences independent of the impact of the crises.

The qualitative phase resulted in a finalized quantitative research tool. The standardized questionnaire consisted of a total of questions 28 and covered the following topics: perception of crises, analysis of the impact of crises in the light of perceptions of digital skills, economic knowledge and management competences, bank choice and loyalty to the service provider - conditions for staying in the bank. Only closed questions were used in the questionnaire, at nominal (selective, decisive, combinatorial) and metric Likert and semantic differential scale, ratio scale) levels of measurement.

In this paper we focus on the partial results of the quantitative phase of our research project. Within that, we have also given priority to the analysis of the impact of crises, the examination of the relationship between the perception of crises and the financial education of the subjects.

The quantitative results were processed using descriptive statistics, bivariate and multivariate analyses using SPSS 22.0 software. In the present study, in addition to descriptive statistics, the analysis of variance method was used to examine the correlation between nominal and metric scale scores, including the one- way ANOVA method for comparing multiple sample means. The mean of a metric dependent variable was compared between more than two groups. The post-hoc test was used to determine which pairs of groups differed significantly. Significance values were used to determine the existence of correlations (sig<= 0.005). Internal correlations were analyzed along the comparison of group means using the F- statistic, i.e., the coefficient of variance of the means within samples [51], [52].

For the correlation tests presented in the study, where the significance value according to the ANOVA table was below 0.05, it was confirmed that there is a correlation between the age group (generation) and the variable under study (average value of the change in the use of products and services), so these data were highlighted and illustrated in the SPSS post-hoc test results.

During the quantitative research phase, our main objective was to analyze the following hypotheses:

H1: The impact of the coronavirus has led to statistically verifiable changes in consumer habits and the composition of the consumer basket;

H2a: Buying habits differ between the generations studied;

H2b: Buying habits are also related to individual values.

The logical framework for the presentation of the partial results presented in this paper is the evaluation of the hypotheses mentioned above.

The main socio-demographic characteristics of the sample are as follows: 50.6% of the 6804 respondents were male and 49.4% female. Only 7.2% of the respondents have elementary education, 57.2% secondary education, 26.3% have a bachelor's degree and 9.3% have a master's degree. In terms of age, the largest share of the sample (39.4%) is from Generation Z (18-25 years). They were followed by 21.8% of respondents aged 26-35 and 17% of respondents aged 36-45. Respondents aged 46-55 years represented 13.1% of the sample, while respondents aged 55 years represented only 8.5% of the sample. As our research hypothesis suggests that there is a statistically verifiable correlation between financial and economic education and perceptions of the crisis, we consider it important to characterize our sample along this criterion. More than half of our respondents (57.1%) have no previous economic-financial education, with such knowledge characterizing 57.1% of our respondents.

4   Results

To test the H1 hypothesis, a separate set of questions analyzed the consumer behavior of the sample members in terms of changes in their shopping habits caused by the epidemic situation. The results show that the proportion of durable food and health food products in the respondents' shopping baskets increased the most as a result of the coronavirus outbreak.

Table 1

Changes in personal consumption in response to the coronavirus epidemic[1]

	clothing items	durable food	daily consumer goods (bread, dairy products)	medicine	health preservatives	consumer durables (technical and other goods)	culture, entertainment
Mean	2,01	2,97	2,83	2,80	2,88	2,38	2,14
St.dev.	0,95	0,86	0,86	0,92	0,90	0,97	1,02

Source: authors' own research 2020, N= 6804

In addition to the impact of the coronavirus epidemic on FMCG (fast moving consumer goods) and consumer durables purchases, we also analyzed its impact on the tertiary sector. Overall, the results show that the service sector suffered a fairly big loss in the pandemic, as there was no type of service that did not experience a drop in demand. The largest declines were recorded in frequenting larger clothing stores, smaller grocery stores and large shopping centers as well as restaurants.

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[1]   average where 1 = greatly decreased, 4 = greatly increased

Table 2

Frequency of use of certain services

(Average, where 1 = greatly decreased; 4 = greatly increased)	Frequency before corona-virus (average)	Frequency after corona-virus (average)	Difference between averages in absolute terms
bank branches	2.66	2.51	0.15
large shopping centres	3.29	**3.04**	**0.25**
small food shops	3.36	**3.11**	**0.26**
larger clothing stores	3.22	**2.93**	**0.28**
small clothing shops, boutiques	3.12	2.93	0.19
larger technical stores	3.10	2.89	0.21
small technical shops	3.00	2.86	0.14
insurance companies	2.66	2.60	0.06
travel agencies	2.61	2.56	0.05
restaurants	**3.14**	**2.90**	**0.25**
cookery shops	3.05	2.84	0.21
bakeries	3.12	2.90	0.22
pharmacies, health shops	3.26	3.08	0.18
beauty service providers	3.05	2.85	0.20

Source: authors' own research 2020, N= 6804

While certain product groups were the clear winners of the epidemic – due to their increased purchase volume during the epidemic – the services under review all experienced a drop in customer interest (hypothesis H1 confirmed). In line with the hypothesis testing, we also analyzed the individual changes in consumer behavior on a generation-specific basis: we looked at the products and services whose frequency and extent of use after the epidemic were related to the age of the sample member. The results of the correlation analysis between the extent of purchase of products and age categories showed that for the exception of health promotion products, a significant difference (sig=0.008) was found between the extent of purchase of the product and the age of the respondent for each product group (sig<0.005). (Hypothesis H2/a confirmed).

For our Generation Z respondents (18-25 years old), we found that purchases of clothing, daily consumer durables and consumer durables, as well as durable food increased at a higher rate than the sample average and other age groups. For clothing and consumer durables, as well as for education and entertainment, members of Generation Y (26-35 years) represented the largest consumer base. While, unsurprisingly, consumption of medicine was higher than the sample average among older respondents aged 56-65.

Table 3
Consumption patterns in relation to age in the context of the coronavirus epidemic[2]

		N	Average	sig
clothing items	18-25 years	2688	**2,04**	0,000
	26-35 years	1490	**2,10**	
	36-45 years	1156	2,08	
	46-55 years	882	1,89	
	56-65 years	349	1,84	
	above 65 years	239	1,90	
	sample	6804	2,02	
durable food	18-25 years	2688	**3,04**	0,000
	26-35 years	1490	2,93	
	36-45 years	1156	2,88	
	46-55 years	882	3,01	
	56-65 years	349	**3,02**	
	above 65 years	239	2,89	
	sample	6804	2,98	
daily consumer goods (bread, dairy products)	18-25 years	2688	**2,90**	0,000
	26-35 years	1490	2,79	
	36-45 years	1156	2,85	
	46-55 years	882	2,76	
	56-65 years	349	2,81	
	above 65 years	239	2,67	
	sample	6804	2,84	
medicine	18-25 years	2688	2,87	0,001
	26-35 years	1490	2,80	
	36-45 years	1156	2,76	
	46-55 years	882	2,76	
	56-65 years	349	**2,91**	
	above 65 years	239	2,83	
	sample	6804	2,82	
consumer durables (technical and other goods	18-25 years	2688	**2,45**	0,000
	26-35 years	1490	**2,43**	
	36-45 years	1156	2,39	
	46-55 years	882	2,20	
	56-65 years	349	2,24	

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2   average where 1 = greatly decreased, 4 = greatly increased

	above 65 years	239	2,36	
	sample	6804	2,39	
culture, entertainment	18-25 years	2688	2,15	0,000
	26-35 years	1490	**2,23**	
	36-45 years	1156	2,16	
	46-55 years	882	2,01	
	56-65 years	349	2,08	
	above 65 years	239	2,17	
	sample	6804	2,15	

Source: authors' own research 2020, N= 6804, analysis of variance, measurement levels: nominal and metric scale

A significant difference (sig< 0.005) was found between age groups for all services for all alternatives examined. For bank branches, the biggest drop in service was observed for respondents belonging to Generation Z. However, it was members of this generation who accounted for the majority of visitors to large shopping centers, smaller grocery stores and especially restaurants during the coronavirus outbreak. For our Generation Y respondents (26–35-year-olds), this was the case for restaurants. The results show that Generation X (36-45 years old) became the main customers in the tertiary sector during the outbreak, with members of this generation showing the highest purchasing power and the most frequent use of beauty services, travel agencies, insurance companies, bakeries and technical shops. By contrast, for customers aged 65 and over, the overall trend was a drop in the frequency of use of all services in their age group as a result of the epidemic. This is presumably because they may have felt most vulnerable to the negative effects of the epidemic.

Table 4
Patterns of use of post-epidemic services for coronavirus by age[3]

		N	Average	sig
bank branches	18-25 years	2688	**2,36**	0,0000
	26-35 years	1490	2,63	
	36-45 years	1156	2,63	
	46-55 years	882	2,59	
	56-65 years	349	2,53	
	above 65 years	239	2,56	
	sample	6804	2,51	
large shopping centres	18-25 years	2688	**3,08**	0,0041
	26-35 years	1490	3,03	
	36-45 years	1156	3,05	
	46-55 years	882	3,04	
	56-65 years	349	**2,90**	

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[3]   average where 1 = greatly decreased, 4 = greatly increased

	above 65 years	239	2,90	
	sample	6804	3,04	
small food shops	18-25 years	2688	**3,15**	0,0293
	26-35 years	1490	3,07	
	36-45 years	1156	3,09	
	46-55 years	882	**3,19**	
	56-65 years	349	3,00	
	above 65 years	239	**2,80**	
	sample	6804	3,11	
small clothing shops, boutiques	18-25 years	2688	2,93	0,0000
	26-35 years	1490	2,92	
	36-45 years	1156	2,96	
	46-55 years	882	**2,98**	
	56-65 years	349	2,85	
	above 65 years	239	**2,77**	
	sample	6804	2,93	
larger technical stores	18-25 years	2688	2,85	0,0212
	26-35 years	1490	2,93	
	36-45 years	1156	2,92	
	46-55 years	882	**2,95**	
	56-65 years	349	2,81	
	above 65 years	239	2,83	
	sample	6804	2,89	
small technical shops	18-25 years	2688	2,84	0,0155
	26-35 years	1490	2,87	
	36-45 years	1156	**2,94**	
	46-55 years	882	2,85	
	56-65 years	349	2,82	
	above 65 years	239	2,73	
	sample	6804	2,86	
insurance companies	18-25 years	2688	2,56	0,0000
	26-35 years	1490	2,67	
	36-45 years	1156	**2,71**	
	46-55 years	882	2,53	
	56-65 years	349	**2,51**	
	above 65 years	239	2,52	
	sample	6804	2,60	
travel agencies	18-25 years	2688	2,51	0,0000
	26-35 years	1490	2,65	
	36-45 years	1156	**2,66**	
	46-55 years	882	2,52	

	56-65 years	349	2,47	
	above 65 years	239	**2,46**	
	sample	6804	2,56	
restaurants	18-25 years	2688	**2,94**	0,0000
	26-35 years	1490	2,91	
	36-45 years	1156	2,91	
	46-55 years	882	2,89	
	56-65 years	349	2,69	
	above 65 years	239	**2,55**	
	sample	6804	2,90	
cookery shops	18-25 years	2688	2,84	0,0018
	26-35 years	1490	**2,88**	
	36-45 years	1156	2,87	
	46-55 years	882	2,82	
	56-65 years	349	2,72	
	above 65 years	239	2,64	
	sample	6804	2,84	
bakeries	18-25 years	2688	2,90	0,0000
	26-35 years	1490	2,90	
	36-45 years	1156	**2,99**	
	46-55 years	882	2,90	
	56-65 years	349	2,77	
	above 65 years	239	2,73	
	sample	6804	2,90	
beauty service providers	18-25 years	2688	2,83	0,0014
	26-35 years	1490	2,89	
	36-45 years	1156	**2,90**	
	46-55 years	882	2,85	
	56-65 years	349	2,69	
	above 65 years	239	2,72	
	sample	6804	2,85	

Source: authors' own research 2020, N= 6804, analysis of variance, measurement levels: nominal and metric scale

Since several studies have shown that consumer preferences and purchasing decisions are related to individual values [53], [54] we investigated whether the mindset and values of generations with different purchasing habits during the epidemic also carry this significant difference and to what extent individual value preferences can explain the difference in purchasing habits.

The survey also looked at respondents' values. The reason for investigating the value orientation is that many theories and behavioral models confirm that the consumer's purchase decision is ultimately based on the value orientation [55], [56].

Value system research has a crucial role in revealing the internal context of consumer behavior. It is no coincidence that the methods used in marketing research as early as the 1960s were based on the basic context of lifestyle and values, such as the AIO or the VALSI and VALSII methods [57]. The correlation between values and consumer behavior is also true for the analysis of food consumption and eating habits. This is evidenced by models that attribute dietary choices and food choices to values and lifestyle. A common feature of these models is that they start from abstract value systems of products or services and arrive at the specific attributes of a particular product, food or service in relation to these. Such is the case of Gutman's chain of meaning theory [58], which, as a hierarchical model, highlights the interrelationship between values, consumption and specific product attributes. According to the values-based food consumption behavior theory, the influence of values on food consumption preferences is realized at three levels [59]. At the first level are the general core values of the consumer, such as peace, security and time. At the second level are the values that determine consumer behavior, such as quality consciousness, hedonism and time consciousness. These reflect the social status, preferences and living conditions of the consumer. Finally, at the third level, there are the values of specific products and services, such as product and service choice motives [60]. A common feature of these theories is that they assume a relationship between the consumer's motives for product and service choice and the value system. These theories have inspired us to analyze each generation in terms of their value judgements in addition to their purchasing preferences, thus providing a more nuanced picture of the real reasons behind their consumer choices.

Significant differences (sig<0.005) were also found between the generations for each value dimension, with the only exception being the value of thrift (sig=0.011). (Hypothesis H2/b confirmed). We believe that the difference in consumption and purchasing habits may be explained not only by the epidemic but also by the difference in values between generations. Analyzing the value orientation of each generation in the light of the results, we found that Generation Z members, above the sample average, value freedom to indulge in something good, plenty of free time, a career, hobbies, a good life and good human relations. Given this value orientation, it is not surprising that this generation is the one that has seen the highest levels of shopping activity for product groups and services in large shopping centers, small grocery stores and restaurants. Thus, it can be said that the highly individualistic values of young people are also linked to the high levels of shopping activity they have shown during the viral situation. This contrasts with respondents over 46, who tend to be more restrained in their spending, and whose values are more characterized by social sensitivity, pleasure for others and a desire for inner harmony.

Table 5
Relationship between value orientation and age[4]

		N	Average	sig
freedom	18-25 years	2688	**3,41**	0,000
	26-35 years	1490	3,21	
	36-45 years	1156	3,20	
	46-55 years	882	3,28	
	56-65 years	349	3,23	
	above 65 years	239	3,24	
	sample	6804	3,30	
giving pleasure to others	18-25 years	2688	3,18	0,000
	26-35 years	1490	3,09	
	36-45 years	1156	3,06	
	46-55 years	882	**3,23**	
	56-65 years	349	3,19	
	above 65 years	239	3,15	
	sample	6804	3,14	
I can afford something good	18-25 years	2688	**3,19**	0,000
	26-35 years	1490	3,07	
	36-45 years	1156	3,05	
	46-55 years	882	3,11	
	56-65 years	349	3,08	
	above 65 years	239	3,00	
	sample	6804	3,12	
peaceful life	18-25 years	2688	3,38	0,000
	26-35 years	1490	3,22	
	36-45 years	1156	3,28	
	46-55 years	882	**3,42**	
	56-65 years	349	**3,45**	
	above 65 years	239	3,23	
	sample	6804	3,33	
health	18-25 years	2688	**3,47**	0,000
	26-35 years	1490	3,30	
	36-45 years	1156	3,32	
	46-55 years	882	3,44	
	56-65 years	349	3,46	
	above 65 years	239	3,35	
	sample	6804	3,40	

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[4] average where 1 = greatly decreased, 4 = greatly increased

material well-being	18-25 years	2688	**3,24**	0,000
	26-35 years	1490	3,14	
	36-45 years	1156	3,14	
	46-55 years	882	3,17	
	56-65 years	349	3,19	
	above 65 years	239	3,05	
	sample	6804	3,18	
hobby	18-25 years	2688	**3,16**	0,000
	26-35 years	1490	3,10	
	36-45 years	1156	3,01	
	46-55 years	882	3,06	
	56-65 years	349	3,00	
	above 65 years	239	2,90	
	sample	6804	3,09	
calm, balanced family life	18-25 years	2688	3,44	0,000
	26-35 years	1490	3,30	
	36-45 years	1156	3,30	
	46-55 years	882	**3,47**	
	56-65 years	349	3,44	
	above 65 years	239	3,29	
	sample	6804	3,38	
good human relations	18-25 years	2688	**3,40**	0,000
	26-35 years	1490	3,23	
	36-45 years	1156	3,21	
	46-55 years	882	3,37	
	56-65 years	349	3,33	
	above 65 years	239	3,10	
	sample	6804	3,31	
lots of free time	18-25 years	2688	**3,15**	0,003
	26-35 years	1490	3,05	
	36-45 years	1156	3,08	
	46-55 years	882	3,10	
	56-65 years	349	3,03	
	above 65 years	239	3,00	
	sample	6804	3,10	
career, professional success, self-fulfilment	18-25 years	2688	**3,25**	0,000
	26-35 years	1490	3,09	
	36-45 years	1156	3,01	
	46-55 years	882	2,94	
	56-65 years	349	2,96	
	above 65 years	239	2,70	

	sample	6804	3,10	
inner harmony	18-25 years	2688	3,37	0,000
	26-35 years	1490	3,24	
	36-45 years	1156	3,25	
	46-55 years	882	**3,38**	
	56-65 years	349	3,36	
	above 65 years	239	3,29	
	sample	6804	3,32	
happy family life	18-25 years	2688	3,47	0,000
	26-35 years	1490	3,28	
	36-45 years	1156	3,35	
	46-55 years	882	3,45	
	56-65 years	349	**3,49**	
	above 65 years	239	3,25	
	sample	6804	3,40	
enjoyable life	18-25 years	2688	**3,42**	0,000
	26-35 years	1490	3,23	
	36-45 years	1156	3,21	
	46-55 years	882	3,24	
	56-65 years	349	3,10	
	above 65 years	239	2,95	
	sample	6804	3,29	

Source: authors' own research 2020, N= 6804, analysis of variance, measurement levels: nominal and metric scale

Summary

In conclusion, our results show that the impact of the coronavirus has changed consumer habits and the composition of the consumer basket: the service sector has incurred the biggest losses due to the pandemic as it has seen a decline in every industry we have studied, according to the responses of our respondents. However, there are significant differences in the purchasing activity of each generation, both in consumer goods and services. Generation Z showed the strongest consumption activity in the consumer goods sector during the epidemic, while the same was true for Generation X in the tertiary sector. Differences in consumer preferences are also related to individual values. The values of Generation Z, which was the least restrained in its consumption in the wake of the virus, also carry strongly individualistic, hedonistic traits. While the generation over 45, which is typically more restrained in its spending and more frugal and active in its spending at the outbreak of the virus, is characterized by traditional values and social sensitivity, which also explains its purchasing behavior. The results of the research show that generation-specific buying and consumption patterns are also related to individual values. This result also provides useful information in practical terms, as it allows a more sophisticated understanding of the differences in purchasing and consumption

preferences between generations, which can help design target group-oriented activities and modify the service and product purchasing preference system.

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Contribution of a CRM System to the Creation of a Family-Friendly Working Environment

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Abstract: Today's pandemic situation intensifies companies' competition for customers. The rapid acceleration and growth of economic competition, is a serious challenge to meet, for many companies. With the wide range of market supply and the resulting increase in price competition, customers are increasingly switching brands or service providers, with the result, that it is much more difficult for businesses to retain customers. The peculiarities of this situation are a strong customer focus, the possibility to expand direct communication with the customer and the seemingly endless range of products and services offered [1]. Managers focusing on maintaining and improving the competitiveness of companies, are paying increasing attention to meeting special needs, getting to know different segments of the market and more effective marketing communication with customers. Efforts in this direction, by all business organizations, including family-friendly businesses, are also supported by CRM (Customer Relationship Management) systems that - when they work well – results in a long-term, difficult to imitate competitive advantage, in addition to the already existing family-friendly policy, within a company. The current research aims to explore employee needs, for a family-friendly workplace. The focus of this study is on corporate services and expectations, as well as, on their evaluation and acceptance by the employees. This paper is based on a two-step research approach; while the secondary study investigates the related literature, in the framework of the primary research, a case study is presented.

Keywords: CRM system; family-friendly company; relationship marketing; corporate strategy

1　Family-Friendly Companies

One of the most frequently choices, in our everyday lives, is "family" or "career". With the words by Ternovszky, "Income is not the main basis for happiness; family and work are more important. A family is that which provides love, affection, security, recognition and care. The joy of working, the stimulation that comes from it and the joy of action through the self-confidence that comes with it", so the answer is that the two must be able to work together, in the life of families [2].

In the 21st Century the image of women in the labor market is not the same as it was in the previous decades. Nowadays, a very tight lifestyle has come to the fore in the life of woman compared to the earlier, weaker, and family-focused image. They are appearing in increasing numbers as employees, with the number of two-earner families growing across Europe [3]. As a result, reconciling work and private life has become a basic need [4].

"Family-friendly" as a concept has become known in Hungary as a support for the weaker sex, in everyday life, but it must be emphasized that this is much more than that. It includes, inter alia, also, that women and men in family life can and are able to take part in the most optimal way. In this more and a more equitable distribution of tasks, in the labor market discrimination against women might decrease, as the employer sees that child upbringing and problems occurring in a household, are divided between men and women and, therefore, not only women shy away from work [5]. The organizational appearance of these details is the family-friendly workplace.

Family-friendly workplaces help to create a work-life balance by providing their employees with the opportunity to reconcile family life and work as finely as possible [6]. Table 1 shows work-life balance options for gender and age-independent sitting.

From the column of allowances and services, the provision of childcare is highlighted as one of the main areas in this paper. The employer may decide to create a service for the child of an employee who is gainfully employed by him, in which he undertakes to supervise the child, thus relieving the workforce. This is not a nursery school or a kindergarten operating within the institutional framework, but usually in a building located at the company's headquarters and premises, where the number of specialists caring for children in accordance with the regulations is provided.

Győrpál et al. state in their publication "the positive example presented as a good practice also proves that the integration and application of family-friendly HR policy into the life of a company is of paramount importance. It has an impact not only on the better advancement of women in the world of work and the results of a company, but also on society, the economy and social well-being. To do all this,

however, it is essential to develop a new supportive value system, approach and culture that treats the reconciliation of childbearing and careers as a value that supports the advancement of working women with families. And in the long run, it is essential to incorporate and manage this as part of the corporate strategy" [7].

Table 1
Work Life Balance Tools for Companies [8, p. 11]

WLB tools that can be applied by companies	
Related to worktime	**Related to work completion**
• Flexible starting and ending times • Flexible working time • Working time bank • Shortened working week • Shortened working time • Reduction of overtime • Part-time employment • Working year equaling school year • Voluntary worktime scheduling • (Self-rostering)	• Home office • Job sharing • Casual, temporary job • Remote working • Multiple shifts, shift changing
Off work/holiday procedures	**Allowances and services**
• Lengthening of maternity leave • Home office • Job sharing • Casual, temporary job • Remote working • Multiple shifts, shift changing • Maternity leave for fathers (paternity leave) • Childcare allowances (to fathers as well) • Extension of salary exempt holidays • Family holidays • Career off work time • Sabbatical	• Services for pregnant women • Child supervision • Allowances to other dependents/cared • Education • Panels, consultancy • Shopping, cleaning within blocks of flats • sport facilities • "Personal life assistant", coaching • Charity work, TCR • Supportive programs • Medical care • "Confidence room" • Chappel, right for religion practice

A family-friendly workplace, which already includes work-life balance policies in its corporate strategy, has many potential benefits for the market for economic operators. Family-friendly workplaces are also challenged by "coexistence at work" with those living in a mosaic family [5].

Family-friendly working conditions are mostly influenced by the in-house approach, but it is also shaped by the state's family policy. Intra-company regulation, which strives for work-life balance, is also an important factor for employees and employers [9]. In business life the introduction of this program

leads to greater cost savings for employers [10] [11], since the unreasonably high costs of workforce recruiting do not burden the company's results [12], it contributes to the company's image, and last but not least, employee loyalty to the employer increases. The research by Wiß [13] also confirms that flexible working hours are one of the most important and effective elements of this specific policy for both internal and external stakeholders. Further research justifies that a well-organized regulation achieves a double result. If employees have an optimal work-family balance (welfare appears), then its effect is also reflected in the turnover of the company, therefore, a win-win situation develops [14] [15].

By providing day care for workers' children in the form of corporate crèches, nurseries or even temporary childcare, employers help employees to meet private and workplace needs in a coordinated way. This attitude results in an increase in workforce efficiency and loyalty towards the company. In fact, these family-friendly provisions create such flexibility, supportive environment, that reduce the tension between work and family. Funds assigned to the "Family-friendly Award" help winners to establish nurseries or even kindergartens within the company, or these funds can be dedicated to tools and devices needed in the course of child supervision [8].

The economy of the 21th Century is characterized by structural change, the emphasis is shifted from products to services, to which family-friendly workplaces must also adapt in order to retain their competitive position and existing customers. To support "family friendliness" the introduction of a Customer Relationship Manager (CRM) system can be excellent, which can not only be used to actively communicate with company customers and accurately assess their needs but can also actively participate in supporting employee management.

1.1   State Measures

In order to provide certain opportunities for employees during their active years, state organizations and governments have set minimum requirements for employees. Such minimum allowances, for example, typically offer either a replacement for childcare, such as a crèche, or a work schedule that provides flexibility in the timing and location of work, such as working from home. The purpose of such organizational supports is to help employees improve on the balance between work and time not spent by working [16].

A large-scale study examined the impact of work-based and non-work-related benefits on employee well-being. The result showed that the use of work-related and non-work-related benefits is indirectly linked to well-being through workplace control and supportive management. Evidence has also been found that increased workplace control, through the use of work and other support, allows workers to reduce work-life conflicts and achieve significant improvements in well-being [17].

The main policy implication of the results of the research by Wood et al. [17] for human resource management is that employment and non-employment subsidies should be accepted and, where appropriate, should be encouraged to be used. These are easy-to-implement tools by which an employer could – and visibly can – support working relationships, the needs of workers and can improve the support and control they experience. In addition, they contribute to the understanding of improving job characteristics and are thus in line with a more conscious design of jobs and a revitalization of the quality of work. The negative finding of the study that subsidies between work and non-work do not significantly reduce labor demand is also important to reinforce the argument that we need to place more emphasis on workplace control and their supportive effect, otherwise, there is a risk that the aid will be considered to be of little value on the grounds that it does not achieve its expected primary objective, which is to reduce conflicts between high labor standards and reducing conflicts between non-work needs [17].

1.2 Corporate Challenges

1.2.1 Performance Evaluation

The current practice for managers is to evaluate the performance, personality and behavior provided in the subordinate work. A paper or electronic form is usually available for this purpose. The evaluation seeks to determine the employee's level of aptitude, the need for further training and the use of possible reward opportunities. Nowadays, a strong change can be observed in this process [18]. The right system is also suitable for visualization. Good visualization should be such that decision makers are able to see the differences immediately and they are able to draw conclusions depending on the point of view [19].

Another very important benefit of a performance appraisal done with the right methodology is a satisfied employee. Employers try to develop a number of different evaluation-motivation systems in order for the employee to be satisfied with the results, method and recommendations of the evaluation, to accept it and to be able to integrate it into their daily practice.

This is also important because with the advent of the new type of employee, employers will have to face a large increase in fluctuation [20].

1.2.2 New Type of Employee

Countless research has been done on the new type of workers who have been entering the labor market for about 5-8 years. Generation Y members then began to represent themselves in larger numbers and employers were then confronted with the fact that new expectations, new forms of behavior could be attributed not to a person but rather to a generation, a very broad group of employees.

Several researchers agree that communication between members of the new generations, such as the Y and Z generations, is very different from previous ones, and HR professionals and psychologists have repeatedly drawn employers' attention to the fact that this will be a serious concern both for employees and employers. A study conducted about Chinese graduates' communication problems at their first workplace named and highlighted these problems [21]. According to Machová et al. [22] generations Y and Z place emotional intelligence more important than cognitive intelligence. This plays an important role as it plays a crucial role in communication and in situations that affect behavior. The behavior of members of generations can differ in several areas, which can cause serious workplace tensions. They think differently about job opportunities, working hours, family, possible leisure time, fixed location and mobility. Numerous studies report that members of Generation Y change jobs on average 4 times more times over a specific period of time than workers in Generation X.

As a result, this fluctuation makes the everyday life of companies very difficult. This process can be a very serious cost factor in the life of a company, as the company invests in the workforce at the initial time and if the employee leaves within a short time, the energy invested does not pay off. In addition, more time, energy and money need to be sacrificed for the new workforce, from recruitment to training [23].

2   The Potential of a CRM System

In order to increase the competitiveness of companies, they are introducing more and more efficient and integrated processes for serving their customers and managing their relationships. For almost 30 years, CRM, i.e. customer relationship management, has been helping companies in this direction [24]. Customer Relationship Management is located in the relationship marketing sub-area within marketing. Relationship marketing focuses on making marketing in the traditional sense even more customer centric [25].

Like traditional marketing, relationship marketing rests on building blocks (Figure *1*).

The first element is to deliver the right message by the business to its customers, followed by the targeting of the right customer in the second step. This is followed on the third level by finding the right time for the message to be delivered. The fourth element (via the right way) means developing the right method to convey the message, while finally the mediation, the information conveyed should always be relevant (at all times be relevant!) [26].
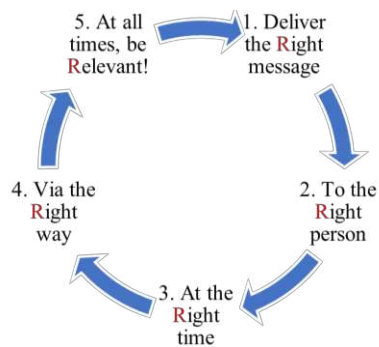
Figure 1

5Rs of relationship marketing

Source: edited by authors

The definition of CRM has undergone a paradigm shift compared to the initial definitions. In the most commonly used domestic and foreign interpretations, in contrast to the previous financial approach, CRM is already being raised to the level of corporate strategy, along with customer value and long-term relationships. Perhaps Payne and Frow's definition is the most complete in this regard: "CRM is such a strategic approach that seeks to increase shareholder value by building the right relationships with key customers and segments of a company. CRM combines relationship strategies with information technology to build long-term relationships with customers and other stakeholders" [27, p. 59]. Figure 2 well illustrates the strategic role of CRM, its connection points with the individual processes of the company.

Grönroos [28] also points out that this type of marketing activity focuses on the long-run relationship versus the price of the product or service. Part of this process is, among other things, building a relationship of trust with customers, as well as planning – which should already be reflected in the company's strategy.

The purpose of the performance appraisal process is, among other things, to ensure that the organization's strategic goals are met at the appropriate level in terms of CRM, and that the foundation for future developments is firmly established. This process focuses on how greater profits can be created, how standards can be determined and performance can be improved. These considerations allow companies to understand how CRM delivers shareholder results and how CRM performance can be measured and thereby can be further improved.

A new concept has emerged in the field of the CRM market and in the field of corporate strategy creation. Over the past 10 years, the growth seemed to be unlimited, and the supporting IT solutions were in the center of attention.
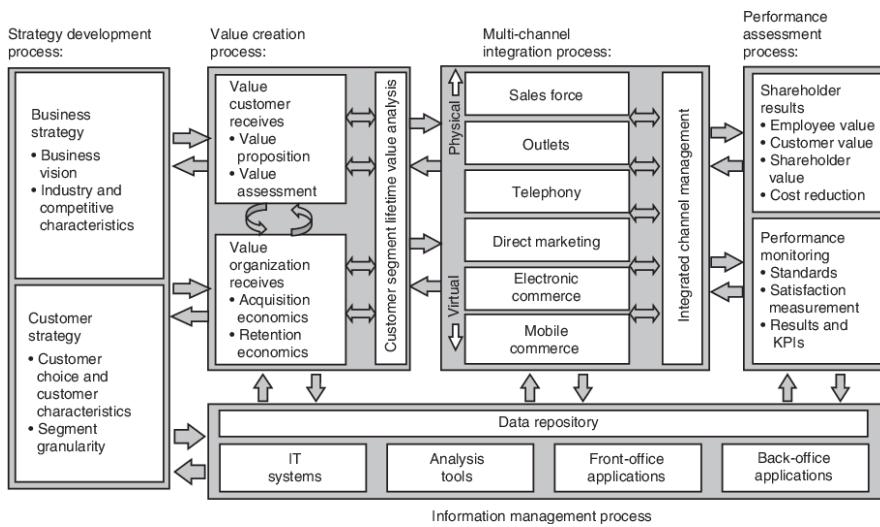
Figure 2
Strategic model of CRM [27, p. 59]

Nowadays, however, IT solutions, including CRM systems, are emerging as cost-saving solutions. It is still in the business interest of companies to find the right consumer layer for their products and services, but they are increasingly thinking of solutions that enable better use of existing resources.

Along a proper CRM implementation and operational strategies greater organizational efficiency can be achieved, where the optimal cost management is more efficient, labor utilization kept in mind and thus significantly might increase the competitiveness of companies. A CRM system can support manufacturing process design and in addition to designing process it might be able to anticipate manufacturing resource needs and to effect workforce planning as well. In addition, it might evaluate production data, working hours and taking into account prescribed standards and norms; it might assess labor performance and efficiency of resource utilization.

If process-controlling role comes to the fore as a result of the introduction of CRM, process-based costing and performance indicators systems can form the basis for process controlling operation. The component of the existing information basis that can be found at the company such as CRM – customer relationship management data and measurements, such as customer satisfaction surveys, employee satisfaction levels, productivity measurement might serve as the input information of process-based costing and performance indicators. The most important performance indicators and information on resource use can be determined using this information basis.

We also have the option of working time management support. For CRM tasks, the amount of planned and actual working time can be set directly, thus making it easier to plan the working time to be spent on each project. Every task completed can be recorded: this way efficiency broken down by day can be measured.

It can also support B2B relationships. All the events related to subcontractors can be accurately recorded in a CRM system. This also makes the work and performance of subcontractors accurately measurable.

The aim of a CRM is that with its use the company becomes capable to find what "value" means for its customers at purchasing a service or when using the product. Its basic element is the repetitive exchange activity, that is, this process has both an antecedent and a future [29]. With the spread of the Internet, the actors of the economy were given the opportunity to deliver their products and services to as many people as possible in a time- and cost-effective manner. The online interface ensures – not just for family-friendly companies – that they communicate with their customers and build relationships with their customers [30]. Consequently, business owners already need to include the planning, the implementation and, of course, the analysis of internet marketing campaigns in their company strategy [1]. All in all, it can be said that CRM supports the organization and management of customer relations of business organizations, which is based not only on the tools and software operating on the Internet interface but also on the company's strategy.

In the development of activities (research and development, investment) of SMEs – including family-friendly enterprises operating in the SME sector – grants that can be obtained through tenders play a major role. Funds for investments funded under the 2014-2020 EU budget period will enable SMEs to acquire new technology and innovation skills. In 2018 the most popular calls from businesses were related to the Operational Program for Economic Development and Innovation (GINOP), which accounted for 93% of all payments. [31]. With these grants, economic organizations can provide resources to procure such software that allow them to build long-term relationships with their customers. CRM systems running on the cloud base or on the company's internal network are excellent for this purpose. Cloud-based operations are more exposed to security risks because the Internet is the most widely used information retrieval interface in the world today [32]. While in 2017, Hungary's economic organizations are lagging compared to the average of the EU(28) in the use of CRM systems (Figure 3) [33], market participants projected growth. However, the growth has not been achieved as shown in Figure 3.
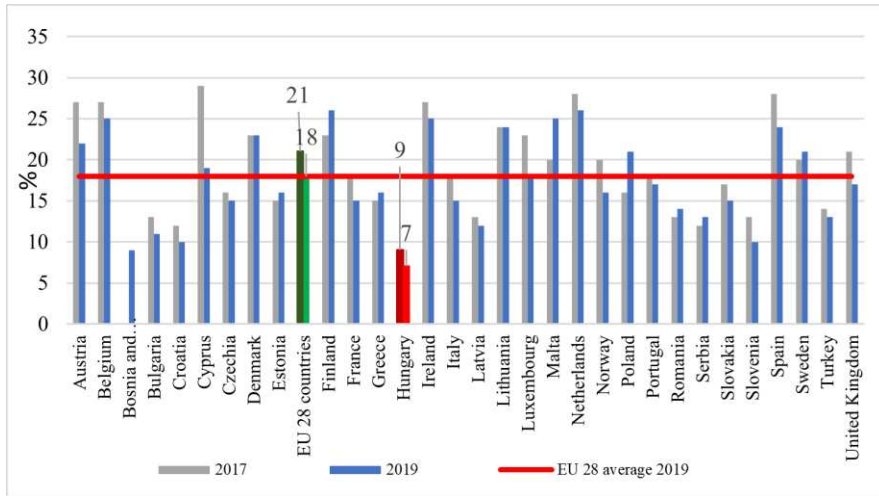
Figure 3

Ratio of business enterprises using software solutions such as CRM to analyze the information about their clients in 2017 and 2019 (%) [33]

In Figure 3 the horizontal axis shows the countries, and the vertical axis displays the proportion of CRM usage within the countries. In a quantitative survey conducted by Bell Research on behalf of T-Systems 779 small and medium-sized enterprises were included, in which one of the important findings of the research was that business leaders listed digitization well behind acquiring business and customers, but even improving customer experience and product development lagged behind in terms of importance. Only one in four businesses spent on IT development in the past year, with nearly half of executives surveyed said it was not yet necessary to address the changes caused by the GDPR, and one in three said that IT problems needed to be addressed retrospectively.

According to Reicher [34], the organization-wide project task is to implement a CRM system, as the company's internal stakeholders and IT vendors participate in it together. However, the introduction of a successful CRM system, fundamental changes are triggered in the processes of economic organizations.

Thanks to its intelligent solutions, a CRM system (efficiency-enhancing features and consequent changes) that is in compliance with the potentials of a company's capabilities an enterprise can further increase the competitiveness of family-friendly workplaces. The retaining of market position in today's fierce competition for customers is essential for corporate survival.

3   Research and Methodology

The aim of our primary research is to examine whether the actors of the SME sector use the potential of the CRM strategy and software solution in order to create a family-friendly environment for the employees. Furthermore, the research aims to explore whether companies strive to:

(1) Offer new types of employee career opportunities so that their employees can successfully manage work-family balance

(2) Take into account the hidden opportunities offered by strategy and software in performance appraisal in workload design.

This research basically consisted of three main parts. First the focus was on the collection of secondary information, in which the focus was placed not only on the national and international literature, but also the regulations concerning companies and the opportunities offered by the state in order to focus on these factors in the analysis was taken into account.

After exploring the secondary information, an in-depth interview with a company manager was conducted. An in-depth interview is a form of qualitative research; it is a direct form of research where the interviewee knows the purpose of the research. It is an advantageous research method when underlying values and beliefs are to be explored [35]. During the interview, answers to the strategic impact of the introduction of a CRM software in the life of a company was looked for. Due to the standard answer options of a questionnaire, many aspects and individual opinions may be lost, thus the underlying reasons and motivations may be hidden, therefore the in-depth interview seemed the most ideal research method to get an idea of the processes, motivation and corporate goals involved in implementing a CRM system in a family-friendly workplace in an SME sector. The qualitative method can provide a good basis for subsequent research based on quantitative methods.

In the quantitative research, family support tools that the state can provide were explored, but companies can also support or create similar support tools. The respondents were asked to assess, considering their own life situation, to what extent, what importance each tool plays in their daily lives, in their career building, and in the management of their families.

The following hypotheses were formulated in respect to the expectations of employees:

$H1_1$ Employees expect help from their employers in daily childcare and child supervision.

$H1_2$ Financial support is important for employees with family, they do not wish to generate extra income with overtime.

$H1_3$ Employees with families do not give up career opportunities either, it is also important for them to build a career path.

3.1   In-Depth Interview Case Study

The in-depth interview was conducted with the executive director of the selected company. The interview could be arranged relatively quickly in time. In response to the interviewee's request, anonymity is kept regarding name, company data, industry, number of employees as well as revenue. The interviewee did not give consent to include these data in the paper. The company was selected due to the reason that the executive director had already had a lot of experience in family friendly programs. The in-depth interview took place in April 2020, in the executive's office, which lasted nearly 2 hours. With the consent of the respondent, the interview was recorded to avoid the possibility of distorting writing from memory for later processing. As requested, the audio recording is deleted at the same time this paper is submitted. Open-ended questions were used during the interview, closely related to the topics of the secondary research. In this way, there was an opportunity to get to know the interviewee's position and way of thinking about family-friendly workplaces and the introduction of CRM. The interview started with additional or different warm up questions, so as to create a suitable atmosphere of the interview, dissolve the tension and to tune the process. During the interview, a pleasant atmosphere could be created, which made it easier for the interviewee to open up. A particular attention was put on not to express personal understanding regarding what has been said form the interviewer's side, or just not to contradict the interviewee's opinion, since the goal was to gather information. During the interview, the interviewer tried to act as neutral and partial as possible, thus ruling out the possibility of mistakes that may arise from the problem of inappropriate behavior, given out the long-standing acquaintance of the interviewer and the interviewee.

More and more women and men are face with the dilemma whether the family or work should be placed to the fore in everyday life. It is almost impossible to meet job expectations and family life to the maximum at the same time. This state produces imbalance, which causes tension in the individual, so it brings about more and more conflicts in the corporate organization as well as in family life. However, one of the most important values of the company is the human resource, as his/her knowledge helps the company to develop and remain competitive. As a result, not only to recruit labor force becomes important for companies, but also to retain it, for which traditional jobs may no longer be suitable. Highly qualified employees already expect more from the company in return for the knowledge they have acquired, which may even be aimed at creating a work-life balance – was responded by the interviewee to the question what he thinks of today's work - life balance issue at workplaces. Consequently, "our company pays special attention to the implementation of family-friendly options. This can be ensured that our company offer various family-friendly solutions to its employees in the form of welfare services so as to ensure work-life balance. We strive to provide an attractive employer background for our colleagues living in family or planning to

start a family, encouraging good performance and the development of a committed team of professionals".

To the question on how a family-friendly solution can be implemented at their company, the managing director answered the following: "We are committed to our family employees. In addition to a lot of possibilities I highlight the following (because these are the most popular among the employees): we ensure flexible working hours and the associated tools, like working from home, and we ensure that they can bring their children to the workplace". Frey professes the same in his article published in Labor Review [6].

"A short survey was conducted last month among our employees with small children returning from GYES, GYED[1], to see how our company can express its support to them even more. The result speaks for itself, 85% of employees would need a nursery at work within the company." said the interviewee. As a father with 3 children, he says from his own experience that the places in public crèches are filled years earlier and that paying for private crèches is not affordable to everyone. He therefore agrees with his subordinates and has already contacted a tender company to apply for the proposal for the realization of a crèche in the workplace announced by the Human Resources Support Manager on behalf of the State Secretariat for Family and Youth Affairs of the Ministry of Human Resources. The company would spend the maximum of HUF 5 million that may be awarded per company in the competition under the fantasy name "Family Friendly Workplace" in opening and running a nursery at the workplace. The Managing Director has not only considered in this decision to reduce the company tax with the amount spent on day care costs, but he expects that such benefits are given to employees that help in keeping workforce for the company and reduce fluctuation. He even believes the child-care services provided within the company does not face and force the employees with the decision to choose between work/career and having children, thus work-life balance becomes more easily accessible.

"The Covid-19 pandemic has dominated the (labor) market as well. Finding and retaining a good professional has become even more prominent in the lives of companies, which results in an increase in the competitiveness of companies. In light of this next to employees with children under 3 years the company wishes to take into account employees raising children of school age" sounded during the interview. Consequently, the company provides school support to such employees as one element of non-wage benefits (called Cafeteria). Although it represents an additional cost to the company in terms of taxation, it is still favorable, as the support given to the beneficiaries in the form of a voucher contributes to reducing the school start-up costs for families in each September.

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[1]   GYES and GYED are childcare benefits and childcare allowances, two forms of family support that allows maternity leave for a parent for up to three years.

The interviewee emphasized that in addition to moral recognition and the support that can be gained, a winning bid will also bring significant marketing benefits. These items improve the image of the employer, a positive image of the organization is formed in the labor market, which gives extra advantages to a company in the fierce competition for qualified employees.

"The pandemic is also affecting the management of our company, and ownership negotiations are ongoing. Just at a meeting of business owners the company (quasi passing over a paradigm shift with respect to customer relations) decided to introduce a system capable of customer relationship. In our approach we have manifested that we place clients in the focus of our sales activities, their satisfaction related to our services provided are aimed at, the focus is not necessarily to sell our services at any price and by all means. That is, the company focused on retaining its customers in this pandemic situation. We consider the introduction of a CRM system to be an excellent opportunity for this endeavor."

The customer relationship system is going to be implemented as part of a GINOP project. The company possesses the necessary own contribution and also requires external funding from the Growth Loan Program in view of the call for proposals. From the CRM software market, the company chose a suitable software version, which it would run on its own internal server, in island mode for the time being, but providing the opportunity to connect to a later corporate governance system. The software operator has been contacted and the requirements have been assessed, although the application is still in the evaluation stage.

According to the interviewee, they formulated their company's business strategy in such a way that they adapt to the needs, behavior and expectations of their customers by continuously improving their own operations (process, organization, technology). And their CRM strategy is characterized by a "personalized" i.e., sophisticated, tailor-made policy for their customers.

The Managing Director believes that in addition to the family-friendly approach, the introduction of a CRM system will further strengthen their competitive position in the economic market.

3.2 Research Results

3.2.1 Demographic Profile

In the research, 187 people were questioned exclusively online due to the pandemic situation resulting in a non-random sampling method. The exclusively online form of questioning may distort the composition of the sample; thus no further generalization can be made and no more general conclusions can be drawn from the sample. However, extra attention was paid to the most important aspects for the structure of the database. Although the sample data are far from being representative of any population, a significant proportion of the respondents,

73% are active workers, nearly 10% (9.63%) are on maternity leave (GYES and GYED), and only 18% are students or unemployed at the time of responding. 60% of respondents work as subordinates - this is more than 80% of the 73% of active workers - so they do not decide on their (work)time, career and benefits. They are the ones most exposed to managerial decisions (Figure 4).
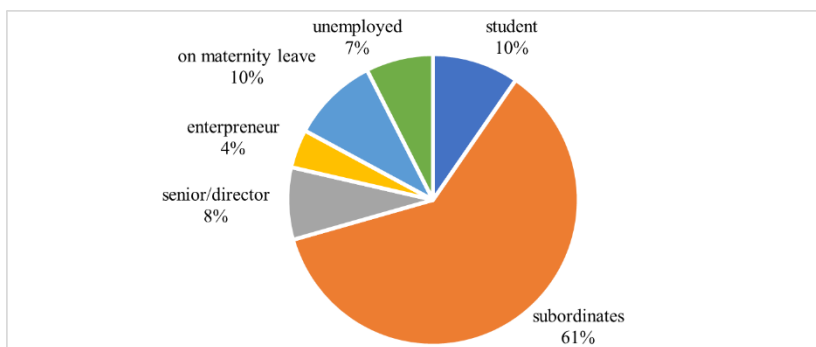

Figure 4
Respondent distribution by mode of employment (n=187)
Source: edited by authors

Nearly 60% of respondents live in a married or cohabiting relationship (40.64% and 22.46%, respectively) and the same number are raising children (56.56%) (Figure 5, Figure 6). According to the gender distribution of our respondents, 57% are women and 42% are men. In terms of age distribution, we managed to reach the members of the Y and Z generations in large numbers. Half of our respondents came from these two generations. Nearly 70% of active-age workers responded and filled in the survey. However, it was also considered important to reach the younger generation, as they will also be involved in the labor market in the near future and will come into contact with the topic under discussion. In terms of education, nearly 32% of respondents have a high school diploma, but 46% have a college or university degree.
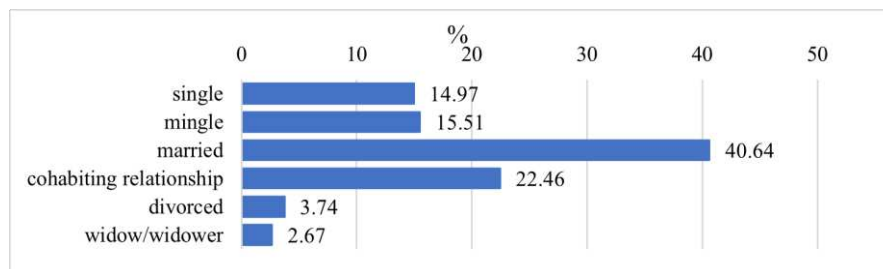

Figure 5
Respondent distribution by form of couple relationship
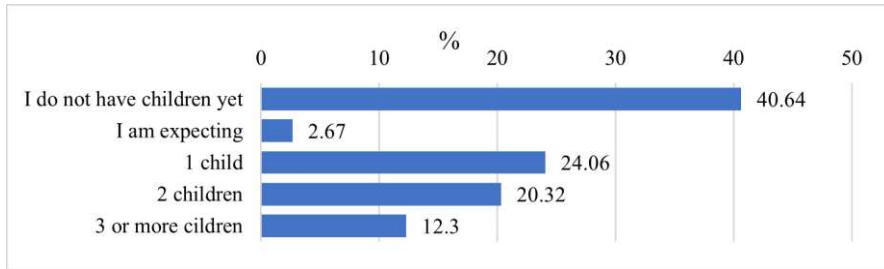Source: edited by authors

Figure 6
Number of children among the respondents
Source: edited by authors

In terms of industry appearance, the agriculture sector is underrepresented, and the industrial sector is also low in number, but in that sector IT tends to support production, so the chances of a CRM appearing are very low. Nearly 50% of the respondents came from the areas involved in commerce services, where CRM appears the most.

In terms of territorial distribution, the Central Hungarian region is over-represented, almost 70% of the responses came from this region.

3.2.2 Family Friendly Service Expectations

The quantitative analyses comprised of a sentiment analysis in which the expectations of employees in relations with daily childcare and support is analyzed. Questions referred to who should help families with young children financially and what kind of services employees with young children expect from the employer (Figure 7).
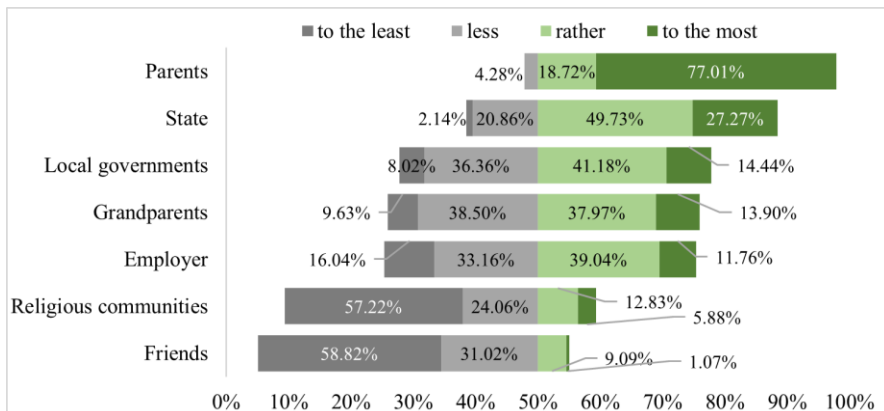

Figure 7
Partners to take part in financial help to families with young children
Source: edited by authors

The sentiment analysis shows that families still expect the state and the self-government to provide financial help to families with young children while the employer, religious communities and friends are behind grandparents. Based on Figure 7 if the state is in 2nd place and the local government is in 3rd place then it is important to well regulate the role of employer. Nearly 50% of the respondents say that the employer also has a role in solving financial problems, e.g. school start support, kindergarten, nursery maintenance. This means that the employer, the local community and especially the state plays an important role beyond the parents.

Employees with young children expect childcare, nursery and kindergarten services from the state and the employer. The problems of nursery and kindergarten care found during the qualitative interview appear in the results of the quantitative research as well. It can be seen that those who would rely heavily on the role of the state also expect the employer to help in this area. So, the baby-mama room also needs to be designed by the employer as the respondents expected. A significant relationship could be detected between these two elements ($p = 0.043$), see Figure 8. Consequently, $H1_1$ is justified.
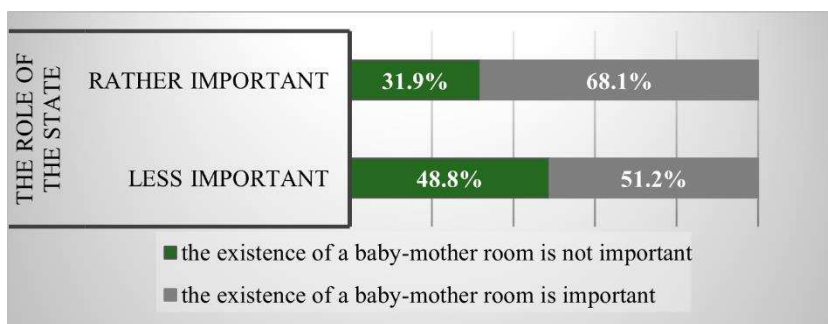

Figure 8
Relation of baby-mama room and state funding Source: edited by authors
Source: edited by authors

It was also examined how the imposition of overtime and the expectation of different financial benefits relate to each other. Regarding our respondents, it can be said that for employees with small children who consider it important that the employer does not assign overtime to them it is important significantly ($CHI^2=12.756$, $p=0.001$) in high proportion that the workplace provides financial benefits beyond the support prescribed by legal regulations. It also suggests that the private and work life balance is highly important for today's worker, but obviously the financial needs do not decrease. Consequently, $H1_2$ is also justified.

It was also examined how important it is for respondents to follow an employer's career path. It was found that only 23% of the active employee age group does not consider it important for their employer to monitor their development and career opportunities. Those who did not consider this important did not show a

significant difference in their ranks with whom, who supported a career path. The difference for each sector was also examined, but no significant difference appeared in the industry sectors either. However, when education level was considered, it showed that those with tertiary education rated career follow-up significantly (p = 0.007) higher than those with secondary education. Therefore, $H1_3$ is not justified.

It can be seen on Figure 9 that ordering overtime is burdensome for employees, and leisure time is valued more by employees with family. However, financial support from other sources would be welcomed to make up for lost income in this way. Nevertheless, a career path is important to them, and they require the employer's attention in this area. A childcare solution is less important to these workers. They search to find other ways to try to solve these problems.
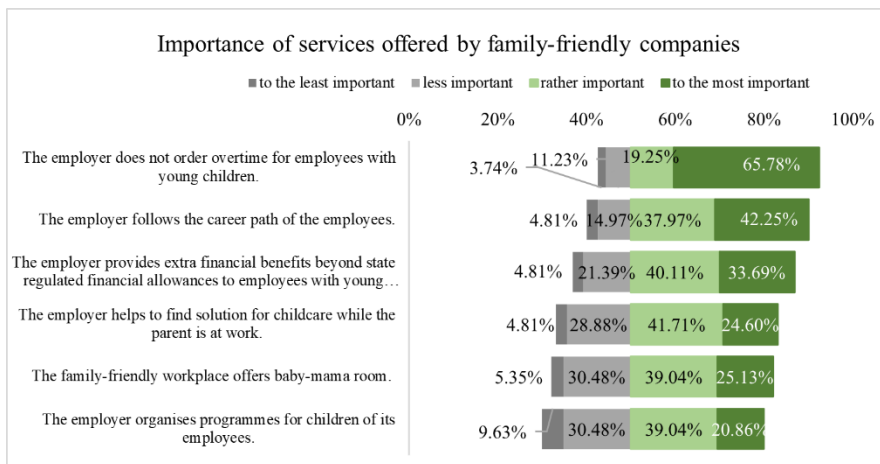

Figure 9
Services offered by family-friendly companies
Source: edited by authors

Conclusions

The economic weight of SMEs is extremely significant, in the Hungarian economy, so their digital readiness affects the economic competitiveness of the whole country. The direct message from the research is clear, that those who are willing to invest in development, will have a serious advantage over their competitors. The availability of mobile- and tele-working also reveals a great deal about the digital development of businesses: according to the Bell Research study, this is typical for over a third of all businesses (38%) but it is already over 50% in the medium-sized business segment. The vast majority of Hungarian SMEs still spend less than 1% of their sales on infocommunications, even though the services based on these are already necessary for the successful and promising operation of businesses [36].

The working habits of the new generation also justify that businesses should be open to new opportunities. The possibility of a home office, part-time work, support for parents with small children are opportunities that can be a serious competitive advantage for the business in the labor market. As a result of structural unemployment, employers face a serious challenge when losing an employee.

In the course of the primary research, an insight could be obtained in the functioning and operation of a "family-friendly" SME and in the initial steps of the introduction of an CRM system. The research has its limitations since specific sectors were included in the research, therefore, the sample could not be considered representative. Due to page limits, only the questions closely related to the literature section were analyzed and strongly indicate that, even in the case of a work-life balance-based company, there is a purpose for customer relationship management, that is, to increase competitiveness. The survey, as exploratory, is only marginally able to draw more generalized conclusions, so additional research is planned, using a larger sample size and focus on economic organizations which are more suitable to quantitatively describe the research area, thus, giving a more comprehensive picture of the subject.

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The Investigation of the Applicability of Fuzzy Rule-based Systems to Predict Economic Decision-Making

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Abstract: Classical mathematics is the language of precision. Statements can be either true or false. But in our everyday lives and our systems (from economic behavior through social sciences to project management models, etc.), most things cannot be fully described by this logical concept. The solution to this problem might be the introduction of soft computing methods, especially Fuzzy logic. In this paper, a short review of the application of Fuzzy systems is presented from an economic perspective. In addition, the applicability of Fuzzy logic is demonstrated through a detailed example. In this part, the main goal is to select a target group of people for a new market campaign based on previously collected data. Qualitative and quantitative variables were used as well in the generated multi-input, single-output system. Finally, the evaluation process is discussed in detail to justify the conformity of the Fuzzy methodology.

Keywords: Fuzzy inference; soft computing methods; economic forecasts; decision-theory; risk analysis; behavior economics

1   Introduction

According to the classic approach of economic decision theory, human decision-making focuses on quantitative aspects in many areas. The starting point for this is that the products and services on the market are countable [1]. Smith and Taylor [2] also first examined the motivation and purpose with which participants engage in decision-making interactions in describing decision-making behavior. The principle that was formulated is the principle of utility. According to Smith [1], the process is about that the decision-maker usually has several alternatives. If these alternatives are implemented, some consequences or outcomes are reached, and each has a specific value and probability. The decision-maker has information about the

available alternatives (input parameters) and their consequences (output parameters). The decision maker's ability to distinguish between alternatives is highly sensitive.

In many cases, in addition to the sensitivity of discriminatory ability, many theoretical variations can make it difficult to choose the right decision. This is indicated by the theory of bounded rationality [3], which considers that a person's ability to process information is limited in decision-making. The bounded rational decision-maker thus uses heuristics to help control the search for alternatives in a way in which we have a high chance to find a satisfactory solution. Furthermore, psychological approaches increase the relevance of subjective judgment compared to economic perceptions. That is fulfilled in three different ways [4]: on the one hand, it is crucial to capture why people do not make their risk decisions based on probabilities and expected values. On the other hand, the study has shown that if the decision is made based on quantified values, the probabilistic information, and thus the risks, are still incorrectly assessed. And finally according to the anthropological approach, in addition to social influences, the cultural background also plays an important role in determining uncertainty and thus in risk-taking and the resulting decision. Douglas and Wildavsky [5] found that people's reactions reflect their social position and opportunities to assert power.

Intuitive decision-making is a general phenomenon; the outcome of any decision-making process unfolds before the actual decision-making. Past experiences can have a substantial impact. Thus, the decision-maker can only be in balance with an intelligent device if the invisible model results in the least possible distortion. Previous experience and knowledge can be mapped to artificial working memory [6].

Szemere et al. [7] investigated the risk hierarchy. He found that the most critical risk in the investment process is the hedging of the investment. That is followed almost equally by the reliability of the collaborating contractor in the process. In third place, according to the sample issues, the quality of the work carried out and the flexibility of the project participants were set. The results showed that the availability of the parties involved in the process and the minimization of legal risks are essential aspects in implementing the project. These issues occupy the following two places. The return on investment risks are lower but rank high on the list of risk factors.

In some sectors, such as the banking sector, where risk assessment plays an outstanding role, more resources need to be invested in the development of compliance management systems, and it needs to be linked to organizational business processes. By integrating risk management and compliance management, the PRISM hybrid methodology provides a better and more accurate picture of risk assessment than the FMEA and RM methodologies alone when applying these systems. PRISM can be easily customized based on parameterization while focusing more on RPN values or partial risks [8].

2 Theoretical Background

The studies mentioned in the previous section revealed that several problems exist, which are difficult to handle with the help of classic mathematical principles. These are mainly rooted in algorithmic difficulties, lack of information, uncertainty, and vagueness. To solve this controversy, biologically inspired techniques were introduced. These spread away in any fields of investigations: engineering, system control, economics, decision support, etc. The three most commonly chosen concepts are Fuzzy systems, artificial neural networks, and genetic algorithms. In the case of Fuzzy inference, the main idea is to describe the way of human thinking and decision-making by extending the bivalent logic into a multivalued one, using transient phenomena (1965) [9]. Regarding artificial neural networks, their operation is based on the conduction process of the nervous system, including the learning process whose researching started in the 1940s [10]. Finally, a genetic algorithm is a kind of optimization technique suitable for searching a quasi-optimal solution based on the strain evolution and the inheritance of genetic traits (starting in the 1960s) [11]. These methods are also widely used in economic studies. For decision support, Fuzzy systems seem to be a promising solution. Several concepts were already provided in the case of modeling economic behavior and decision-making; their chronological order is the following.

Soft computing and Fuzzy methods can be used to make decisions and assess risks in many economic decisions. Ponsard has been addressing this issue since his work in 1980 [12]. In 1984 [13], he examined the conditions must be met for the compatibility of consumer and producer balances to be justified. For that purpose, a Fuzzy function and Fuzzy point set mapping was used. Furthermore, a comprehensive study was published on the same issues in 1988 regarding whether the effect of weaker rationality and the consequences of these decisions could be described in addition to the homo economicus model instead of the two precise positions [14]. In addition, three examples were presented to justify the usability of Fuzzy-based techniques: Fuzzy model of economic choice, economic calculations and economic equilibrium. In 1993, Dompere [15] introduced a method in which social or even project costs can be solved by Fuzzy decision theory, thus allowing, for example, optimal tax allocation or optimal allocation of project costs. Dompere [16] developed a comprehensive framework for social costing in cost-benefit analysis in his later work. From the elements in the cost identification matrix, the distributional weights of the cost burden were developed through Fuzzy-supported decisions and Fuzzy mathematical programming. An elaborative example of the theory's application to the problem of mental illness was presented in that study. In a later research on cost-benefit analysis, Dompere [17] showed that the distributional weights of benefit intensities are computed by the logic of the Fuzzy decision. Finally, a theory of efficient prices was presented [18] for cost-benefit analysis in the Fuzzy space – In this approach the proceeded by taking consumers' income and producers' outputs were posited as given. The working mechanism of the theory was illustrated by a computational example. At the same time, Escada et

al. [19] presented the investigation project to develop an expert system for *Demand forecast by Neuro-Fuzzy techniques*. Their target was to study the feasibility of using Fuzzy neural networks and compare the results obtained from conventional tools. Lin [20] treated the optimal profit for Fuzzy demand in the Fuzzy sense.

Ganji et al. [21] presented a Fuzzy dynamic Nash game model of interactions between water users in a reservoir system. The model represented a Fuzzy stochastic non-cooperative game in which water users were grouped into four players, where each player chose its individual policies to maximize expected utility. According to their results, policy for each water user and the optimal policy of their reservoir system could be developed. Their proposed modeling procedures can be applied as an appropriate tool for reservoir operation, considering the interaction among the water users as well as the water users and reservoir operator. Aliev [22] argued that many economic dynamical systems naturally become Fuzzy due to uncertain initial conditions and parameters. An economic system was considered as a human-centric and imperfect information-based realistic multi-agent system with Fuzzy logic-based representation. Fuzzy "if-then" knowledge and Fuzzy differential equations were used for modeling the economic agents. A behavioral model of agents was created using the Fuzzy and Bayes-Shortliffe approaches to incorporate motivation input variables of economic agents into their models.

Real options analysis is also a growing field of academic research and practical application because that is often difficult to understand and implement due to the complex mathematics involved. This problem can also be addressed by the soft-computing method of Collan et al. [23]. A new Fuzzy real option was presented as an evaluation method with Fuzzy numbers based on previous real option valuation methods and Fuzzy real options evaluation. That new method was also presented in an industrial setting. The results of this research field in recent decades were compiled by Shin and Wang [24]. They showed an overview of some of the basic mechanics of Fuzzy theory and current economic applications in both micro and macroeconomics.

The research and development (R&D) project ranking as investments is a well-known problem made difficult by incomplete and imprecise information about future project profitability. The Fuzzy technique can also be applied in this area, as demonstrated by Hassanzadeh et al. [25]. Their research aims to develop a practical research and development (R&D) portfolio selection model that addresses the practical R&D project evaluation issue while tackling R&D uncertainty in portfolio optimization. Fuzzy set theory was employed to capture and model the uncertain project information. An example was also presented to compare these measures and illustrate the simplicity and applicability of the proposed approach. R&D research also was investigated by Collan and Luuka [26]. Their work showed how can the evaluation of the profitability results of an R&D project with Fuzzy method be ranked. They used four new variants of Fuzzy TOPSIS, each using a different Fuzzy

similarity measure. The implementation of the created techniques was illustrated with a numerical example.

Another concerning economic research topic is the field of large industrial or giga-investments because they are risky businesses with long economic lives that often control their markets. The information available is non-stochastic, normative, and often imprecise. Luuka and Collan [27] showed a new Fuzzy insurance pricing method for giga-investment project insurance. Their studies dealt with a new and intuitive four-step procedure for pricing giga-investment project insurance based on creating a pay-out distribution for the giga-investment project insurance contract. A numerical illustration of insurance pricing was also presented with the new method. On the other hand, the Fuzzy pay-off method was introduced profitability analysis tool. In this vein, their other work [28] analyzed the effect of the risk aversion in the possibilistic setting, relevant to giga-investments.

The application of a Fuzzy inference system to investment decision-support and real options analysis is a relatively new approach. Real options analysis looks at investment projects and assets as possibilities and analyzes their acquisition, project start, or making changes within projects as an option. Real options valuation is valuing these possibilities as options. Collan et al. [29] presented a new version of the Fuzzy pay-off method that incorporates a credibility measure into the real option valuation construct of the Fuzzy pay-off method. The real options analysis field was also studied with the Fuzzy method by Kozlova et al. [30]. They proposed a procedure for enriching investment and real options analysis performed with the Fuzzy pay-off method. Furthermore, based on the proposed procedure, a Fuzzy inference system was shown to support investment decision-making. The proposed procedure and the application of a Fuzzy inference system were illustrated with the numerical case analysis of a power generation investment. Related to this topic, Muzzioli and Baets [31] reviewed the literature that has addressed direct and inverse problems in option pricing in a Fuzzy setting then provided some lines for future research. Stokalsa et al. [32] presented the first fully probabilistic method for the real option valuation of investment projects, a new possibilistic variant of the Fuzzy pay-off method for real option valuation. The use of the new variant was illustrated with a set of numerical examples.

Ferrer-Comalat et al. [33] also proposed incorporating Fuzzy logic into the study of economic models. To develop this idea, they analyzed a simplified model for determining national income. It was assumed that set value is composed of consumption and investment for the sake of equilibrium. For gaining more objective information than that resulting from the application of classical models, they incorporated Fuzzy logic in their model.

The Fuzzy logic also offers a natural and convenient framework for modeling various concepts in social science. An example of this is found in their research by Ghosh et al. [34]. The level and spread of educational attainment and sustainable economic growth were examined by introducing the value of the education index.

The results were in line with expectations, with the value of the Education Qualification Index rising with the better economic situation (in terms of employment, land value, household goods, livestock, etc.) and vice versa.

Based on the results of the different economic studies described above, covering a wide range of research areas –, it can be concluded that soft computing methods – particularly Fuzzy logic and inference – provide promising results in economic decision-making and decision-support, social sciences, etc. In this paper, a multi-input, single-output (MISO) Fuzzy rule-based system is introduced. This example can be used as decision support. The presented model contains both types of independent variables: qualitative and quantitative ones as well. The estimated single dependent output variable shows the success of a market campaign, which can predict the target group in future problems. In this work, we basically emphasize the usability of the Fuzzy concept and its background rather than real case analysis.

3   Methods

In 1965, L. A. Zadeh [35] introduced the new methodology of Fuzzy sets. The aim was to provide a concept to solve problems previously addressed unsolvable within the framework of classic methods. The fundamental innovation was the simple modification in terms of the mathematical definition of *set*s. As a result, the strong boundaries were blurred, the membership function and the degree of membership were defined. The concept has been further developed, making it applicable in many areas, like decision-making problems [36] [37], modeling and control [38] [39] [40], practical analysis of systems [41], etc. [42].

The structure of a Fuzzy rule-based inference system is shown in Figure 1 that has four fundamental elements.
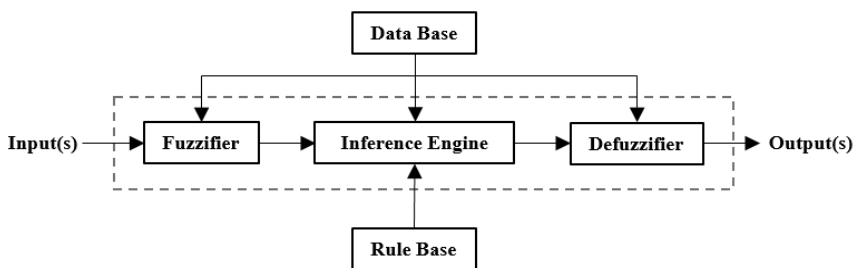

Figure 1

The structure of a Fuzzy inference system (based on [45])

The Fuzzifier is designed to describe the independent input and the dependent output variable(s) with the help of Fuzzy sets. There is the opportunity to use linguistic expressions and interval numbers instead of simple, crisp values in this

step. The Rule Base is the storage box of the available expert knowledge concerning the specified problem. The Fuzzy rules are composed in *IF…(antecedent(s))…THEN…(consequence(s))…* form and connect the input and the output variables. In the Inference Engine the rules are activated. The firing strength is defined by the membership degree of the independent variables, which is turned into the Fuzzy output set. More types of Fuzzy inference exist: the Mamdani-type [38] [39], the Sugeno-type [40], Tsukamoto-type [43], etc.

One of the most commonly used inference systems is the Mamdani type that describes expert knowledge based on previous information. The inference itself is introduced with the help of an example. Let us explain a simple system with two inputs (x_1, x_2) and an output (y) variable. The partition of the variables is shown in Figure 2.
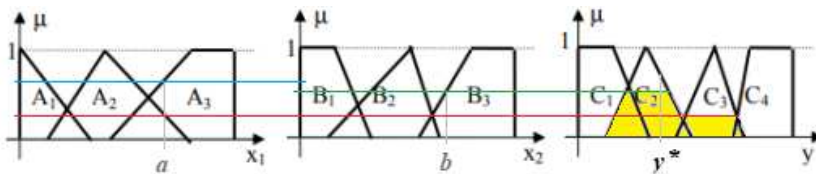

Figure 2
The Mamdani inference

In the case, when $x_1 = a$ and $x_2 = b$, two rules can be activated:

R_1: IF $x_1 = A_2$ AND $x_2 = B_3$ THEN $y = C_3$ (1)

R_2: IF $x_1 = A_3$ AND $x_2 = B_3$ THEN $y = C_2$ (2)

In the case of Rule 1 (Eq. (1)), the membership degree of a in A_2 is marked with a red line; the membership degree of b in B_3 is marked with a green line. There is an *AND* connection between the conditions. As a result, the rule strength is the minimum of the membership values. So the activation level of C_3 is the red level.

On the other hand, Rule 2 (Eq. (2)) is activated as well. The membership degrees are shown with blue (in the case of A_3) and green (for B_3) lines. It can be said that the *AND* connection results in their minimum (the green level) as the firing strength of Rule 2. That becomes the level in C_2. Finally, the answer to the activated rules is the union of the results (the yellow area in Figure 2).

Finally, the resulting Fuzzy set needs to be transformed into a more tangible, more easily evaluated value. The Defuzzifier does this near to translation procedure. As it can be seen in Figure 2. the result is hard to understand. That is the reason why the defuzzification has to be carried out. So it is possible to get a more understandable output (y^* in Figure 2). Several defuzzification techniques exist, there is no general proposal on which concept to use. The best solution depends on the problem itself.

Fuzzy inference systems might be a practical choice if uncertainty, lack of information, too many disturbances, or difficult-to-describe connection can be found around the investigated problem [42].

4 Practical Example

Our study examined a classic banking database for marketing purposes, originally uploaded to the UCI Machine Learning Repository. The dataset contains information about a financial institution's past telemarketing campaign pricing. The database they used (a Portuguese retail bank with data collected between 2008 and 2013) is freely available. Based on this, in 2014, Moro et al. [44] investigated which data mining methods (logistic regression, decision tree (DT), neural network (NN), support vector machine) could be used to measure the prediction of a future successful telemarketing campaign, among which methods the neural network proved to be the most successful.

In this case study, we want to use Fuzzy's system for forecasting and decision preparation. For this goal we have analyzed the latest telemarketing campaign of the bank on which the database is based and filtered out the cases where the campaign was successful or unsuccessful. Then, we identified patterns that can be used to conclude future strategies to make future campaigns as successful as possible. The target group of our study was the entrepreneurs, mainly the corporate sector, and we looked at their forecasts for banking products.

4.1 Structure of the Fuzzy Inference System

Based on the available data, a MISO system is presented. The first step was selecting the variables. The significance test was carried out based on a statistical approach to determine the proper independent input parameters. It was revealed that the following variables have a significant effect: age, marriage, education, housing, loan. The single output was the success of the campaign. The main goal was to find out more target groups for similar problems in the future. For that purpose, a Mamdani type Fuzzy inference system was created. It can be said that a Mamdani type Fuzzy system can adequately describe databases containing expert knowledge. The structure of the system is shown in Figure 3.

The independent variables are either qualitative or quantitative ones. The precision and the flexibility of the system can be enhanced by using quantitative parameters. In this case, housing and loan were found to be qualitative ones.
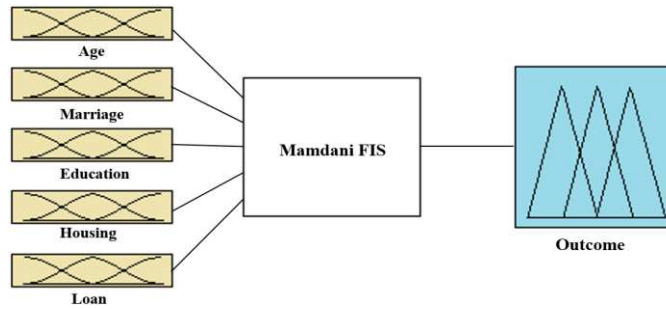
Figure 3
The structure of the FIS

Different types of membership functions were used to describe the partition of the input parameters: trapezoid (Eq. (3)), triangular-shaped (Eq. (4)), and the so-called Fuzzy singleton (Eq. (5)).

$$\mu_{trapezoid}(x) = \begin{cases} 0, & if \quad x < a_1 \\ \dfrac{x - a_1}{b_1 - a_1}, & if \quad a_1 \le x < b_1 \\ 1, & if \quad b_1 \le x \le c_1 \\ \dfrac{d_1 - x}{c_1 - d_1}, & if \quad c_1 < x \le d_1 \\ 0, & if \quad d_1 < x \end{cases} \tag{3}$$

$$\mu_{triangle}(x) = \begin{cases} 0, & if \quad x < a_2 \\ \dfrac{x - a_2}{b_2 - a_2}, & if \quad a_2 \le x < b_2 \\ \dfrac{c_2 - x}{c_2 - b_2}, & if \quad b_2 \le x \le c_2 \\ 0, & if \quad c_2 < x \end{cases} \tag{4}$$

$$\mu_{sglt}(x) = \begin{cases} 1, & if \quad x = a_3 \\ 0, & if \quad x \ne a_3 \end{cases} \tag{5}$$

where a_i, b_i, c_i, d_i are the parameters of the membership function which can be used to tune the system.

The partitions of the independent variables are shown in Figure 4. In the case of age, the interval of 25…65 was investigated. Five different levels were determined (decennial breakdown, see Fig. 4a), which were characterized with the help of trapezoid membership functions. Regarding marriage, there are strict definitions of the different levels. However, there are transitional states; between single (0) and married (1), between married and divorced (2). As a result, the levels were described with triangular membership functions (see Fig. 4b). The same concept was used in the case of education; the levels were set from unknown (0), through primary (1) and secondary education (2) to the university degree (tertiary level, 3).

The triangular-shaped membership functions are shown in Fig. 4c. Since it is harder to define transitions, housing and loan were found to be qualitative variables. The Fuzzy singleton function was used for their characterization (see Fig. 4d and e), which is similar to the characteristic function of a simple, crisp set. In these cases, the levels were either no (0) or yes (1).

Finally, Fig. 4f shows the partition of the single output variable. The outcome of the campaign described by the 0…1interval, where 0 means the failure, 1 is the success. Triangular membership functions illustrate the levels. Based on Fig. 4f, it can be said that as the degree of failure decreases, an enhancement is in success, and the reverse is also true.

a) Membership functions of age   b) Membership functions of marriage

c) Membership functions of education   d) Membership functions of housing

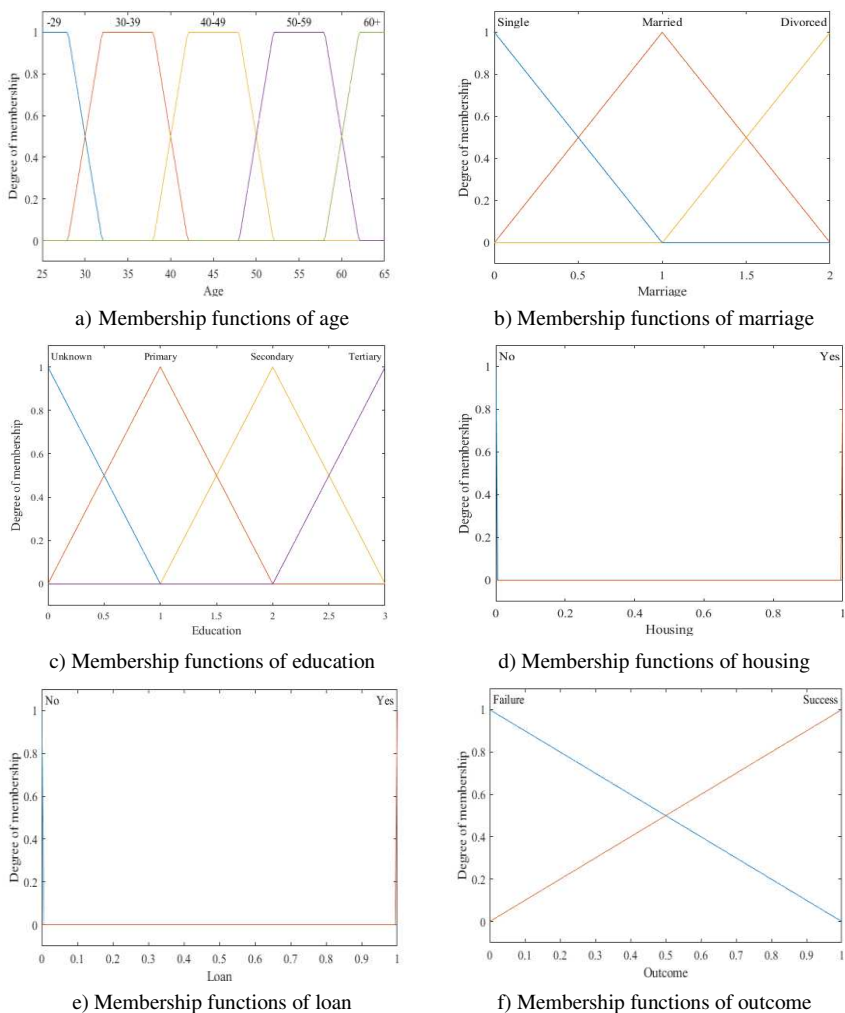e) Membership functions of loan   f) Membership functions of outcome

Figure 4
Partitions of the input and the output variables

The connection between the independent input and the output variables is defined in the rule base. In this case, 34 combinations were used to train the system. These setting points are shown in Table 1.

Table 1
The rule base

	Rule no.	Inputs					Output
		Age	Marriage	Education	Housing	Loan	Outcome
Training points	1	26	Single	Secondary	Yes	No	Failure
	2	29	Single	Tertiary	Yes	No	Failure
	3	31	Single	Secondary	Yes	No	Failure
	4	32	Married	Secondary	No	No	Failure
	5	32	Married	Unknown	Yes	No	Failure
	6	33	Married	Secondary	Yes	No	Failure
	7	34	Married	Tertiary	Yes	No	Failure
	8	35	Married	Secondary	No	No	Failure
	9	36	Divorced	Tertiary	No	No	Success
	10	36	Single	Secondary	Yes	No	Failure
	11	36	Married	Secondary	No	No	Failure
	12	36	Single	Secondary	No	No	Failure
	13	38	Married	Tertiary	Yes	No	Failure
	14	38	Divorced	Secondary	Yes	No	Failure
	15	38	Married	Tertiary	No	Yes	Failure
	16	39	Married	Secondary	Yes	No	Failure
	17	41	Married	Tertiary	Yes	No	Failure
	18	42	Married	Secondary	Yes	No	Failure
	19	44	Married	Tertiary	No	No	Success
	20	44	Single	Unknown	No	No	Failure
	21	44	Married	Secondary	Yes	Yes	Failure
	22	44	Married	Tertiary	Yes	No	Failure
	23	45	Married	Secondary	No	Yes	Failure
	24	45	Divorced	Tertiary	Yes	Yes	Failure
	25	46	Married	Secondary	No	No	Failure
	26	47	Married	Unknown	Yes	No	Failure
	27	49	Married	Tertiary	Yes	No	Failure
	28	50	Married	Primary	No	No	Failure
	29	51	Divorced	Tertiary	No	No	Success
	30	52	Single	Tertiary	Yes	No	Success
	31	56	Divorced	Primary	No	No	Failure
	32	58	Single	Primary	Yes	Yes	Failure
	33	59	Single	Primary	Yes	No	Failure
	34	63	Married	Secondary	No	No	Success

A Mamdani type inference system was generated with *Largest of Maxima (LOM)* defuzzification technique. The concept of LOM translation is shown in Figure 5.
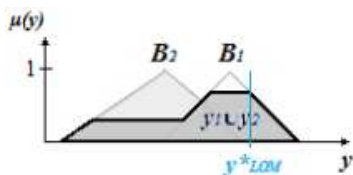

Figure 5
LOM defuzzification technique (based on [42])

4.2   Evaluation

The main goal of the evaluation procedure was to find possible target groups for future campaigns where a positive outcome can be expected. It was revealed that having a loan, housing, or both a profound impact on the negative outcome. In this section, the focus was on the opposite. As a result, the absence of these features was examined in the cases introduced below. The visualization of the outcome was done in three-dimensional space, so in each case one additional variable was kept constant.

Figure 6. shows the surface of the outcome plotted against the age and the marriage for participants who have completed secondary education. The promising results are shown with yellow color, and the poor success is marked with dark blue.

It can be demonstrated that even marital status and age have a considerable effect on the outcome. Two major target groups can be found in Figure 6. Focusing on singles, success can be achieved at 40…50 years old people. What is more, another possible target group was found in the case of the participants aged over 50, who are married. It is noted that these parameters need to be considered together.

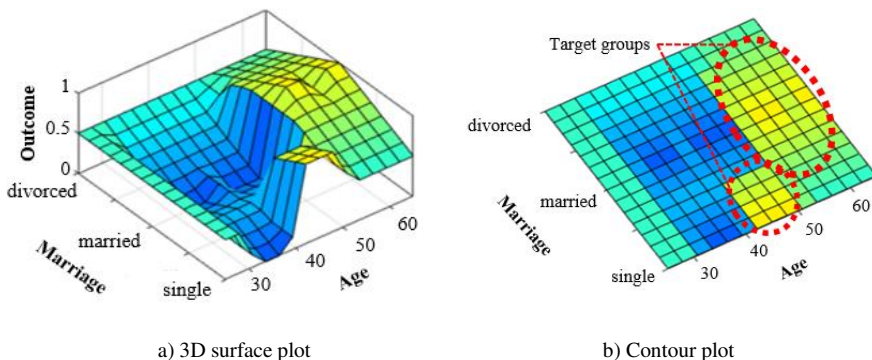a) 3D surface plot   b) Contour plot

Figure 6
The outcome plotted against the age and the marriage (for secondary education)

The effect of age and education on the outcome (see Figure 7) was investigated in the case of married attendees. In this case, it is convenient to focus on the group aged 40…50 with a university degree. Furthermore, corresponding to Figure 6, for people over 50 years old, secondary education provides the most successful result.

a) 3D surface plot   b) Contour plot
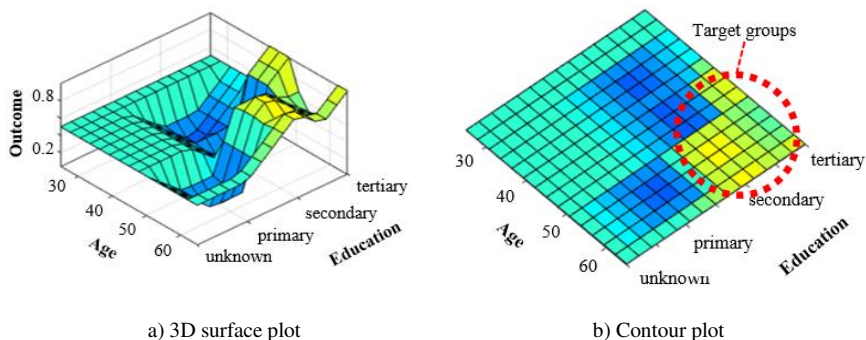
Figure 7

The outcome plotted against the age and the education (for married participants)

In Figure 8 the 45 years old category is analyzed, having no housing and no loan. It be revealed that a forward-looking group is performed either by singles with a secondary degree or by marrieds with a university degree.

a) 3D surface plot   b) Contour plot
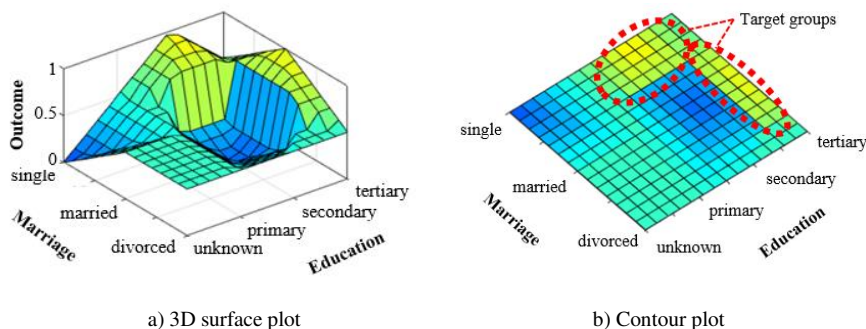
Figure 8

The outcome plotted against the marriage and the education (for 45 years old participants)

Finally, the age group of 55 years was investigated as well. Figure 9 shows the outcome plotted against the marriage and the education for this case. It was revealed that it is proposed to focus the campaign on married people with secondary schooling. Further contacted people might come from the tertiary-educated divorced attendees.

Overall, it can be concluded that having housing or loan or both worsen the success of the campaign. However, promising target groups of people can be chosen with the help of the Fuzzy inference system introduced above.

a) 3D surface plot   b) Contour plot
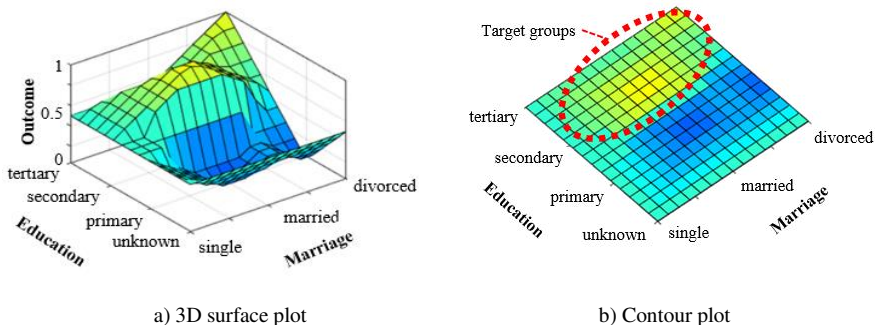
Figure 9

The outcome plotted against the marriage and the education (for 55 years old participants)

4.3   Confirmation

What is more, further testing points were chosen from the database used. These combinations were used to test the model and were not applied to train the system. The confirmation points are shown in Table 2. Regarding the predicted values over 0.7 can be considered to be successful. On the other hand, results under 0.3 are said to be undoubtedly a failure.

Table 2

Confirmation points

	No.	Age	Marriage	Education	Housing	Loan	Outcome	Predicted
				Inputs			**Output**	
Testing points	1	31	Married	Secondary	Yes	Yes	Failure	0.125
	2	36	Single	Tertiary	No	Yes	Success	1
	3	38	Single	Secondary	No	No	Failure	0
	4	44	Married	Secondary	Yes	No	Failure	0
	5	49	Single	Secondary	No	No	Success	0.875
	6	54	Divorced	Unknown	Yes	No	Failure	0
	7	59	Married	Secondary	No	No	Success	0.875
	8	65	Married	Tertiary	No	No	Success	1

It can be said that the results of the model correctly correspond to the measurement data in the cases of the training points. In addition, Table 2 shows that the system can be applied appropriately to estimate the outcome's success in those combinations that were not used during the training procedure. As a result, the Fuzzy inference system introduced above is suitable for defining future target groups.

Conclusion

In this paper, some limitations of classic logic were presented with regards to economic aspects. Following the problem statement, several studies were given concerning the valuable opportunities provided by soft computing methods. Fuzzy logic was highlighted in particular for it was found to be a promising technique to support decision-making.

In addition, the applicability of the methodology was justified by a case study. In this section, a classic banking database was analyzed and used to generate a Mamdani type Fuzzy inference system. The aim was to provide some decision support in future market campaign strategies.

The following conclusions can be drawn:

- It was revealed that the introduced inference system could be used to find patterns. These results can be used to find target groups of people from whom success might be achieved in similar campaigns in the future.

- It can be said that the generated Fuzzy model was proved to follow the outcome derived from the data properly. For that purpose, besides the teaching point, further testing points were selected to confirm the accuracy of the model.

- It can be concluded that the Fuzzy system introduced accurately describes the available dataset (in the case of the teaching and the testing points as well). As a result, it can be used to support future strategies.

In the final conclusion, it can be drawn that Fuzzy systems are successfully applicable for decision support and solving further economic issues.

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Food Consumption Patterns, in a Values-based Approach, for Generation Z

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Abstract: The main objective of this research is to validate the value-based consumer behavior models of food consumption, for a specific generation. The theoretical basis of this topic is provided by two pillars: value-based consumer behavior theories and generational marketing, in which the focus is on the main characteristics of Generation Z. A common feature of the consumer behavior theories based on the value system proposed in the literature review is that they assume there is a relationship between the consumer's motivation for selecting products and services and the value system. This basic concept inspired the present primary research, to analyze the relationship between the value system and consumer behavior in a generation-specific way by examining the food consumption habits of Generation Z, including their attitudes towards healthy eating. As part of the primary research, quantitative data collection took place in the form of a snowball sampling procedure among Generation Z. As part of the quantitative research, a pre-tested, standardized, online survey was conducted that analyzed over 500 evaluable questionnaires. The main hypothesis of this study is the primary analysis, namely, to prove that the basic structure of consumer behavior theories based on values, is applicable, to the food consumption habits of Generation Z. The results help identify the values of future generations, their focus on health and what they do to protect their health. In addition, the results of the survey will also help identify relevant food consumption behavior patterns among Generation Z participants. This helps define a target group for healthy eating and health education campaigns, that target Generation Z.

Keywords: values; Generation Z; segmentation

1   Introduction

Consumer behavior is part of human behavior. The factors that determine our human behavior and choices, also affect our purchasing decisions. Finding the ultimate drivers of our consumer choices is at the heart of marketing. Because if we know and understand the customer's main motivations, we can offer them targeted marketing activities. In this paper, I focus on food consumption within

consumer behavior, and its value systems approach, with the aim of identifying the ultimate drivers of consumer decisions.

Among the determinants of consumer behavior, I emphasize value systems as a fundamental determinant of the internal context of consumer behavior. In examining consumer behavior, the effects of changes in lifestyle and values cannot be ignored. The literature review of this study presents different approaches to values and their impact on consumer behavior.

Value measurement methods play an important role in extending the marketing research toolbox to provide a sound analysis of the individual characteristics that explain consumer preference and how consumer decision-making is influenced. These models, based on the measurement of values, have already sought to explain the motives behind product and service choice and thus form the theoretical model for the research described in this paper.

2   Theoretical Background

2.1   The Role of Values in Food related Consumer Behavior

One pillar of the theoretical background of the research is the value-based theories of consumer and food consumption behavior. The common rationale for these theories is to interpret the purchasing and consumption decisions as an external aspect of the value system. Therefore, among the factors that determine consumer behavior, the value system has been prioritized as the basic determinant of the internal context of consumer behavior.

As a part of human behavior, consumer behavior is a complex and complicated process. It is not by accident that its research has been the main focus of marketing for decades. Understanding consumer behavior and purchasing decision-making processes is essential for developing competitive marketing concepts and product and service portfolios that meet current expectations [1]. In order to create attractive offers that attract customers, it is important to understand how decision is made and the process and mechanism behind the decisions [2-4] According to the interdisciplinary approach to consumer behavior, consumer behavior is such a complex form of behavior that includes individual needs, the determinants of one's environment, as well as the buyer's information supply, the ability to evaluate alternatives and the decision-making mechanism that subsequently satisfies or dissatisfies the buyer. According to the schematic model of consumer decision-making, in addition to the influence of familiar (endogenous) factors that are related to consumers and affect consumer decision-making, the influencing power and effects of the wider environment (exogenous

dimension) are also considered [5]. In this research, the analysis of endogenous factors, namely the value system is in the limelight.

The interdisciplinary approach to consumer behavior shows that values are related to the two environmental factors of culture and society. Each society develops a set of values and regulations in its own cultural framework, which determines the behavior of its members within certain limits. Social factors can be linked to values through dimensions such as lifestyle, way of life and status.

However, sociological views and sociological approaches to consumption differ in their emphasis on the cultural, social, or individual determinants of value.

According to Hofmeister-Tóth [6], a value is a persistent concept or belief about a desired form of behavior or way of life, ranked by relative importance in different situations.

The cultural determinacy of value is emphasized by Andorka, Giddens, Hawkins-Best-Coney, [7-9] who consider value as a cultural principle, an idea. In contrast, there are authors who emphasize the individual determination of value. For example, the subjectivist approach characterizes Peter-Olson's [10] definition of value as a cognitive representation of the consumer's basic needs and objectives.

Other authors, on the other hand, emphasize the social determinacy of value, as opposed to individual determination. Gauthier [11] stresses the normative force of value when he names value as the norm of choice. Similarly, Hartmann [12] theorizes that value is the source of our norms.

In our opinion, on the basis of the theories, it can be concluded that values are produced by the culture of a given group, but that group values are influenced by the conditions and circumstances that determine everyday life.

Among the value measurement methods used in psychology, the most well-known in marketing science are the Rokeach value system [13] and Mitchell's "Values and Value Styles" [13] The Kahle's list of values [14] already adapted to the specificities of marketing research, is a method well suited for consumer behavior research [15].

Value measurement techniques play an important role in expanding the market research toolbox to provide reliable analysis of individual characteristics that explain consumer preferences and how they influence decision making. Value models of consumer behavior based on the measurement of value made possible by the aforementioned methods have been developed by further thinking the methods of measuring value. These value-based models have now attempted to explain the motives for selecting products and services [15].

The links between values and consumer behavior also apply to the analysis of food consumption and eating habits. This is evidenced by models that attribute dietary choices and food choice to values and lifestyle. A common feature of these models is that they start from abstract value systems of products or services and

arrive at the specific attributes of a particular product, food or service in relation to these. Such is the case of Gutman's Means-End Chain Model theory [16], which, as a hierarchical model, highlights the interrelationship between values, consumption and specific product attributes.

Taking this a bit further, Grunert (1996) [17] created a model of food-oriented lifestyles, which also explains the specific situational components of food consumption on the basis of values, such as the way of shopping, aspects of product quality, methods of food preparation, consumer situations and consumer motivations.

According to the theory of food consumption behavior based on values, the influence of values on food consumption preferences is reflected at three levels. The first level is for the general core values of consumers, such as peace, safety and time. The second level is occupied by the values that determine consumer behavior, such as quality awareness, hedonism, and time consciousness. These reflect the social status, preferences and living conditions of consumers. Finally, at the third level, there are specific product and service value, such as product and service selection motivation. [13]

The basic concepts of these theories inspired the exploration of the relationship between values and consumer behavior. It was completed for the first time within the framework of a study conducted on a domestic sample in 2008. The results of the study showed that the value-based consumer behavior theory is applicable to food consumption and one specific branch of food consumption, the provision of workplace (institutional) catering [18].

As a result, the value-based consumer behavior model of workplace catering was created, and the model was validated in the light of the results of the research.

We were able to confirm the same correlation in a 2016 study, when we showed a correlation between the perception of the value of money and the way money is managed and financial decisions are made. This confirms that the basic framework of value-based theories of consumer behavior also applies to money-related decisions. [19]

Value-based models have been successfully applied in several different areas of marketing to understand the ultimate motivation of consumer decisions. Wiedman et al. [20] were looking for an explanation in consumer value orientation in the segmentation of luxury products.

Aindrila and Mousumi [21] included value orientation in their analysis of attitudes and willingness to buy sustainable, green products, seeking to explain the motivations behind consumers' willingness to pay more for sustainable, green products.

Kennedy and colleagues [22] have successfully applied value-based segmentation to the targeting of advertising messages in their empirical study.

Ramasamy et al. [23] relied on Schwartz's Human Values Theory to investigate CSR activities in their study of consumer attitudes.

Fleseriu et al. [24] investigated the motives behind the purchase of Romanian organic products and used the basic concept of value system studies as a starting point.

The above examples also show that value systems are often the most credible explanation of consumer choice, the ultimate indicator of purchase.

All the international examples also show that value system analysis, regardless of which value dimension structure is used, can be used to identify the motives for buying a product/brand. Moreover, it allows the exploration of intrinsic relationships and explains in such depth how the purchase decision is made that it provides a number of relevant hints for the choice of marketing targeting tools.

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2.2 The Characteristics of Generation Z from a Generational Marketing Perspective

Another important theoretical basis for this study is the concept of generational marketing. This section describes the consumer characteristics of Generation Z.

According to the basic concept of generational marketing, each generation can be characterized by its own common and specific values. Values, shared experiences, identities enable generations to be characterized because these are the features that connect people and form a kind of organizational principle between many different individual destinies, stories, and features. The identities found within a generation frame the choices of the people belonging to it and distinguish it from other generations [25].

An important aspect of generational behavior research is the study of value orientation and the identification of differences in it [26]. The concept is that, in addition to the strict demarcation of age, it is also necessary to consider the fact that each generation has different group experiences. The starting point of a marketing approach based on generational theory is that the major and defining events experienced during their socialization, the 'zeitgeist', accompanies people throughout their lives and influences their choices. In this study, the focus is on Generation Z consumers, therefore this generation is briefly described.

Generation Z is the target group of the primary research. In our country, Tari [27] [28] has examined Generation Y and Generation Z in more detail. According to her characterization, Generation Z is also known as the "new-conservatives", the "Facebook generation". But it is also called the digital natives, the "Instant online" generation or the next generation, the iGeneration [29] [30]. Because of the former, they are often referred to as Generation C, which comes from the

English word connection, or D, which refers to the word digital, but also R, which comes from the English word responsibility. This generation is more environmentally aware and sensitive to social issues than any of the previous generations [31].

It is important to emphasize that Generation Z should not be considered as just one of the generations, as it is the world's first global generation to grow up in the same culture and share the same food, fashion and places. Globalism is also a language toolkit. They use words and phrases that other generations do not understand or hardly understand. Generation Z has the same problems as young people of the previous era, looking for identities and tackling the big problems in life, conformity, etc. but technological opportunities give new frameworks to their lives that suddenly makes their behavior even more incomprehensible to their elders. Generation Z's general hedonism is pushing back childbearing and keeping them being a child longer. Often, a focus on the individual, self-interest, brings to the surface narcissistic characteristics that will affect their attitude towards work and even society [30]. A closer look at generations provides an opportunity to define habits more precisely, to understand why, when, and how customers are likely to act.

In line with this, traditional shopping is no longer dominant for young people, the field of shopping has also moved to the online world, shopping, wandering around the shops is not typical for them and it is not an experience factor for them. According to experts, the best way to meet the needs of the new generation is to make the activities in which we want to involve them as community-based as possible, so that it can become community experience and community space for them. Nowadays, creating an experiential environment for shopping has become imperative, and consumers are demanding elements of spectacles and shows, which is especially important for young people according to Törőcsik [33] [34]. The younger generation needs experience: tasting, touching, amazement, surprise, horror, in short, entertainment is the key word for the services and product experiences positioned for them [25] [35].

3   Material and Method

The main research objective of the study is to demonstrate the basic relationship between food consumption and values in a generation-specific perspective.

The research hypotheses were based on the value system models outlined in the secondary research, and a generation-specific validation with an emphasis on food consumption is recommended, they are:

H1   Individuals of this generation may be categorized based on their food consumption preferences, with separate groups depending on the above-mentioned descriptive variable.

H2 Food consumption of Generation Z, the underlying correlation of value-based consumer behavior theories holds true, i.e., the value orientation of the food consumption preference groups varies considerably.

As part of the quantitative research, a pre-tested standardized online questionnaire survey was performed, which resulted in the analysis of 546 evaluable questionnaires. For the quantitative research, subjects were recruited using a snowball sampling method. The condition for being included in the sample was that the subjects should be from Generation Z in terms of age.

The research instrument contained only closed questions, nominal – single- and multiple-choice selective questions – and four-item rating scales to analyze consumer attitudes and value orientation.

The topics of the research tool were the values of Generation Z, their food consumption behavior, their views on health and healthy eating. A pre-qualitative phase – 5 mini-focus groups – helped to compile the themes and specific questions of the questionnaire. Within this framework, subjects were recruited from Generation Z, heterogeneous by gender but age, using a snowball sample. During the qualitative phase, used as a pre-study, a semi-structured interview schedule was used during the guided interviews.

A "forcing scale" from 1 to 4 for the scaling problems was used. One reason for this is Hungarian respondents' individual scale preference: according to the school grading system, our Hungarian respondents are most stable when interpreting a scale of up to five grades rather than scales 1-7, 1-9, or 1-10.

The even scale was selected since the middle value (3) for the odd scale (1-5) provides a sort of escape route for responses. In the examination of attitudes, those who choose the middle value do not tip the scales in either direction, resulting in an excessive number of "indifferent" customers, making their segmentation statistically and professionally difficult. As a result, an even scale was selected, which, by excluding the middle value, leads the respondent to take a more stringent stance, thus contributing more to a successful segmentation [34]. In addition, for the questions analyzed using the odd- even scale, it was not necessary to have a middle, indifferent value either as a "do not know" or "do not recognize" response, as the cognitive level was filtered using separate questions.

Descriptive statistics, bivariate and multivariate analyses were used together with SPSS 22.0 software to analyze the quantitative findings and test the hypotheses. A factor analysis of the preference system was carried out in the first phase of segmenting the food buyer preference, deciding on the final factor structure based on the KMO value, total variance value, and professional explanatory power. A K-means clustering algorithm was employed for segmentation, which is a statistically appropriate method due to the sample size of more than 1,000 sample elements.

In the present study, in addition to the results of factor and cluster analysis, Pearson's Chi-square significance values for the determination of statistical correlations in the characterization of the segments was applied, while the absolute values of the Adjusted Residual (Adj.R) were considered for the determination and analysis of internal correlations [37].

4   Results and their Evaluation

To test the first hypothesis (H1), food consumption preferences among the sample members were analyzed.

The results showed that the most important factor in selecting food was its freshness, as shown in Table 1. The second most important aspect to consider was value for money, followed by the good taste and smell of the food.

The fact that the cheapness of food was pushed to the background by its nutritional value (vitamin and mineral content, free of artificial substances) and its external characteristics shows that this generation is less sensitive to prices. Of course, this is not only a function of individual food consumption preferences, but it is also presumably related to the fact that the majority of the respondents do not make their own living, but still live in the same household as their parents.

Table 1

Food consumer preferences in the sample

Aspects of food selection	Average 1 = not at all important and 4 = absolutely important	Deviation
freshness	**3.68**	0.60
low calorie content	2.33	0.91
organic quality	2.11	0.88
good taste, smell	**3.62**	0.62
nice, attractive appearance	3.11	0.80
geographical origin, place of origin	2.31	0.96
high nutritional value	2.74	0.88
vitamin, mineral content	2.88	0.90
practical packaging	2.64	0.84
quick to prepare	2.92	0.90
brand name	2.44	0.90
the food must be free from artificial substances	2.78	0.91

long shelf life	2.71	0.86
value for money	**3.63**	**0.65**
the right size packaging	3.18	0.77
recyclable, environmentally friendly packaging	2.71	0.93

Resources: owns research, N=546 (average, 1 = not at all important, 4 = absolutely)

In order to confirm that the sample can be divided according to food consumption preferences, a factor analysis was conducted on the factors that play a role in food selection.

The results of the three, four, and five-factor tests were analyzed with the four-factor solution providing the best explanation.

As a result, the following factors could be defined (Table 2):

- Health and Environmental Awareness: aspects such as recyclability, geographical origin and organic quality are also taken into account, in addition to the nutrients of the food, the high content of vitamins and minerals. These factors constitute a conscious set of factors that take into account health and the environment.

- Time and price, whereby durability and speed of preparation, i.e., time-related and time-saving elements, are added to the price-related factors.

- Sensory elements, which included visual perceptual characteristics such as freshness, taste, and smell

- Design and communication, a group of factors that included practicality, appearance and branding.

Table 2
Rotated factor matrix of factors involved in food selection

Aspects of food selection	Health and Environmental Awareness	Time and price	Sensory elements	Design and communication
vitamin, mineral content	**0.78676**	0.037005	0.128931	-0.00616
the food must be free from artificial substances	**0.76487**	0.040316	0.07004	0.150526
organic quality	**0.74578**	0.071571	-0.1266	0.009187
recyclable, environmentally friendly packaging	**0.70652**	0.085475	0.136874	0.026998
high nutritional value	**0.698**	0.061657	0.084324	-0.06675

geographical origin, place of origin	**0.60981**	-0.25351	0.024441	0.358147
low calorie content	**0.39509**	0.361324	-0.1959	0.019246
quick to prepare	-0.1071	**0.68764**	-0.09003	0.216979
long shelf life	0.159716	**0.67593**	0.027882	0.106936
value for money	0.105523	**0.59541**	0.485745	-0.00733
cheap	-0.09438	**0.53456**	0.252734	-0.11076
the right size packaging	0.175099	**0.48357**	0.267709	0.268561
good taste, smell	-0.02398	0.173588	**0.80037**	0.145475
freshness	0.163343	0.044012	**0.77329**	-0.06164
brand name	-0.01639	0.183361	-0.12872	**0.80903**
nice, attractive appearance	0.022518	0.010986	0.469521	**0.63328**
practical packaging	0.338598	0.364455	0.086516	**0.46666**

Source: own research, N=546, factor analyses, sum variance=56.2% KMO=0.697; df=66; sig=0.00

In order to segment the sample according to the food consumption criterion system, a cluster analysis on the complete list of factors was performed using the K-means procedure. As a result, the following segments were distinguished (Table 3):

- Health and environment segment, who rated the considerations of the health and environment factor group above the other segments and the sample.

- Non-price-sensitive consumers who overestimated everything, and who considered all criteria apart from cheapness to be more important than the sample average.

- Those without a preference, for whom no single criterion was more important than the overall sample average. These are consumers who presumably do not have a mature pattern of behavior; their preference system is still immature and can be influenced.

- Time- and price-conscious group, for whom speed, time-related elements and price-related factors played an above-average role in their food choices.

Table 3
Food consumer segments in the sample

Aspects of food selection	Food consumer segments				
	Health and environment segment N=220	Non-price-sensitive consumers N=120	Those without a preference N=56	Time- and price-conscious group N=150	Sample N=546
freshness	**3.81**	**3.72**	3.11	3.67	3.68
low calorie content	2.32	**2.87**	2.04	2.03	2.33
organic quality	2.19	**2.90**	1.79	1.47	2.11
good taste, smell	**2.83**	2.70	1.93	**2.97**	2.75
nice, attractive appearance	**3.66**	**3.73**	3.00	3.71	3.62
geographical origin, place of origin	3.05	**3.45**	2.57	3.12	3.11
high nutritional value	**2.44**	**3.05**	2.04	1.64	2.31
vitamin, mineral content	**2.92**	**3.55**	2.39	1.97	2.74
practical packaging	**3.19**	**3.63**	2.29	2.05	2.88
quick to prepare	2.52	**3.45**	1.71	2.53	2.64
brand name	2.78	**3.18**	2.18	3.19	2.92
the food must be free from artificial substances	2.14	**2.95**	1.93	**2.65**	2.44
long shelf life	**3.00**	**3.58**	2.00	2.09	2.78
value for money	2.48	**3.40**	1.75	**2.84**	2.71
the right size packaging	3.65	**3.85**	2.50	**3.84**	3.63
recyclable, environmentally friendly packaging	3.22	**3.53**	2.18	**3.23**	3.18
freshness	**2.95**	**3.45**	1.89	2.08	2.71

source: My research, N=546, K-means clusterization process

In order to test hypothesis H2, according to which there is a correlation between the value orientation of Generation Z and their food consumption behavior patterns, analysis of variance was used to see whether it is statistically proven that the food consumption groups can be differentiated by value orientation (Table 4).

According to the results of the analysis of variance (sig=0.000), there are differences between food consumption segments for each value dimension included in the analysis.

The result is that freedom, friendship, a calm and balanced life, health, good relationships, internal harmony, and a peaceful life are important aspects ranked above average for health and environmentally conscious food consumers. In addition to being career-oriented, they are young people and followers of traditional values whose patterns of food-consuming behavior are very closely related to their values and ways of thinking.

Time and price conscious food consumers are a group of people who prioritize freedom, leisure, life enjoyment and material well-being. That is, they follow hedonistic values that are consistent with the attitude of food consumption.

The results also showed that those who overestimated all dimensions of food consumption preferences showed a similar pattern in their values, and this was also true for those for whom nothing was really important. They were characterized by this kind of lack of preference in their food consumption habits as well as in their perception of human values.

Table 4

Characterization of food consumption behavior patterns by value system

Values	Clusters	N	Average
Freedom	Health and environment conscious segment	220	**3.78**
	Non-price-sensitive consumers	120	3.73
	Those without a preference	56	3.35
	Time- and price-conscious group	150	**3.78**
	Sample	546	**3.72**
Leisure, life enjoyment	Health and environment conscious segment	220	3.77
	Non-price-sensitive consumers	120	3.78
	Those without a preference	56	3.32
	Time- and price-conscious group	150	**3.82**
	Sample	546	**3.74**
Material well-being	Health and environment conscious segment	220	3.52
	Non-price-sensitive consumers	120	3.65

	Those without a preference	56	3.21
	Time- and price-conscious group	150	**3.8**
	Sample	546	**3.59**
Friendship	Health and environment conscious segment	220	**3.83**
	Non-price-sensitive consumers	120	3.76
	Those without a preference	56	3.42
	Time- and price-conscious group	150	**3.88**
	Sample	546	**3.79**
Calm and balanced life	Health and environment conscious segment	220	**3.83**
	Non-price-sensitive consumers	120	**3.86**
	Those without a preference	56	3.3214286
	Time- and price-conscious group	150	3.76
	Sample	546	**3.76**
Health	Health and environment conscious segment	220	**3.89**
	Non-price-sensitive consumers	120	**3.86**
	Those without a preference	56	3.25
	Time- and price-conscious group	150	3.78
	Sample	546	**3.79**
Good relationships	Health and environment conscious segment	220	**3.79**
	Non-price-sensitive consumers	120	**3.8**
	Those without a preference	56	3.25
	Time- and price-conscious group	150	3.68
	Sample	546	**3.70**
Freetime	Health and environment conscious segment	220	3.45
	Non-price-sensitive consumers	120	3.50

	Those without a preference	56	3.10
	Time- and price-conscious group	150	**3.49**
	Sample	546	**3.43**
Allow myself something good	Health and environment conscious segment	220	3.51
	Non-price-sensitive consumers	120	3.63
	Those without a preference	56	3.142
	Time- and price-conscious group	150	**3.69**
	Sample	546	**3.55**
Economy	Health and environment conscious segment	220	**3.31**
	Non-price-sensitive consumers	120	**3.51**
	Those without a preference	56	2.89
	Time- and price-conscious group	150	3.12
	Sample	546	**3.26**
Gaining pleasure for others	Health and environment conscious segment	220	3.50
	Non-price-sensitive consumers	120	**3.66**
	Those without a preference	56	3.21
	Time- and price-conscious group	150	3.48
	Sample	546	**3.50**

Source, My results, N=546, analysis of variance (sig=0.000)

Conclusions and Summary

First, the food consumption habits of Generation Z were studied and distinct consumer groups were characterized, based on food consumption preferences. This confirms the first hypothesis (H1), according to which members of this generation are well distinguishable on the basis of food consumption preference. As a result of the clustering procedure, four consumer segments were differentiated: the "health and environment cluster", whose members overestimated the aspects belonging to the health and environment factor group. The "all-above-average, non- and price-sensitive consumers", who rated all aspects except for the criterion of cheapness as more important than the sample average. The "no preference" group, for whom no single aspect was really

important; and the "time and price sensitive" group, for whom speed, time-related elements and price-related factors played an above average role in the selection of a food.

To test the second hypothesis (H2), these segments were also characterized in terms of values. According to the results of the analysis of variance (sig=0.000), there was a significant difference between the food consumer segments on each of the value dimensions included in the analysis. This confirms the second hypothesis, i.e., that the value orientation of the groups according to food consumption preference differs significantly.

In summary, the main objective of the research is to examine the values, food consumption behavior and perceptions of health and healthy eating of Generation Z based on secondary and primary research findings. The aim was to demonstrate that the basic concept of value-based consumer behavior models is valid for the members of Generation Z being studied.

The theoretical basis for the topic under review was provided by theories of value-based consumer behavior and generational marketing. According to the basic concept of value-based food consumer behavior theories, there is a correlation between consumers' motives for selecting products and services and their perception of human values: i.e., food selection is attributed to consumer values.

Following this basic concept, the relationship between values and food consumption behavior was analyzed in a generation-specific way in the primary study.

Overall, consistency was found between the groups in terms of food consumption choices and perceptions of basic human values.

The results give us a clear picture of the food consumption habits of the members of Generation Z, as well as, their values, which serve as an important point of reference in the choice of marketing activities for this generation. The characterization of each segment can provide a basis for a differentiated marketing strategy, which can definitely be a useful source of information for food distributors and producers.

Based on food consumer preference, four target groups were defined as a result of the primary research. The characterization of these segments and the description of their specificities in terms of values can help to define the scope of the targeted marketing activities.

A limitation of the research herein, is that the results are only valid for the given sample, a limitation that can be overcome, by conducting a nationally representative sample in the future. As a further step in the research, a qualitative phase is planned, to achieve deeper and more nuanced results, analyze the segments identified in the quantitative analysis in a more sophisticated way and possibly, identify further segmentation possibilities and consumer niches.

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Flexible Work Designs, as a Strategic Tool for Twenty-First-Century Intricacies: A Descriptive Analysis amongst Healthcare Employees in the United Arab Emirates

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Abstract: Many of the 21st Century's intricacies can be explained by their strategic employment relationships. The present study discusses the necessity of flexible work designs by utilizing and maintaining the workforce to their full potential. Keeping this in mind, this study was conducted in randomly selected health sectors, in the UAE. Along with the models related to this subject and a questionnaire of 300 respondents, by stratified proportional sampling, provided a deep understanding of the outlooks of employees in their work designs. A descriptive analysis, using SPSS 24.0, maintained the significance level of the latent variables, such as, organizational flexibility, and cognitive flexibility, to the independent variable, flexible patterns. The findings confirmed the alignment of models extracted from the theories to the variables discussed in the questionnaire. Moreover, all the hypotheses crafted for the study have accepted. Thus, the study proved that a flexible workforce requires management to be tactical, create various work designs on demand, and develop requisite skills to undertake this task. Furthermore, it communicates that productivity and career responsibility can increase while fatigue and staff turnover can lessen if the work designs are strategically crafted, within the selected companies.

Keywords: Flexible work designs; Organizational flexibility; Cognitive flexibility; Productivity; Career responsibilities

1   Introduction

Society depends on organizations for its endurance. The standard of living of the citizens in any nation is linked with the adaptability of the organizations. The competence of organizations, in turn, measures the competencies of their employees. Hence, organizations need to strive hard to achieve the goals by specific ways in organizing and managing their work designs [1] [2]. Much of the current literature supports the view that employee engagement, involvement and

participation are crucial in management practices towards organizational competence [3-7]. Additionally, organizations in the present era are making swift changes in utilizing their resources due to the increase in the economic volatility, and new technology coupled with shortage of skills. This leads to the evolution of restructuring the traditional HRM functions into strategic, and operational levels. It highlights the alignment between strategic management and strategic human resource management, which can be executed through an effective co-operation between HR professionals and line managers. The economy of a country is dependent on its firms' growth and sustainability [8-10]. Human capital has a vital role in the organizations to develop strategies and operationalize them. In fact, there are numerous models of SHRM that supports the fit between HRM practices and effective utilization of human resources. Unlike the traditional approach in analyzing the internal factors only, the studies identified that flexible work design can create innovative practices in organizations by external scanning.

According to Ursell (1991), flexible labor in organization needs a strategic planning and it involves numerous processes. It can be a greater variety, in the time periods of employment; utilization of individual skills in a varied manner; employment contracts as franchise; subcontractor relations; part time or temporary employees [11]. Moreover, this includes both quantitative (hard) and qualitative (soft) approaches. It emphasizes on organizational strategies as hard approach and talent management as soft approach [12] [13]. Thus, the use of flexible work arrangements is a holistic approach and can lead to changes in all aspects; organizational, cultural, operational, and managerial. Moreover, the overlapping or increasing use of multiple flexible patterns in organizations helps the management to response to changing demands. At the same, it is a question that organizations are ready for this flexibility in its work design. Considering the importance of flexible work designs, the objectives crafted for the study are as follows:

To identify the variables for Cognitive flexibility in organizations

- To find the variables for Organizational flexibility in organizations

- To explore the significance of flexible work-design in organizations

2   Review of Literature

In fact, it is not easy to define flexibility in organizations as it includes wide range of issues and analysis. According to Pilbeam and Corbridge (2006) [14] flexibility is the ability of the organization to adapt to its size, structure, responsiveness, and rate of the people inputs required to achieve organizational objectives. In traditional SHRM models, one of the models that strongly supports the view of flexibility is model of 'fit' versus 'flexibility'. Here it focused on two types of congruence or fit, such as, a vertical fit and a horizontal fit. The former fit implicates the alignment of

HRM practices and the strategic management process. This directs the human resources towards the initiatives of the organization. The latter involves a fit amongst various HRM practices by efficiently allocating the resources (Wright and Snell, 1998) [15]. So, these models of fit have a direct link between needs, demands, goals, objectives, and structures (Nadler & Tushman, 1980) [16]. However, various shifts due to environmental factors call for a flexible work design in companies for its adaptation. To support this fact, Snachez (1995) stresses flexibility as a wider perspective because it provides environmental scanning, detects challenges, and through this, it can modify its capabilities, and develop alternatives to manage changes [17]. To add to this, Wright and Snell (1998) designed an SHRM model in which it demands organizational flexibility in order to achieve a dynamic fit. The model focuses on strategies and employee behaviors and skills to achieve the mission and goals of the organization.

Literature provides several flexibilities exist in organizations where they overlap each other to maintain a competitive advantage. As mentioned earlier, companies need to change according to market demand and for this, management extends their ability to arrange and reorganize the tasks with adequate skill development programs. Contrary to Taylor's scientific management principles, this functional flexibility provides teambuilding, multi-skilling, re-skilling, and project working (Treu, 1992) [18]. When it comes to the quantitative approach, this is based on the principle of relating the workforce to the levels of economic activity easily and on short notice such as seasonal, part-time, casual, and subcontracted workers. In work-time flexibility, there is a closer correlation between labor utilization and production demands, without additional costs of hiring labor. Moreover, these overtime or shift time flexible designs can enhance work-life balance and job sharing (Legge, 1995) [19]. Furthermore, Atkinson (1984) argues on the need for financial flexibility as it determines the design of compensation and wage rates with respect to market rate [20]. Another flexibility, procedural flexibility focuses on changing severities in labor and employment patterns and contributes to industry policymaking and industrial relations (Woods, 1989) [21]. The work design that enhances and enables the establishment and development of amendment or public policies are termed regulatory flexibility. To add on, mobility flexibility involves a change in the work such as telecommuting or virtual teams can also enhance the employee engagement levels (Bamber, 1990) [22].

2.1   Cognitive Flexibility

From an individual perspective, employee value proposition (EVP) fulfills employees' needs, expectations, and aspirations. While constructing a successful EVP, tangible and intangible factors need to consider. As discussed earlier, while considering flexibility related to the package, it relates with the pay and benefits, role definition, job content, and the nature of work. The working experience entails role clarity, relationship with managers, respect for colleagues, and adaptation to

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diversity. Moreover, the leadership style provides freedom and respected behavior in their tasks. A work design with these factors and related feelings of the employees can relate to the mental frame or cognitive flexibility. Hence, employees can perform effectively by developing their skills and talents with these flexible designs. Furthermore, this flexibility has contributed to significant changes in the psychological contract between the employer and employee relationship (Ingham, 2006) [23]. It is important to identify whether the employees acquire new skills knowledge and competencies to the demands and expectations of the organizations (Rosseau, 1995) [24].

Owing to the significance of cognitive flexibility, the first hypothesis of the study is:

H1: The EVP has a significant role in cognitive flexibility

2.2 Organizational Flexibility

In a broader meaning, the structural response to the development of the flexible patterns towards the employee value proposition is termed organizational flexibility (Atkinson, 1984). This flexibility is dependent on all the above-mentioned work patterns. To be specific, a formal and informal organization system, physical environment, career opportunities, training, and development increase individual satisfaction and aspirations (Ingham, 2006). Moreover, the Australian Centre for Industrial Relations and Research and Training (ACIRRT) highlights that the new work designs to the changing labor market created an extensive transformation in the employee-employer relationship [25]. The "gold-collar workers", need good working conditions and developed systems as this group forms a company's strategic advantage. Hence, organizations must focus their employment systems, procedures, and organizational structures to guarantee they acquire these skills into the businesses (Scarbrough, & Swan, 2003) [26]. Additionally, knowledge management creates an organizational culture in learning and change management. Research showed that it is an interexchange of knowledge between individuals who know and those who want to know (Davenport & Prusak, 2001; Feher, 2002; Sandori, 2007) [27-29]. Moreover, leadership can make structural changes in organizations. It can be developed through experience, culture, and history through which more followers can be created. It streamlines the processes to achieve a common goal and increases individual performances. Leadership maintains an unequal distribution of power to activate the effort and behavior of followers to the desired goal. In Leader-member exchange theory (LMX), it emphasizes the entity perspective approach to leadership and relationships between leaders and followers. Also, it highlights that leadership is comprised of "three primary components: the characteristics of the leader; those of the follower; and the maturity of the leadership relationship" as it "occurs within the context of the leadership relationship [30-38].

Furthermore, the new flexible system encourages the flow of information and an open system through social networks, which can enhance competitiveness (Kelliher & Anderson, 2008) [39]. According to Szabó and Hámori (2006), "at the information age, companies undergo constant transformation and reorganization, their strategy and organization are both flexible." [40]

Another development in the system approach is the High-involvement Work Systems (HIWSs) where employees feel more autonomy, self-designed teams (Gordery & Parker, 2007) [41]. Considering this, the next hypothesis to test is:

H2: The system approach has an imperative role in organizational flexibility

2.3 Flexible Work-Design

Studies have shown that those organizations that utilize the workforce in a flexible manner can adapt to the changing environment. Research by the Institute for Employment Studies in the UK identified the development of a distinct organizational structure can reinforce the multiple forms of flexibility, which has mentioned above. To support this view, Thompson and McHugh argue that the core-periphery model promotes a competitive advantage by developing a better employee relationship [42]. The new era with a great transformation due to economic and social changes, the impact reflects on the labor market and in turn affects the employer-employee relationship [43]. Employers frequently focus on person/organizational match to ensure the execution of strategic plans both in the short and long run. Employers constantly look for the personal abilities and knowledge that ensure the implementation of their strategic plans both in the short and long run [44]. At the same time, the talents or workforce management establishes the company's performance is maintained by employees' Knowledge, Skills, Abilities (KSAs) [45]. Unlike traditional work design, the new design takes the form of a core with a variety of peripheral activities to its changing environment. Numerous pieces of the literature indicated that in the developed countries like the UK and Australia these flexible work patterns are not much developed (Burgess, 1997) [46]. Seeing these facts, the third hypothesis of the study is:

H3: Cognitive and organizational flexibility have a significant role in competitiveness

3 Research Methods

The study utilizes a mixed approach, which consists of a close-ended questionnaire (Table 1) generated from profuse literature, and interviews with managers and leaders, by random sampling method. The data universe consists of 300 respondents from various health sectors located in Dubai, UAE. The first task was to do

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descriptive statistics to estimate the reliability and validity of the measures used in the research. Initially, an input model was created using AMOS 18 graphics. Later, the study tested the proposed research model by assessing the contributions and significance of the manifest variables' path coefficients. SPSS 20.0 was used to analyze the response from the sample. Another measure, Structural Equation Modelling (SEM) provides a confirmatory approach to the analysis of a structural theory bearing on some phenomenon. Moreover, the hypotheses are statistically tested to examine their consistency with the data through the goodness of fit measures. This allows the examination of a series of dependence relationships between exogenous *(independent)* and endogenous *(dependent)* variables simultaneously. This was done using the two-stage analysis in which the measurement model is first estimated and then the measurement model is kept fixed in the next step in which the structural model is estimated. The justification for this approach is that accurate representation of the indicators' reliability is best accomplished in two steps by avoiding the interaction of structural and measurement models. According to the usual procedures, the goodness of fit is measured by checking the statistical and substantive validity of estimates, the convergence of the estimation procedure, the empirical identification of the model, the statistical significance of the parameters, and the goodness of fit to the covariance matrix. A level of 0.05 was established, as a priority, for determining significance. Stratified proportional sampling was used in collecting the data as the study consists of employees from varying demography, which helps to recognize the disparity in employees' outlooks on mentioned latent variables.

4   Analysis of Data

As mentioned earlier, a Likert point scale questionnaire was distributed amongst the employees from the selected companies, and the related latent variables are expressed in Table 1 below;

Table 1

Measures for latent variables

Latent Variables	Related Factors
Cognitive flexibility	Q1. Do you have opportunities for systems development through inputs, processes, feedback?
	Q2. Do you have enough opportunities for competencies through skill and knowledge development?
	Q3. Do you have opportunities to work with leaders, managers, customers at your organization?
	Q4. Do you have opportunities to work in a team-learning environment?
	Q5. Do you have shared culture, values, and norms in your organization?

	Q6. Do you have enough opportunities for technological advancement competencies through skill and knowledge development?
Organizational flexibility	Q7. Do you have a strong urge for learning from observing others, managers, leaders?
	Q8. Is your work monotonous or time-consuming?
	Q9. How extent you are socialized (informally) with your team?
	Q10. Do you have a flexible work environment?
	Q11. Are you creative/innovative in your workplace?
	Q12. Does your company emphasize suitable rewards?
	Q13. Do you have a strong social network?
Flexible work design	Q17. Do you have specific policies and strategies approved and well communicated by the top management?
	Q18. How do you feel about your commitment to the organizations' mission?
	Q19. How well does the organization forecasts project, deadlines, and workloads?
	Q20. Does your company provide coordination in teamwork?
	Q21. Does your organization have performance appraisal and employee development methods?
	Q22. Does your organization update in information- and communication system?
	Q23. Do you feel that your company values your ideas and work?

Source: literature review

4.1 Reliability Test

The reliability test in research reduces the bias and more transparency for the qualitative research. If the reliability and validity of the research are not assessed, it will be impossible to describe the effects of measurement errors on theoretical relationships that are being measured (Forza, 2002) [47].

Table 2
Reliability Test

Variables	*Cronbach's Alpha*	*Number of Items*
Cognitive flexibility	0.652	6
Organizational flexibility	0.786	7
Flexible work design	0.757	7

Source: Data Analysis

The values for each variable are above 7 and thus, it confirms the reliability of the factors for the study.

Table 3
Model fit Indices for CFA

Variables	χ^2	DF	P	Normed χ^2	GFI	AGFI	NFI	TLI	CFI	RMR	RMSEA
Cognitive flexibility	19.56	14	0.14	1.397	0.98	0.96	0.96	0.98	0.99	0.006	0.036
Organizational flexibility	16.64	8	.58	0.830	0.99	0.97	0.97	1.02	1.0	0.009	0.00
Flexible work designs	17.59	7	0.01	2.513	0.98	0.93	0.97	0.95	0.98	0.008	0.071
Recommended value				<5	>0.9	>0.9	>0.9	>0.9	>0.9	<1	<1

It is clear from the above table that significance level has reached for all attributes taken for the study. The measurement model is good enough to conduct this study as the value of fit indices reaches its recommended value. To confirm, the regression coefficients for each variable were also analyzed, which are tabulated in Table 4 to Table 6.

Table 4
The Regression Coefficients – Cognitive flexibility

Latent Variables (Dependent Variable)	Constructs (Independent Variables)	Regression Coefficient	t	P	Variance explained (%)
	CF 1	0.172	2.994	0.013	2.9
	CF 2	0.599	11.92	<0.001	52.4
Cognitive flexibility	CF 3	0.423	7.778	<0.001	17.9
	CF 4	0.748	16.689	<0.001	56.0
	CF 5	0.872	23.117	<0.001	76.1
	CF 6	0.754	17.121	<0.0001	57.5

The table confirms the significance level of all measures in cognitive flexibility, except for CF 1 (0.013). The regression coefficient for all factors, except systems development opportunities, are greater than 0.4.

Table 5
The Regression Coefficient – Organizational flexibility

Latent Variables (Dependent Variable)	Construct (Independent Variable)	Regression Coefficient	T	P	Variance explained (%)
	OF 1	0.724	15.786	<0.001	52.4
	OF 2	0.146	4.328	0.003	6.1
Organizational flexibility	OF 3	0.599	11.919	<0.001	35.9
	OF 4	0.586	11.573	<0.001	34.3
	OF 5	0.713	15.394	<0.001	50.8
	OF 6	0.652	12.321	<0.001	42.5
	OF 7	0.787	16.382	<0.001	53.2

Except for OF 2 (p-value 0.003), all other attributes show their significance in organizational flexibility as the value is <0.001. For the factor, monotonous or time-consuming tasks, the value is 0.1, and for all other factors, it is above 0.4.

Table 6
The regression Coefficients – Flexible work-designs

Latent Variables (Dependent Variable)	Construct (Independent Variable)	Regression Coefficient	T	P	Variance explained (%)
	FWD 1	0.417	7.653	<0.001	17.4
	FWD 2	0.483	9.080	<0.001	23.3
Flexible work-designs	FWD 3	0.512	9.745	<0.001	26.2
	FWD 4	0.814	19.625	<0.001	66.3
	FWD 5	0.598	11.892	<0.001	35.7
	FWD 6	0.118	2.043	0.042	30.1
	FWD 7	0.549	10.632	<0.001	23.3

It is clear from the table that the construct FW 6 has a regression coefficient of less than 0.4. Hence, only this construct has no significant influence on flexible work designs. It is clear that the P-value is less than 0.001, except for the updated communication system and thus it proves the significance level of variables for flexible work-designs.

4.1 Hypothesis Test

As a next step, the study analyses the hypotheses, H1 to H3. The following Table 7 establishes the influence of two latent variables on flexible work design in organizations.

Table 7
Model fit Indices for CFA-Flexible work-design

Variable	χ^2	DF	P	Normed χ^2	GFI	AGFI	NFI	TLI	CFI	RMR	RMSEA
Flexible work-design	0.471	1	0.493	0.471	0.999	0.992	0.999	1.005	1.000	0.023	0.000

The value of the fit indices specifies a sensible fit of the measurement model with data. Moreover, the regression coefficient for dependent and independent variables is presented in Table 8. It proves that cognitive flexibility has a significant impact on flexible work design as the standardized direct effect is greater than the recommended value (0.4) and it is clear from the above table the values like 0.76. Similarly, the value of organizational flexibility is 0.85 and validates its significance level. Moreover, the values for reach the significance level as p-value is <0.001 and

the reliability as 0.59, 0.61, and 0.54 for cognitive responsibility, organizational flexibility, and flexible work-design, respectively.

Table 8

Regression Coefficient – Flexible work-design variables

Path	Regression coefficient	t	P-value	Variance explained	Average Variance Extracted	Composite Reliability
High-involvement work systems → Flexible work-design	0.904	25.742	<0.001	81.8		
Career developments → CA	0.979	39.171	<0.001	95.8		
Increased productivity → CA	1.001	65.500	<0.001	100.2	91.1	0.60
Less turnover → CA	0.945	30.725	<0.001	89.3		

Table 8 clarifies that the p-value for all the factors has the significance level (<0.001) and reliability as 0.60.

5   Findings and Recommendations

Categorically, the study throws light on a new strategy development related to flexible work design in the selected healthcare sectors. The findings explain the successful accomplishment of the objectives mentioned in the introduction part as the values of all latent variables reach their significance level. The flexibility model, certainly, can act as leverage in the mindset of employees towards their motivation, engagement, and talent management (Treiu, 1992). The values of the Confirmatory Factor Analysis (Table 4), proves the association of each attribute to latent variables such as cognitive flexibility and organizational flexibility in organizations as the values reach their recommended value. Moreover, Table 5 confirms the regression analysis and significance level of cognitive flexibility in selected organizations as all the values are <0.001, except for CF 1. This confirms the need for psychological contracts in organizations. Organizations should equip employees with adequate skills, knowledge, and competencies to meet the demands of the organizations through flexibility (Rosseau, 1995). Also, Table 6 proves the correlation of organizational flexibility, where all attributes, except OF 2, reached the significance level as the value is <0.001. It supports the view of the structural approach in the physical environment for career advancements, training, and development of informal and formal systems (Ingham, 2006). Furthermore, the regression analysis shows a positive impact on flexible work designs for all factors, except FWD 6,

which achieved the recommended value. (Table 7). The selected models for this study underline the tangible and intangible values as well as individual and organizational facets in the selected organizations. Therefore, the findings reinforce the concepts in developing organizational and cognitive flexibilities in organizations (Atkinson, 1984).

The findings of hypothesis tests from Table 7 verify the significance of each latent variable to the flexible work-design model. Moreover, it illustrates the relationship between attributes and related variables of the study. The results confirm that cognitive flexibility in selected organizations has a significant influence on flexible work design as a standardized direct effect of this construct is 0.755, which is more than the recommended value of 0.4 (p-value is significant). Hence, hypothesis, H1 has been accepted and it proves that employee value propositions are imperative in cognitive flexibility. Thus, the study proves that the employee values through cognitive flexibility enhance individuals' ability to widen their personal interests. This, in turn, increases career responsibilities and personal interests and reduces stress. It provides greater satisfaction and improved motivation (Ingham, 2006).

Likewise, the result of organizational flexibility is 0.85, which attains the significance level. Thus, hypothesis, H2, has been accepted. While considering the relevant factors too, the outcome clarifies the significance as the p-value is <0.001. It proves that the management should update with the knowledge transfer internally and externally, increase the coordination with the peripheral groups by sub-contracts or part-time (Scarbrough & Swan, 2003). This can not only develop the core groups but attract new talents into the core group. This can create a hybrid of the core-periphery model. Thus, the selected companies should develop competitive management practices in creating relationships and knowledge-sharing externally. This leads to team building, self-managed work teams, High-involvement work systems. Additionally, employees feel more satisfaction, quality work-life, less turnover.

The findings from Table 8 elucidates that the p-value for all the factors, which are the outcome of flexible work design, have the significance level (<0.001).

Hence, hypothesis, H3 has been accepted and this confirms that organizational strategies in work design, incentive practices, and flexibility direct to high-involvement work processes (HIWP). By achieving organizational goals, the employees can develop their career goals by promotions and upgrading their skills. This in turn increases psychological work relationships and organizational effectiveness. Thus, it reduces staff turnover, more satisfied employees, and better quality of work life. Even though with a lot of critics in the literature on the implementation of a successful Flexi model, this study clarified the significance of cognitive and organizational flexibility in the selected companies (Burgess, 1997; Atkinson, 1984; Ingham, 2006).

Conclusions

The present study discusses the development of a flexible work designs model in businesses and the factors to be considered by the management, in expanding their tactics, to capture full capacities. It reveals the success of proper incorporation of cognitive and organizational flexibilities. Moreover, the CFA establishes the relationship between each sub-variable to its dependent variables. The result sheds light to the employment relationship and long-term commitment in creating intrinsic and extrinsic factors. Of course, this cannot happen overnight, so it necessitates deep understanding and tactic rules. Moreover, other sectors can be taken for further studies for a wider perspective in a long-term basis. Concisely, the study can develop employees' competencies and enhancement level through structural changes. This can create change management and talent management initiatives towards a competitive advantage.
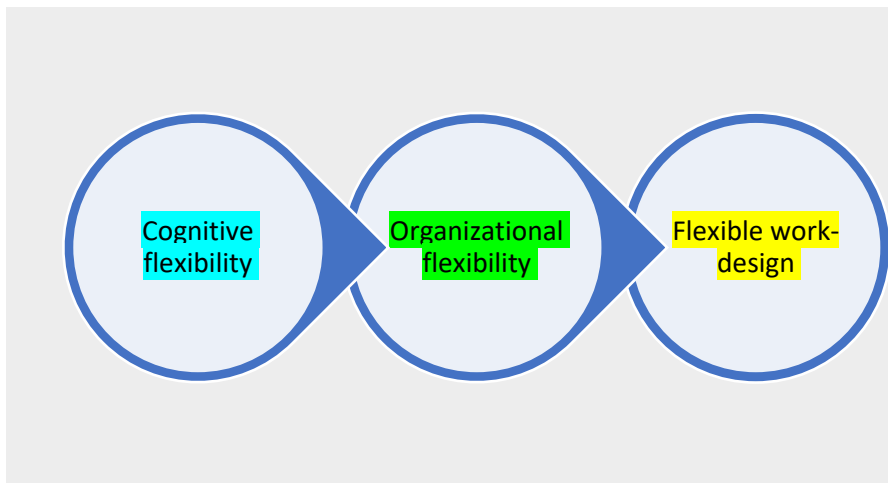

Figure 1

A flexible work-design

Source: Study from the findings

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Customer Preferences in Bank Selection before and after the Pandemic in the Light of Financial Culture and Awareness

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Abstract: The concept of financial culture and its importance is one of the most popular topics today. Financial knowledge and awareness are necessary in every aspect of life. It is important not only when choosing a bank account type or taking out a loan, but also when conducting conscious financial activities. The recent crisis underscores the damage that can be caused by a lack of financial literacy and awareness, and the devastation that can be caused by irresponsible financial decisions. Lack of economic awareness and knowledge can cause enormous damage to the economy, lead to irresponsible economic decisions, projecting solutions over the years or even generations. This was perfectly illustrated following the 2008 crisis, with the collapse of a series of recklessly taken out credit products. More than ten years later on, a large number of research and studies have been written to promote financial literacy (Németh, 2017), but these have typically ended up in 'desk drawers', scattering any substantial progress. Even today, public education is still not equipped to effectively impart financial literacy. The lack of financial literacy was demonstrated by the crisis caused by the coronavirus epidemic. Unexpected and unforeseen closures have highlighted new aspects of financial literacy. The emergence of home-based finance has led to a reassessment of previous financial decisions, including the selection of bank service providers. The objective of this paper is to show bank selection preferences as a function of financial culture before and after the crisis by highlighting the most important factors for customer loyalty based on the results of a primary research.

Keywords: financial literacy; financial culture; financial decision; digitalisation; bank services

1   Introduction

Financial decisions are decisions about financial and monetary instruments that are based on sound financial knowledge. Today's homo economicus (economic man) should be able to do this in a rational and standardized way, along the lines of textbooks and theories, and based on classic characteristics. However, every day Homo sapiens in real life have limited rationality due to lack or limited knowledge and understanding. However, this limited rationality also has an impact on daily life and daily decision-making. The limited or lack of financial socialization and

financial knowledge means that the information needed to make rational decisions cannot be obtained. The low demand for such information and lack of motivation can make the situation more complicated. One of the biggest crises of the modern era, the 2008 crisis, has highlighted the importance of financial literacy. Numerous studies and research have shown that the low-level of financial literacy and the lack of financial literacy played an important role in the prolonged [1]. Financial decisions made as a result of for-profit banking practices with no financial literacy have put many financial institutions on the verge of bankruptcy, collapse and failure. The resulting crisis has led governments to seek solutions to the situation, aimed at stabilizing markets but also undermining confidence in the banking system. More than ten years after the economic crisis, knowledge of finances, money and related skills has become increasingly important, almost part of our lives. Nevertheless, the theoretical and practical financial competence of Hungarian households and companies still lags behind in an international comparison [2] [3] [4] With the advent of FinTech companies, banks are spurring innovation to add useful elements and digital support to banking. Until the 2000s, the banking sector was considered one of the most innovative sectors. This was reflected in digitalization, the proliferation of digital solutions, customer experience, and convenience services. However, the emergence of high-tech and FinTech companies after the turn of the millennium pushed traditional banks into the background, exacerbated by the lack of resources and liquidity due to the crisis [5]. According to some studies, the main purpose of banks during this period is not innovation and innovation, but mitigation of damage [6] [7], resulting in a huge loss of blood. Efforts to minimize losses and relieve loans that had failed deprived companies of energy for innovations and left room for FinTech companies to demonstrate their motivation and ability to innovate. FinTech companies have penetrated the market for common banking services such as account management and payment services, but also for investments, loans and insurance. FinTech companies that can innovate on a daily basis mean a challenge for traditional banking systems to catch up with them [8] [9]. The banking system is a very tightly and widely regulated sector, leading to more stringent operations and actions compared to their agile competitors. That is why the banking system faced the new challenge of competing with FinTech companies after recovering from the effects of the crisis. The innovative solutions implemented by banks are responding to market changes, but they are doing so more inflexibly and with a delay compared to their peers that are dictating the competition. This is why customer segmentation, the development of customised service offerings, the expansion of time-saving digital transactions and the reduction of bank waiting times have become important activities in order to meet the expectations of their [10]. The coronavirus pandemic, which escalated in 2020, and the subsequent closures and tightening of regulations, has only reinforced the situation described above. The present study also explores this issue while seeking to answer the question of which factors play a role in selecting a bank, what factors serve as the basis for the selection of a bank by each customer group by highlighting the main correlations and influencing factors.

2   Literature Review

2.1   A Diverse Approach to Financial Culture from the Turn of the Millennium to the Present

Individual cultural characteristics are formed through learning and socialization. This is no different for financial culture and financial attitudes. It takes decades for a behaviour pattern to become part of a culture. In this process, the family plays a very important role. A number of studies have shown that the younger generation learns about money management, attitudes, aspects and risk-taking behaviour patterns from their parents, and the family is the main source of this information and shaping their attitudes [11] [12]. In view of this, we should first clarify the concept of financial socialization in the context of financial culture. Financial socialization is the ability to acquire all relevant theoretical, behavioral, emotional and material information that contributes to personal financial knowledge, skills and abilities. The main source is the family, the group of relatives and friends, supplemented by professional organizations and educational institutions [13]. The influence of the media should also be added to the above list [14]. Inherited patterns are incorporated into financial decisions, shaping individuals' attitudes towards money and the way they deal with financial issues, which is embodied in both attitudes towards banking and money management. Personal responses to certain stimuli are shaped by financial experience, which further reinforces the importance of financial socialisation [15]. Gutter et al [16] emphasized in their paper that individuals acquire financial skills in society and learn from them, making people who we live together with an authoritative model. Due to the abundance of money and perceived unlimited resources before the crisis, certain age groups were socialized without understanding the value of money or knowing its value, because they were told through various channels that the wealth they wanted can be obtained through obtaining loans. In the run-up to the crisis, Johnson and Sherarden [17] pointed out that the younger generation needs to be involved in the preparation of the financial process through the education system or when planning the family budget. Osana and his colleagues [18] have expressed similar views before. They argued that this would give young people a greater sense of responsibility.

If we want to look at a single definition of financial culture, it is important to note that there is no universally accepted and inclusive definition. The definition of financial literacy is served by the agreement on the development of financial literacy reached between the National Bank of Hungary and the then, State Financial Supervisory Authority (FSA) in April 2008 on the development of financial literacy prior to the crisis as "the level of financial knowledge and skills that enables individuals to identify and, once acquired, interpret the basic financial information necessary to make informed and prudent decisions and to make decisions on that basis, assessing the possible future financial and other consequences of their decisions". This definition was expanded by the crisis and subsequent recession [19].

Atkinson and Messi [20] define financial literacy as the set of knowledge, skills, abilities, attitudes and forms of behaviour that are required to make sound financial decisions, both individually and in the community. According to Béres and Huzdik [21] financial literacy refers to financial knowledge (financial literacy), financial knowledge and experience, financial skills and financial awareness and should be understood in combination. Holia and Iramani [22] defined financial literacy in terms of behaviour. In their opinion, it can be conceptualized in terms of a person's attitude towards day-to-day finances (financial planning, budgeting, control, spending, money management and savings).

Luksander et al. [23] define financial literacy as the ability to process financial information and make sound financial decisions. Suganya and co-authors [24] see the essence of financial literacy as a set of knowledge for individuals to maximize their lifetime financial well-being. According to Süge [25], the concept of financial literacy contains all the elements that help people navigate financial issues and thereby generate their financial well-being. Amagir and colleagues [26] define financial culture as a combination of three elements. They define it as a combination of knowledge, behavioral patterns and attitudes. The author also defines several factors in financial culture and attitudes towards finance in different ways from the perspective of behavioral economics. According to Mien and Thao [27], financial behaviour is determined by attitudes, knowledge and external control. In our model [28], which is based on these findings, we interpret financial literacy as a combination of three factors.
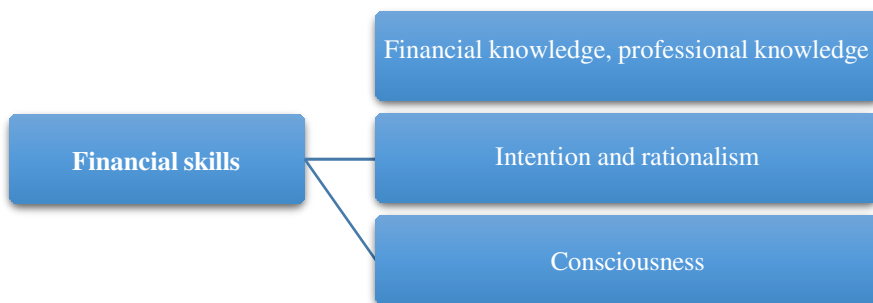

Figure 1

The components of financial capability that define financial culture

Source: Csiszárik-Kocsir et al., 2016

In terms of financial literacy, it is definitely a combination of skills, abilities, knowledge and behavioral factors that can enhance personal happiness and well-being, improve their sense of security, and enable them to make rational decisions. There is a consensus in the profession that financial socialization is essential to financial literacy, so education is inevitable. This research also aims to study its role in influencing financial education. This is why Grifoni and Messy [29] capture the essence of this concept as an indispensable skill today. Compared with a few years

ago, today's individuals and families need more skills [30]. Several studies have addressed the role of education in financial awareness [31] [32]. Such knowledge has become indispensable for individuals who know and understand modern financial processes and are able to adapt to change. Basic financial literacy imparted by educational institutions has a positive impact on responsible financial decisions [33] [34], but it has also been shown that good basic financial literacy does not in itself lead to good financial decisions, as it requires an individual's attitude [35] [17]. Financial literacy is also reflected in making the right life- long decisions such as saving for retirement, but it also includes saving, investing and borrowing. Financial literacy improves retirement planning, the ability to prepare for retirement in a thoughtful way [36], and the ability to rationally manage savings, stock market and bank investments [37]. The acquisition of financial knowledge should thus be seen as a long-term investment.

Low levels of financial literacy have been a problem in our country for many years. Despite numerous studies and initiatives, research has shown little success. Research data on the financial culture of OECD countries, which have been identified by many researchers, continue to point to shortcomings in our country. The 21 points assigned to three factors studied by the OECD: knowledge (0-7 points), behaviour (0-9 points) and attitude (1-5 points) places Hungary in the lower middle category. In the 2016 measurement, we scored 12.5 points, which, while not increasing for the next measurement in 2018 as a result of numerous awareness-raising programmes, initiatives and research, decreased slightly. Countries that can be seen as direct competitors or neighbours, such as Austria, which is almost two points higher than our country (14.2-14.4), the Czech Republic, which is at a similar level to us (12.5-12.9), Poland, which started from a lower level, but has jumped enormously (11.6-13.1), or Croatia, which has a lower score than us (12.1-12.3), have also improved their ranking in recent years. All this shows that Hungary has room for improvement in terms of financial culture, knowledge, behaviour and attitudes.
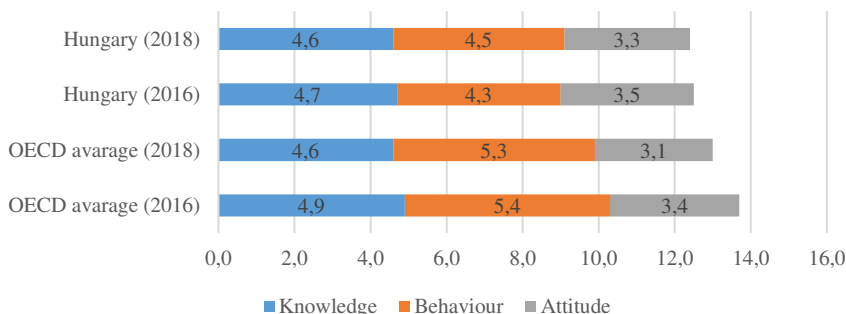

Figure 2

The state of financial culture according to the OECD survey

Source: author's own editing based on [38] [39]

As with all decisions, there are costs and benefits. Several studies have investigated the long-term benefits of investing in financial knowledge. Japelli and Padula [40] concluded that individuals who invest in financial education can enjoy higher wealth growth than individuals who do not. They also showed a positive relationship between wealth growth and financial literacy.

Financial education is most effective if it points out practical aspects that assist the individual to react immediately in certain situations. Demonstrating through practical examples is much better in terms of retaining knowledge. Several studies have shown that people who have been involved in financial product decision-making from a young age will certainly have greater awareness of these issues when they grow up [41]. Programmes aimed at raising financial awareness mainly focus on household budgeting, savings management, and borrowing. Unfortunately, banking services receive little attention in the curriculum. And it is exactly on this area that the coronavirus epidemic has had an impact and reduced the financial security of individuals and families [42], which could have been improved by the knowledge that individuals gained from knowing more about financial services, quasi-lifebelts.

2.2 The Combined Impact of Financial Awareness and Digitalisation on the Banking System in the Light of the Pandemic

With the exception of the 2008 crisis, the rise of digitalization has most prominently highlighted the importance of financial knowledge. Although the banking system recovered very slowly from the 2008 crisis, it is still working hard to restore stability and establish a credible image of itself, the companies that emerged in the background could quickly and effectively respond to new customer needs due to their agility. The banking system, squeezed by the crisis, had almost no development resources before the mid-2010s, leaving room for innovative new market players. Since the mid-2010s, smartphones have become more popular, and the scope of online transactions has also expanded. Along these processes, the banking system recognised that it had to learn from new competitors, and vice versa. The disappearance of national borders through digitalisation, the ever-expanding range of financial products and the emergence of FinTech companies have laid the new foundations for assessing traditional banking services. The digitisation of financial services has been ongoing for several years, gradually bringing many areas of banking online, from day-to-day financial management to account management [43].

Hatami [44] outlines five options in connection with the future of banks (cited in [45]):

– "A better bank": they have recognized challenges, tailored operations to the clients' needs, connected with customers via digital channels,

retained the majority of their customers, and equipped their staff to meet the new challenges.

– "New bank": the old banks have lost out to the competition, as they have lost some customers, who have flocked to new, faster, more agile banks that can serve their needs better.

– "Shared banking": new businesses have emerged in parallel with competitors, carving out a slice of traditional banking businesses. They do not want to act as a bank, leaving room for classic institutions, but only providing specific activities to their customers.

– "Background bank": they provide only back-up support, supervision and licensing, with significant risk-taking.

– "Disintermediated bank": customers, disliking their bank, increasingly switched more banking services to their preferred providers. In their case, they felt they were more trusted and less abused than their banks. However, in the background, banks are still at work, providing services but no longer owning their customers.

Most banks have realized that it is difficult to keep up with the agile FinTech companies with huge innovation capabilities. 81% of European banks believe this is an appropriate step to collaborate with them to innovate systems and processes, 8% are considering developing them independently, 6% are considering outsourcing their core processes, and the remaining 5% consider it suitable to create their own neobank (MNB, 2020). All of this shows that banks see the importance of digital challenges and are considering solutions to ensure that the best solution is the above-mentioned scenario. Responding to digitalisation challenges requires not only rapid technological development or unpredictable events, but also generational changes.

As the younger generation grows, the need for digitalization will continue to increase. Visiting a bank branch seems like an extreme activity for Generation Z, who is called the "always online" generation, but the late Generation X and Y, who dominate the world of work, have the same policy. The pandemic has even reinforced this. However, the demand for digital solutions also varies greatly with individual financial literacy, risk tolerance, age and education. An Accenture 2019 survey [47] categorized bank customers and distinguished the following four types.

– Pioneers: who are risk-takers, open and receptive to innovative solutions and not intimidated by technology. They are mostly Generation Z and late Generation Y young people, whose lives are dominated by mobile phones and a constant online presence. They are eager to try new things, new channels, but also to take risks for greater rewards.

– Pragmatists: they see technology as a tool, they do not live their lives in the expansion of digital platforms. They are completely satisfied

with the services provided by their banks, they are not open to new things, but if banks personalise them for them, they welcome it.

– Sceptics: they cannot accept such an advance in technology. They are cautious, not to be persuaded by a service, suspicious, difficult and conscious customers for banks. They are Generation Y, the strategic base for banking.

– Traditionalists: they are people centred. They focus on the person, not the convenience of novelty. Typically, they are members Generation BB and X. They are sceptical, suspicious and not very satisfied with the activities of financial service providers.

The outbreak of the coronavirus epidemic in 2020 and its aftermath has only reinforced this trend. Accenture's 2020 report [48] on digital channel usage published the following statistics before and after the pandemic. The graph shows the channels through which customers interacted with their banks.
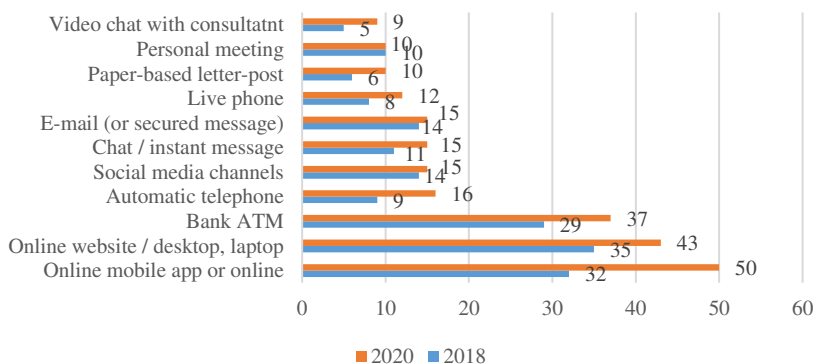

Figure 3

Use of digital channels before and after the pandemic (%)

Source: author's own editing based on [48]

The figure above is a perfect illustration of coercive digitalisation and its advancement. However, the domestic banking system is still in the midst of progress. As a result of the pandemic, loss aversion occurred again, depriving major development projects of resources. In parallel with the banking system, domestic FinTech companies are gaining strength in specific areas, posing a real threat to slow-moving banks.

The figure below shows the distribution of domestic FinTech firms by service, as a way of concluding the theoretical overview and setting the scene for related research.
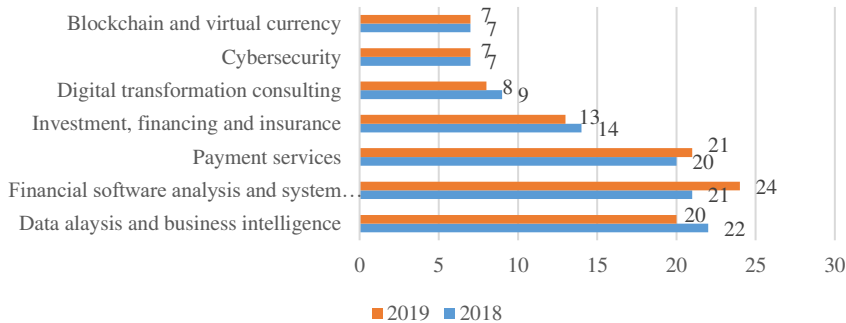
Figure 4

Distribution of FinTech companies by range of services (%)

Source: author's own editing based on [46] [49]

3   Material and Method

After introducing the subject through literature review as a form of secondary research, this article presents the results of primary research carried out in 2020. The study was conducted using pre-tested standardized questionnaires. The sample of respondents was recruited using a snowball method, resulting in the present sample of 6804 respondents presented in the paper. The questionnaire was the result of a prior, preliminary qualitative research. The research instrument contained only closed questions for better evaluation. Based on the experience of the previous surveys prior to the research, the present form of the questionnaire was developed, covering several aspects of financial awareness (attitudes, money management, bank selection, staying loyal to a bank, competencies) in the context of the coronavirus pandemic. Data collection took place between May and August 2020. The survey was conducted online, ensuring respondents' anonymity. The sample is not considered representative, but it provides the opportunity to lay the foundations for a future representative study. The results of the questionnaire presented in this study were obtained using SPSS 22.0 software. The obtained results are presented according to whether the respondent had previously participated in financial education.

The literature review stressed the importance of financial literacy. This is becoming more and more important due to the need for digitalization. This paper seeks to answer the question of how well these factors are reflected in the views of domestic respondents. In line with the literature review above, this paper seeks to answer the question of how participation in former financial education affects customer preferences and what factors determine the selection of an individual banking

service provider together with the fact of how these preferences have changed as a result of the pandemic. The paper tests the following hypotheses.

H1: The pandemic has also increased the need for digitalisation among respondents, which is stronger for individuals who are financially educated beforehand.

H2: Respondents who have previously received financial education have not selected and do not choose a financial service provider on emotional grounds.

Men accounted for 50.5% of the sample and 49.5% of the respondents were women. In terms of educational attainment, 7.1% of respondents had primary education, 57.4% had secondary education, 26.2% had BSc title and 9.3% had MSc. 43.1% (2934) of the sample had previously participated in financial education, while the other half of the sample, 56.9% (3870), had not participated in financial education prior to responding. Cross tabulation analysis, calculation of Chi-squared values and adjusted standardised residual values are used to evaluate the responses.

4 Results

The questions raised in this article are intended to answer the extent to which previous financial education has affected customers' selection of banks. In terms of the factors presented, a separate question examines the changes before and after the coronavirus pandemic. Based on the views of the interviewees, the possible answers include the factors that were most frequently raised in the qualitative research before the questionnaire. In this study, the term "pre-pandemic" refers to the period before the lockdown due to the 2020 pandemic and the period before the setback due to the coronavirus pandemic, while the term "post-pandemic" refers to the period after the economic recovery after the pandemic, the period after the temporary normalisation of the situation. The following factors were included in the questionnaire with regard to the selection of banks.

- The speed of banking,
- Opening hours of the bank,
- The price of the services offered by the bank,
- The banking services of the residence,
- The range of online, home-based services offered by the bank,
- The expertise of the bank teller,
- The kindness of the bank teller,
- The reputation of the bank and
- Reliability of the bank.

The first thing to look at is the frequency of responses, which is illustrated in the figure below, showing the results as a percentage of responses.
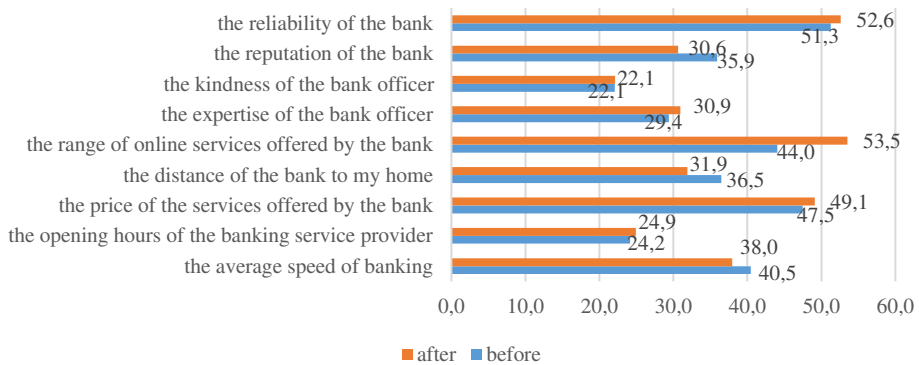

Figure 5

Perception of factors influencing bank selection before and after the pandemic (% of respondents)

Source: author's own research and compilation, 2020, N = 6804

The frequency of each response shows that bank reliability was the main criterion for selecting a bank before the epidemic (51.3%). The background of financial socialization is clearly manifested here, since the reliability of banks is, first of all, one of the pieces of information that comes from the circle of people we consider. The opinions of friends, family and relatives are the main source of information for assessing the reliability of a bank, followed by objective information from professional or other sources. The price of banking services was ranked second (47.5%), where again respondents' financial awareness is shown by respondents. Third place was given to the range of services available online, from home (44%) in terms of perceptions before the epidemic. A less important factor for respondents before the crisis was the friendliness of the bank teller, the opening hours of the branch, or even the competence of the bank teller.

After the crisis, online services were clearly the first choice for banks (53.5%). Literature reviews show that this is a dangerous factor for banks, as FinTech companies are at the forefront of this issue, as opposed to bank players who have been shrugging off the effects of the pandemic. They can move services to online platforms that banks currently cannot. This factor will not change in the future, as the risk of the same kind of closure that we saw in 2020 will arise from time to time. Reliability (52.6%), which was previously ranked first, is second only due to the coronavirus pandemic, up 1.3 percentage points on the previous result, reflecting respondents' fears. The third place was for the cost of services (49.1%), which, although small, is an indication of the loss of income due to the pandemic and the worsening of the living conditions of certain groups. Even less important in the selection of a bank after the pandemic is the kindness of the person in charge, just

as the opening hours of the branch are not important, as much more rational factors dominate respondents' preferences. The results are examined in more detail in the two tables below.

Table 1
Bank selection preferences and their change in relation to previous financial education before the pandemic

	total	with previous financial education N=2934	difference	without previous financial education N=3870	difference
the average speed of banking	40.5	41.1	0.6	40.0	-0.5
the opening hours of the banking service provider	24.2	23.8	-0.4	24.4	0.3
the price of the services offered by the bank	47.5	50.3	2.8	45.3	-2.2
the distance of the bank to residence	36.5	36.4	-0.1	36.6	0.1
the range of online services offered by the bank	44.0	48.9	4.9	40.3	-3.7
the expertise of the bank teller	29.4	27.9	-1.5	30.5	1.1
the kindness of the bank teller	22.1	20.7	-1.4	23.1	1.1
the reputation of the bank	35.9	40.2	4.2	32.7	-3.2
the reliability of the bank	51.3	56.2	4.9	47.5	-3.7

Source: author's own research and compilation, 2020, N = 6804

The table displays the factors that are much more prevalent among respondents who have studied finance in the past compared to the sample. In terms of selecting a bank, before the pandemic there was a stronger demand for the reliability and perception of the bank, as well as a higher demand in terms of the services provided and the price and speed of banking. Respondents who had not previously studied finance showed a stronger emotional need for the kindness and expertise of the bank officer (teller). The distance from the branch and its opening hours is also an important factor, so convenience is the main consideration. The facts above reflect the previously envisionaged financial consciousness, and those who have previously gained financial education seem to have chosen a financial service provider on the basis of more rational considerations, compared to less financially educated respondents, where convenience and emotional considerations were more dominant.

Regarding the post-pandemic aspects, the same four factors were more strongly represented for better educated respondents although the difference was reduced in terms of sample mean. A new factor also emerged, namely, the need for the expertise of a bank teller, which became more important for respondents who had previously studied finance.

Table 2

Bank selection preferences and their change in relation to previous financial education after the pandemic

	total	with previous financial education N=2934	difference	without previous financial education N=3870	difference
the average speed of banking	38.0	39.5	1.6	36.8	-1.2
the opening hours of the banking service provider	24.9	22.5	-2.4	26.8	1.8
the price of the services offered by the bank	49.1	52.4	3.3	46.6	-2.5
the distance of the bank to residence	31.9	31.8	0.0	31.9	0.0
the range of online services offered by the bank	53.5	57.0	3.5	50.9	-2.6
the expertise of the bank teller	30.9	31.6	0.7	30.4	-0.5
the kindness of the bank teller	22.1	20.2	-1.9	23.5	1.4
the reputation of the bank	30.6	33.9	3.3	28.1	-2.5
the reliability of the bank	52.6	56.4	3.8	49.7	-2.9

Source: author's own research and compilation, 2020, N = 6804

For respondents with no financial education, the latter factor was not significant, and they kept on considering the purely convenience aspects where they showed high values (friendliness, distance, opening hours).

The following part examines whether there is a statistically measurable relationship between previous participation in financial education and bank selection, and which groups perform above or below the expected level. For this purpose, Chi-square values are calculated and adjusted standardised residual values (AdjR) are also examined.

Prior to the pandemic, there was no statistically verifiable correlation between bank selection criteria and previous financial education for only three factors. Therefore, previous financial education has no statistically verifiable impact on selecting a bank branch based on distance, business hours, or speed of banking. More respondents with previous financial education than expected selected the price of services, the range of services available online, the reliability of the bank, and the perception of the bank as determining factors. Respondents without financial education prioritized more than expected the kindness and expertise of bank employees. Therefore, what was previously assumed was statistically confirmed, i.e., having financial knowledge makes us more rational in selecting a bank than not having it, when decisions are made on emotional considerations.

Table 3

Bank selection preferences associated with previous financial education before the pandemic

	Chi-square	AdjR with previous financial education N = 2934	AdjR without previous financial education N = 3870
the average speed of banking	0.358	0.9	-0.9
the opening hours of the banking service provider	0.532	-0.6	0.6
the price of the services offered by the bank	0.000	4.1	-4.1
the distance of the bank to residence	0.890	-0.1	0.1
the range of online services offered by the bank	0.000	7.1	-7.1
the expertise of the bank teller	0.018	-2.4	2.4
the kindness of the bank teller	0.016	-2.4	2.4
the reputation of the bank	0.000	6.4	-6.4
the reliability of the bank	0.000	7.1	-7.1

Source: author's own research and compilation, 2020, N = 6804

Table 4

Bank selection preferences associated with previous financial education after the pandemic

	Chi-square	AdjR with previous financial education N = 2934	AdjR without previous financial education N = 3870
the average speed of banking	0.020	2.3	-2.3
the opening hours of the banking service provider	0.000	-4.0	4.0
the price of the services offered by the bank	0.000	4.8	-4.8
the distance of the bank to residence	0.945	-0.1	0.1
the range of online services offered by the bank	0.000	5.0	-5.0
the expertise of the bank teller	0.283	1.1	-1.1
the kindness of the bank teller	0.001	-3.2	3.2
the reputation of the bank	0.000	5.2	-5.2
the reliability of the bank	0.000	5.5	-5.5

Source: own research and compilation, 2020, N = 6804

In two cases, no correlation could be found along the lines of the data-based change in preferences following the pandemic. Previous financial knowledge does not affect the perception of proximity to a bank branch and does not correlate with the knowledge of the bank teller. Before the pandemic, the latter one was also a factor, but the speed of service was not. Service speed was an interesting factor in the aftermath of the pandemic, as it statistically confirmed the fact that respondents wanted to spend as little time as possible in the branch during the lockdown due to fear of infection. All other factors were also statistically correlated with previous financial knowledge. Respondents with previous financial awareness outperformed the expectations in terms of speed of banking, price of services, range of online services, reliability and perception of the bank. For those without previous financial knowledge, convenience continues to prevail such as the opening hours of the bank branch and the friendliness of the branch manager. These values performed above expectations.

Summary

By means of the secondary and primary data analysis provided, the research sought to answer the question of to what extent financial knowledge and previous financial education acquired affect the selection of financial service providers. The skills and abilities acquired through financial socialization are incorporated into our everyday behaviour to encourage individuals to make more rational decisions. The accelerated digitalization process in the 21st Century has left no economic sectors unaffected. Until the millennium, financial services have been at the forefront of the digital process. However, the mortgage crisis a few years ago has completely changed the situation. Loss aversion and damage mitigation divert the attention and resources of digital projects. Taking advantage of this market niche, financial technology companies have emerged to provide cheaper and better banking services through digital platforms. Just as the development of culture is the result of a long process over decades, digitalisation efforts take time to become a stimulus for all generations.

Research has indicated that previous financial knowledge will indeed guide consumers to make more rational decisions. With awareness, objective and measurable factors dominate. When we are financially aware, the perception of the bank, the range and price of its services and the digital services matter when choosing a bank. On the other hand, decision makers with no financial education and background tend to focus on convenience. These trends have become more pronounced during the pandemic. The importance of increasing demand for digital services, the drive for reliability, and the reduction of face-to-face interactions due to infection risks are obvious. All these factors confirm the hypotheses proposed in this study. Statistical evidence shows that the pandemic has triggered greater consumer demand for digitization, which justifies the first hypothesis. The research has also confirmed that, due to previous financial education, financial culture and financial awareness are pushing the emotional factors of bank selection into the background, giving way to rational decision-making. All this suggests that financial

education is necessary. Formal and non-formal education, in addition to the immediate environment, plays an important role in this regard. More and more people are aware of this, and more and more programmes are incorporating this message. It is a cause for some optimism, which has greatly contributed to the improvement of the criticized financial culture of the Hungarians.

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The Ethics and Factors Influencing Employees Working in the Slovak SME Sector

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Abstract: The roots of the dynamically changing relationship between ethics and entrepreneurship can be found in the past. The ethics of individuals in connection to issues with economic nature had been addressed by Aristotle in ancient Greece. Activities of economic nature and getting wealthy were distinguished. He argued that money cannot serve a purpose to become wealthy, as it is unethical and against the rules of nature. The relationship between ethics and entrepreneurship was first mentioned in the work of Adam Smith (The Wealth of Nations) – "Wise formulation of law has to guarantee that even those who do not possess ethical thinking would act wisely in a fair manner in economic issues". This is the reason why we have developed interest in the relationship of ethics and economy. Herein, we examine 3 hypotheses, formulated as a part of our research, based on 581 obtained responses. The results show that the size of an enterprise influences the existence of ethical institutions. Furthermore, the ethics of the individual, is also influenced by the qualification, while no "real" relationship was detected between the size of company and unethical behavior. Introduction of a Code of Ethics, is strongly advised for the companies.

Keywords: business ethics; corporate ethics; individual ethics

1 Introduction

Ethics are present in everyday human relationships and is one of the cornerstones of civilized societies. Ethical considerations are often missing from theories of traditional economics. However, thanks to modern economic trends, ethics now plays a key role in the life of companies, as well as in the field of knowledge management. Unfortunately, to this day, it is still common for some companies to behave unethically in certain practices and even cover them up with untrue statements that are obvious to everyone, but everyone pretends to be unaware of them. In many cases, they proceed in a completely opposite way of the values revealed. Instead of the values defined in theory, what matters is what the superior of the individual asks for. And this can often only be completed in unethical ways.

Superiors often have expectations of employees that they cannot meet in a timely manner without having to resort to unethical steps. If an individual has moral doubts, he or she may not always report them to his or her superiors, but rather remains morally silent. This includes when an individual needs some knowledge to perform a particular task and accesses that knowledge in an unethical manner. It is also possible for an individual to withhold his or her knowledge from others (e.g., co-workers or superiors) to protect his or her own position. So an employee doesn't necessarily share all of their knowledge in order to remain irreplaceable and not benefit any of their employees. It is important to draw attention to these problems.

Companies should strive to use ethical methods in their day-to-day operations to meet individual, organizational and societal expectations. Legislation and regulations have also evolved due to the growing role of ethics. Companies continue to aim to make the most of the time of their workforce, but there are certain mandatory standards and regulations (for example paid leave, appropriate work environment requirements, safety precautions, etc.) that they are required to comply with. Most of these apply equally to all companies, but there are certain internal regulations and rules that vary from company to company. These are created by organizations to provide security and equal treatment for their employees. These measures create a more positive image of companies, both internally and externally, and can help retain the current workforce and "attract" potential future candidates as well. Through this, they can also acquire new strategic and business partners. All large companies have some level of ethical standards, but the situation is no longer so clear for SMEs. Ethical issues need to be managed carefully by companies, as improper handling of them can lead to ignorance and conflict within the organization.

2   Theoretical Background

Corporate Ethics is indicated as a part of Business Ethics in the international scientific literature. Foundation of corporate ethics dates back to the 1980s in the USA. Before the 1980s, the movement called *"Corporate Social Responsibility"*, dealing with social responsibility of enterprises addressed the issue. Later, the questions of business ethics became discussed with the issue of corporate responsibility, and thus both corporate and ethical aspects became important. It was only later that this discipline became popular in Europe, and it slightly differed in content from the American concept. Corporate ethics is addressing the issue of ethics within the company [9] [20] [25].

Szegedi [32] in his work distinguished different business ethics trends, based in what form and quality ethics is present in the company. The groups were created based on the theory of Ulrich [35]. According to this, 4 trends were identified,

which can be detected in currently operating companies. We would like to present these results below. These trends are ranked according to the importance of ethics, starting with the trend where the role of ethics is the minimum [18] [36].

The first trend is based on the traditional perception of enterprise. This trend can be characterized as the *"concept of two worlds"* [32]. This trend is promoting the ethics-free economy and enterprise. Based on the utilitarian approach, the pursuit of the interest of individuals results in the common good. The main principle is profit maximization. Companies based on this principle were the target of attack, but those supporting this approach believe that it is a legitimate right and duty of the company to maximize profit. Companies have no other moral responsibility. According to Friedmann [11], maximizing profit is the only social responsibility of the company. This approach might sound brave and selfish, but if we examine in broader context, we might change or opinion. According to an expert, it is the duty of the company management to achieve as much profit as possible. This is how the company can fulfill the expectations of company owners and shareholders. If decision is based solely on social responsibility, shareholders receive lower dividends, employees have lower wage or the end users will pay a higher price for purchased products. This approach can be described as immoral as it does not address ethical questions. In this case *"immoral"* means ethical neutrality. The representatives of this trend emphasize that the company has to respect certain rules (e.g., law, mandatory regulations). So, this trend is not encouraging the accumulation of unethical profit [1] [7] [8] [12] [21].

The second trend is known as instrumental corporate ethics, where corporate ethics is perceived as a tool. This trend emphasizes that it is beneficiary to act ethically in terms of finances, but the company has to invest to corporate ethics as well. These steps might improve the commitment of employees and the image of company can improve for internal and external stakeholders. It also means long-term success for the company [37]. The experience shows that ethical behavior pays off, so it is not surprising that this trend is popular in companies. This trend is represented by Angyal [2], who compares ethics to performance that can be sold as a product. According to him, being ethical is expensive, the companies can benefit from being ethical in long-run. He differentiated four types of companies (ideal, robbers, saints and stupid). This differentiation is based on ethical (good, bad) and economic (profitable, unprofitable) dimensions. He emphasized that companies have to concentrate on profitability. According to his model, the behavior of companies falling to categories *"ideal"* and *"robbers"* is acceptable [3].

The trend of instrumental corporate ethics had been widely criticized. Instrumental corporate ethics cannot be called ethics at all, as profit targets are the priority, while ethical goals are subordinated [40]. This is unacceptable. According to Hrubi [16], in terms of this approach we can perceive ethics as a tool of fulfilling the final goal (maximizing profit). According to Lay [19], this approach can be perceived as a hidden trick, where final goal is the *"exploitation"* [12] [22] [27]

The next approach is called corrective corporate ethics, which is associated with the charitable activity of the companies. The trend started in the USA, and emerged as a counter reaction to Friedman's theory [11]. Companies have been a subject to heavy criticism for focusing solely on profit and lacking a sense of social responsibility. As a result of this, most of the companies started to sponsor different cultural, sport, scientific and other activities resp. events. It is important to highlight that even this approach is focusing on maximizing the company profit, but part of the generated profit is generously offered for the mentioned activities/events, so the origin of it is not examined from ethical perspective. Profit maximization should be limited by social responsibility of the company. According to corrective approach, ethical aspects are partly taken into account, which contributed to development of corporate ethics [32]. Goodpaster [13] shares an opinion that the companies should not deny the validity of ethical requirements, but should coordinate them. Priority goal should be the profit maximization, but if any legitimate moral issue arises, the corporate ethics has to be applied. Code of Ethics is a tangible sign of the existing corporate ethics [35]. The management of the company determines the ethical boundaries that limit the pursuit of profit [12] [15] [18] [31] [36].

The fourth approach is the integrative corporate ethics, introduced in Switzerland. The representatives of this trend believe that ethical issues and economic expectations have to be combined. It means that the activities of companies have to be both economically rational and ethical. This trend compared to the listed approaches above takes ethics into account to the greatest extent. Ethics is not only a tool having a corrective function, but a basis on which the company success is built. Organizations are the subject of similar ethical expectations as individuals. Higher profit does not entitle the business to be involved or perform unethical behavior. In terms of integrative corporate ethics, companies are related to different groups they have to respect when making decisions. The organizations have to weigh and calculate with the consequences of their decisions. Communication plays a key role in the process. Contrary to the traditional perception of the company, in this case, we speak about *"ethical"* company management and ethical company. Based on the theory of Szegedi [32] and Radácsi [28], the Aristotelian approach is part of the integrative trend, as profit and ethics go hand in hand. The trend is based on the concept of Aristotle, according to which prevention and development of virtues is the main goal. The trend can be detected in Hungarian companies as well [28] [39]. According to Szegedi [32], the integrative approach is the most appropriate from the listed trends [4] [24] [30].

Morgan [23] came to conclusion that individuals showing unethical behavior think that those in their environment are even more unethical. This conclusion was supported by further studies [10] [29] [38]. Individuals will recognize what is ethical, aware of the rules, but in the case of critical situation, they will focus on the possible consequences of their actions [5]. Instead of the values set in the

company, the expectations of superiors become important. If individuals solely focus on achieving the goals set by their superiors, they will sometimes apply unethical methods. According to Csókás [7], the occurrence of unethical actions in micro-enterprises is more frequent than in small and medium-sized companies.

3   Methods and Methodology

The main goal of our research was to examine which factors influence the most the ethical behavior of individuals within a company. The issue was addressed from the employee perspective, as employees are the basic pillar of organizational success [14] [17]. We chose questionnaire survey for the data collection. The questionnaire contained 17 – closed and semi-closed – questions, which allowed us to collect nominal and ordinal data. The respondents were chosen from the SME sector, as a significant part of the economy is made up by small and medium-sized enterprises [26]. Our research was conducted in Nitra Region from 5th October 2020 till 29th November 2020 (56 days). Survio makes possible to examine the circumstances of filling in the survey. 33.4% of the respondents opening the questionnaire link had filled in the questionnaire survey. There was not a single respondent who did not finish filling in the questionnaire, so the respondents had already decided to fill in the questionnaire after opening the link. The average time interval filling in the questionnaire was 10-30 minutes. 71.1% of the respondents needed this time span to complete the task. We managed to address 5,000 companies based on a Slovak database. We asked these companies to forward our questionnaire to their employees. We wanted to examine the responses of employees, so the responses provided by company leaders are not included in the survey results. Self-employed were not included in the survey as well. When processing the research data, we excluded the questionnaires inappropriately filled in. We processed the data obtained from 581 respondents.

We set the following 3 hypotheses:

H1   The existence of ethical institution depends on the size of the company.

H2   Gender, qualification and age have large impact on ethical behavior of the individual.

H3   The occurrence of unethical workplace behavior depends on the size of the company the individual works for.

We set up null (H0) and alternative (H1) hypotheses in case of each hypothesis we defined. The most frequently applied significance level (95%) was used to test our hypotheses. Pearson's Chi-square test was used to examine the hypotheses:

$$\chi^2 = \sum_{total\ cells} \frac{(f_0 - f_e)^2}{f_e}$$

(1)

The relationship (1) is primarily based on the comparison of expected (f_e) and observed (f_0) values.

To express the strength of the relationship, the Cramer V indicator (2) was used in one case. N refers to size of the sample and k expresses the number of categories:

$$V = \sqrt{\frac{\chi^2}{N(k-1)}}$$
(2)

In another case the Goodman and Kruskal's Gamma Coefficient was used (3), where N_c is the total number of concordant pairs (which rank the same) and N_d is the number of discordant pairs (which don't rank the same):

$$\gamma = \frac{N_c - N_d}{N_c + N_d}$$
(3)

The gamma coefficient ranges between -1 and 1. (1 means a perfect positive, and -1 a perfect inverse correlation, while 0 means no association at all).

4   Results

Regarding the age of our respondents, the categories were set on the basis of scientific work of Berkup (2014). We made some modifications compared to original theory, as we wanted our questionnaire survey to be completed by individuals over the age 18.

Table 1
Demographic characteristics of respondents

Gender		Type of employment	
Male	46.8%	Part time	15.8%
Female	53.2%	Full time	84.2%
Age group		**Length of employment**	
1946-1964	4.0%	Less than a year	16.9%
1965-1979	21.3%	1-4 years	46.3%
1980-1994	44.8%	5-10 years	19.3%
1995-2002	29.9%	11-30 years	16.2%
Qualification		More than 30 years	1.4%
Secondary	53.5%	**Net income/month**	
Tertiary	46.5%	Below 500€	14.5%
Position		501 – 1000€	45.1%
Employee	73.7%	1001 – 1500€	26.2%
Middle manager	18.2%	1501 – 2000€	8.6%
Top manager	8.1%	Above 2000€	5.7%

Source: Own processing

In order to follow the rule of simplicity, we used only the number of employees to determine the size of the company, as the statistical offices prepare their reports based on the number of employees in the company. Only those micro-enterprises were part of the research, which have at least one employee, who is not self-employed or the owner of the company. Micro-enterprises are defined as companies employing 1-9 employees. Most of the respondents (49.2%) work in middle-sized enterprises, followed by the respondents in small enterprises (28.6%) and finally the micro-enterprises (22.2%). Most of the companies (26.3%) work in trade. This was followed by processing industry (12.4%), tourism and catering (6.4%), IT and logistics (6.0%). Despite the relatively large number of sectors listed, an additional 6.2% of the respondents chose the option *"other"*. The results are presented in Table 1.

4.1   Main Results

The first questions asked the respondents whether there are ethical institutions (Code of Ethics, Ethical Committee, training on ethics, etc.) in the organizations they work for. The respondents were offered two basic options (*"yes, there is/yes, there are"* or *"no, there is not/no, there are not"*). 56.5% of the respondents answered that there are not ethical institutions in their company, while 43.5% reported that at least one ethical institution is operating in the company. The obtained results will be examined with the help of Hypothesis H1 – taking into account the size of the company.

We asked our respondents whether they think ethical behavior is an advantage. 95.2% of the respondents think that ethical workplace behavior is a benefit. It is a promising result both for the company and the company leaders, but it would be interesting to examine why 5% feels that ethical behavior is not a benefit. These employees can cause significant harm to the company.

In the next question, the respondents were asked to indicate on a 5-point Likert scale (1 = not at all; 2 = rather not; 3 = partly yes, partly no; 4 = rather yes; 5 = absolutely) how ethical they think their workplace behavior is. The value of mode is 5, so the majority of our respondents (48.5%) found their workplace behavior ethical. If we also count the option *"rather yes"* – which is also the median – 87.1% of the respondents behave ethically. The number of respondents selecting options *"not at all"* (1.9%) and *"rather not"* (2.6%) is relatively low. This is similar to the results we obtained based on the answers to our previous question – 4.8% of the respondents do not find ethical behavior as an advantage. 8.4% of the respondents reported their behavior *"changeable"*. Overall, we have obtained positive results, however, unethical individuals can cause enormous financial and other type of damage to the company.

In our next question, we were interested in the opinion of our respondents who they think, a group of individuals or the organizations themselves influence the ethical behavior of the individual. In addition to these, a third option was also proposed, where both of the mentioned factors have influence on the individual. The starting point was that most of the companies have *"organizational memory"*. It can also be manifested in organizational ethics, as individuals can learn from each other. It is valid not only for positive behavior. A new employee can experience unethical workplace behavior from the colleagues. As a reaction, the individual can also make unethical steps in the future. Our results show a high number of respondents (35.0%) who think that ethical behavior in the company is solely formed by individuals. However, 19.4% of the respondents said that ethical behavior of the individual is influenced by the organization. Most of the respondents (45.6%) reported that it is a two-way relationship. According to our personal opinion, the organization memory is strongly reflected in ethical behavior. In order to agree with this statement, further research is required. At the same time, it is also important to emphasize the organizational size, as an important influencing factor of the organizational memory. A simple example of this is a micro-enterprise that employs only one person. In this case, we cannot talk about organizational memory, as the replacement of the employee results in cease of organizational memory.

Our next question examined the ethical behavior in details. The question consists of 3 parts. First, we asked the respondents whether it happened that they had behaved unethically in their workplace. 24.3% of the respondents reported that had happened. 75.5% of the respondents had never behaved unethically, so they followed ethical rules in their workplace. It is important to highlight that the ratio is far higher than the respondents who found their behavior absolutely ethical (48.5%). The reason might be that in the previous question the respondents were provided more options, but in this question, they had to choose from two alternatives. A sub-question was also added to this question, where we asked those behaving unethically (n = 141) to indicate what was the reason of their unethical behavior. All of the respondents (n = 581) 8.6% were afraid of the anger of others. This means 35.5% of the respondents. 6.2% of the respondents were afraid of financial damage and 4.5% were afraid of losing their jobs. In the case of those behaving unethically, the fear of financial damage was 25.5%, while the fear of losing job was 18.4%.

4.9% of all respondents (20.6% of unethical) chose the option *"other"*. This option provided a possibility to respondents to describe the reason of their unethical behavior. Most of the respondents indicated that in majority of cases it was a kind of misunderstanding (1.3% of unethical), restlessness (1.2%) or fatigue (1.2%) that resulted in unethical behavior. A further 1.3% of the respondents indicated a wide diversity of answers that were impossible to categorize.

In our second sub-questions we asked the respondents behaving unethically (n = 141) to indicate the person they behaved unethically with. The results show that

mainly the colleagues were the target of unethical behavior (49.6% of unethical, 12.0% of all respondents). The colleagues on the list are followed by superiors/owners (24.8%; 5.0%) and buyers/consumers (20.6%; 5.0%). Suppliers were ranked the last (5.0%; 1.2%). It is not surprising as the least frequent contact is realized with the suppliers. These contacts are mainly impersonal (e-mail, phone). However, we can think that it is easier to behave unethically with those we have less frequent contact with, as the contact is not so strong. In our opinion, the rule of high numbers applies.

We asked the respondents to indicate on a 5-point Likert scale how much they think the ethical culture of the company contributes to the loyalty of individuals. Data collected using the Likert scale were treated as non-metric. The obtained data (frequency) is summarized in the Figure 1 below. In addition to frequency, the mode and median are also presented in connection to single results.
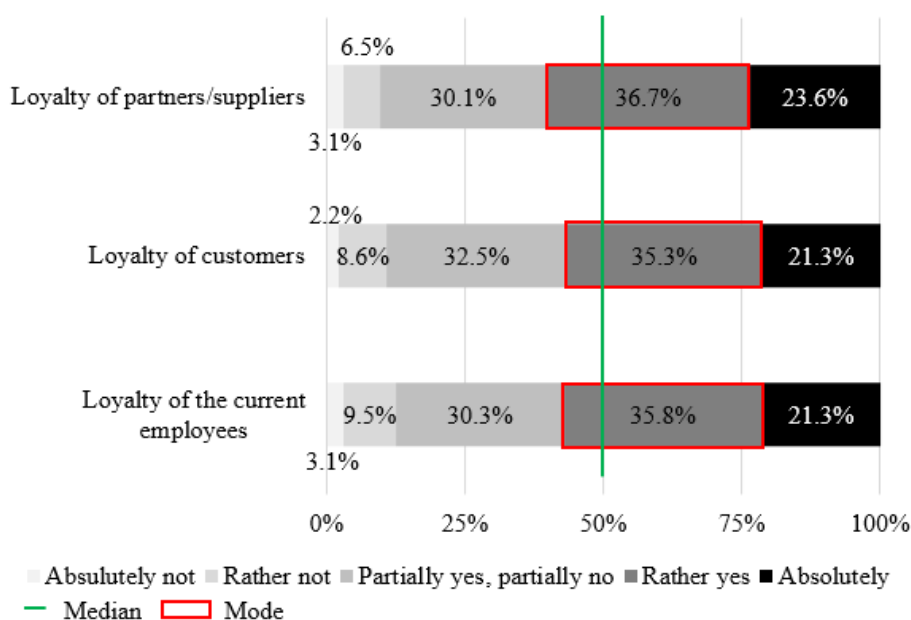
Figure 1

Contribution of corporate culture to loyalty – employee perspective

Source: Own processing

The obtained answers don't show significant difference in terms of loyalty among the different groups. If we merge the *"absolutely"* and *"rather yes"* options, the loyalty of suppliers/partners (60.3%) is the most affected by the company's ethical culture. This is still a negligible significance. Similar result is detected if we merge the categories of *"definitely not"* and *"rather not"*. The company's ethical culture is the least contributing factor to the loyalty of employees.

4.2 Hypotheses Testing

We formulated 3 hypotheses in our research. It is important to examine whether the existence of ethical institutions is influenced by the company size.

H1: The existence of ethical institutions depends on the size of the company

Based on the results, the medium-sized companies (57.3%) put more emphasis on establishing ethical institutions. In the case of small (29.5%) and micro-enterprises (31.0%) we obtained similar results. In order to examine whether or not our results were coincidence, a cross-tabulation analysis was made. Before testing our hypothesis, the following sub-hypotheses were formulated:

H_0 There is no relationship between the existence of ethical institutions and the size of the company

H_1 There is relationship between the existence of ethical institutions and the size of the company

The size of the company (ordinal) is an independent variable, while the existence of ethical institutions (nominal) is a dependent variable. Chi-square test for cross-tabulation analysis was used (Table 2).

Table 2

Cross tabulation – company size and existence of ethical institution(s)

			Ethical institutions in the company		Total
			Yes, there are/ Yes, there is	No, there are not/ No, there is not	
Company size	Micro	Count	40	89	129
		Exp. Count	56.2	72.8	129.0
	Small	Count	49	117	166
		Exp. Count	72.3	93.7	166.0
	Medium	Count	164	122	286
		Exp. Count	124.5	161.5	286.0
Total			253	328	581

Source: Own processing

According to the Table 2, the rule of conducting the test is not violated. The values in the Table 3 below can be interpreted as the follows:

Table 3

Chi-square test – company size and existence of ethical institution(s)

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	43.682	2	0.000
Likelihood Ratio	44.262	2	0.000
Linear-by-Linear Association	33.734	1	0.000
N of Valid Cases	581		

Source: Own processing

The value of Chi is 43.682. This is much higher than 5.5991 for the selected significance level (p = 0.05) and the degree of freedom (2). So, the obtained result is higher than the critical value of Chi-distribution ($\chi2 > \chi2crit.$). The empirical significance level 0.000 is also lower than the significance level determined in our research (0.05). Based on the obtained results, our Hypothesis H_0 can be rejected – there is a relationship between the existence of ethical institutions and the size of the company. As there is significant relationship between, we can examine the strength of this relationship with the help of Cramer V – 0.274, indicating a weak relationship.

Our second hypothesis was formulated as the follows:

H2: **Gender, qualification and age have large impact on ethical behavior of the individual**

We wanted to know to what extent gender, qualification and age can influence the level of ethical behavior. We analyzed our hypothesis by dividing it into three parts. First, we measured the relationship between the gender and ethical behavior. The ethical behavior was measured by using a 5-point Likert scale (ordinal). There is a higher percentage of female respondents who find their workplace behavior ethical. If we merge the categories of *"rather yes"* and *"absolutely"*, 87.4% of the female respondents and 86.7% of male respondents declared to behave ethically in their workplace. In order to examine whether these results are due to coincidence or not, we prepared a cross-tab. Before testing, the following sub-hypotheses were formulated:

H₀ There is no relationship between gender and ethical behavior

H₁ There is relationship between gender and ethical behavior

The independent variable – gender – was measured using a nominal (non-metric) variable consisting of two categories. A cross-tab (Table 4) was prepared for analysis.

Table 4

Cross-tab with observed and expected results – gender and ethical behavior

			How ethical you find your own behavior?					
			Absolu-tely not	Rather not	Partially	Rather yes	Absolu-tely	Total
Gender	Female	Count	5	9	25	114	156	309
		Exp. Count	5.9	8.0	26.1	119.1	150.0	309.0
	Male	Count	6	6	24	110	126	270
		Exp. Count	5.1	7.0	22.9	104.9	132.0	270.0
	Total		11	15	49	224	282	581

Source: Own processing

According to the Table 4, the rule of conducting the test is not violated. The values in the Table 5 below can be interpreted as the follows:

Table 5
Chi-square test – gender and ethical behavior

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.625	4	0.804
Likelihood Ratio	1.627	4	0.804
Linear-by-Linear Association	0.524	1	0.469
N of Valid Cases	581		

Source: Own processing

The value of Chi is 1.625, which is lower than 9.488 at the significance level (p = 0.05) and the degree of freedom 4. The value obtained is lower than the critical value of the Chi distribution ($\chi2 < \chi2crit.$). Furthermore, the value of empirical significance level (0.804) is also higher than the significance level (0.05) determined in our research. Based on the results, hypothesis H_0 cannot be rejected, so there is no relationship between the gender and ethical behavior.

As a next step we wanted to examine the relationship between qualification and ethical behavior. If we merge the categories *"rather yes"* and *"absolutely"*, 92.6% of the respondents with tertiary degree and 82.4% of the respondents with secondary degree declared themselves ethical. In order to examine whether these results are due to coincidence or not, we prepared a cross-tab. Before testing, the following sub-hypotheses were formulated:

H_0   There is no relationship between the qualification of individuals and their ethical behavior

H_1   There is a relationship between the qualification of individuals and their ethical behavior

We tested the independent variable – qualification – with an ordinal (non-metric) variables consisting of 2 categories. A cross-tab (Table 6) was prepared for analysis.

Table 6
Cross-tab with observed and expected results – qualification and ethical behavior

s			How ethical you find your own behavior?					Total
			Absolutely not	Rather not	Partially	Rather yes	Absolutely	
Qualification	Secondary	Count	7	11	37	128	128	311
		Exp. Count	5.9	8.0	26.2	119.9	151.0	311.0
	Higher	Count	4	4	12	96	154	270
		Exp. Count	5.1	7.0	22.8	104.1	131.0	270.0
Total			11	15	49	224	282	581

Source: Own processing

According to the Table 6, the rule of conducting the test is not violated. The values in the Table 7 below can be interpreted as the follows:

Table 7

Chi-square test – qualification and ethical behavior

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.020	4	0.000
Likelihood Ratio	21.693	4	0.000
Linear-by-Linear Association	16.853	1	0.000
N of Valid Cases	581		

Source: Own processing

The value of Chi was 21.020, which is higher than – 9.488 indicated at the significance level (p = 0.05) and the degree of freedom 4. So, the obtained result for test function is higher than the critical value of Chi-distribution ($\chi2 > \chi2crit.$). In addition, the empirical level of significance 0.000 is lower than the significance level (0.05) determined in our research. Based on the results, hypothesis H_0 can be rejected. There is relationship between the qualification and ethical behavior. Since there is a significant relationship between our 2 ordinal variables, we can examine the strength between them. In the case of ordinal variables, the Gamma index was used for this purpose. The value of Gamma was 0.310. It means that the respondents with higher qualification consider their workplace behavior ethical.

Finally, we wanted to examine the relationship between the age and ethical behavior. The independent variable – age group – was measured with a help of an ordinal variable consisting of four categories. No difference was detected between different age groups. If we merge the categories *"rather yes"* and *"absolutely"*, the most ethical were the respondents born between 1980 and 1994 (89.6%). They are followed by those born between 1995 and 2002 with 85.7%, then the respondents born between 1965 and 1979 with 84.7%. The last position is taken by the respondents born between 1945 and 1964 with 82.6%. In order to examine whether these results are due to coincidence or not, we prepared a cross-tab (Table 8). Before testing, the following sub-hypotheses were formulated:

H_0   There is no relationship between the age group of the respondents and their ethical behavior

H_1   There is a relationship between the age group of the respondents and their ethical behavior

The independent variable – age – was examined with the help of nominal (non-metric) variable consisting of four categories. The rule of conducting the test had been violated, the expected value was less than 5. This is the reason why we merged the different levels of being ethical *("absolutely not"* ethical and *"rather ethical"*).

Table 8
Cross-tab with observed and expected results – age group and ethical behavior – merged

			How ethical you find your own behavior				Total
			Absolutely not + rather not	Partially	Rather yes	Absolutely	
Age group	1945-1964	Count	2	2	9	10	23
		Exp. Count	1.0	1.9	8.9	11.2	23.0
	1965-1979	Count	7	12	39	66	124
		Exp. Count	5.5	10.5	47.8	60.2	124.0
	1980-1994	Count	9	18	103	130	260
		Exp. Count	11.6	21.9	100.2	126.2	260.0
	1995-2002	Count	8	17	73	76	174
		Exp. Count	7.8	14.7	67.1	84.5	174.0
Total			26	49	224	282	581

Source: Own processing

According to the Table 8, the expected value is less than 5 in 2 cases, but it means only 13.33%, so the rule of conducting the test was not violated. The values in the Table 9 below can be interpreted as the following:

Table 9
Chi-square test – age group and ethical behavior

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.065	9	0.630
Likelihood Ratio	7.015	9	0.636
Linear-by-Linear Association	0.153	1	0.695
N of Valid Cases	581		

Source: Own processing

The value of Chi is 7.065, which is lower than 16.919 indicated at a significance level of ($p = 0.05$) and the degree of independence 9. So, the value of test function is lower than the Chi-distribution ($\chi2 < \chi2crit.$). In addition, the level of empirical significance 0.630 is higher than the significance level (0.05) determined for our research. Based on the obtained results, hypothesis H_0 cannot be rejected. It means that there is no relationship between the age group the respondents belong to and their ethical behavior. It means that our original hypothesis, H_2 *"Gender, qualification and age have large impact on ethical behavior of the individual."* – can partially be accepted and partially rejected. While qualification of individuals has influence on ethical behavior, in terms of gender and age group this influence cannot be detected.

Hypothesis H_3 was formulated as the following:

H3: The occurrence of unethical workplace behavior depends on the size of the company the individual works for.

We were looking for an answer, whether ethical behavior of the individual can be influenced by the size of the company he/she works for. It was also interesting, whether the employees working for medium-sized companies are more likely to behave unethically than the employees of small and micro-enterprises. Ethical were considered those employees who declared about themselves that they have never behaved unethically in their workplace. In contrast, unethical refers to those respondents who have already taken unethical steps in their workplace. Based on the obtained results, there is no significant difference between different types of companies in terms of ethical behavior. 74.4% of employees in micro businesses, 77.7% working in small enterprises and 75.2% employees in medium-sized enterprises reported to behave ethically in workplace. In order to examine whether these results are due to coincidence or not, we prepared a cross-tab analysis. Before testing, the following sub-hypotheses were formulated:

H_0   There is no relationship between unethical behavior and company size

H_1   There is relationship between unethical behavior and the company size

The ethical behavior was measured with a help of question the respondents had an option to answer *"yes"* or *"no"*, so the dependent variable was nominal. The independent variable is an ordinal (non-metric) variable consisting of three categories. A Chi-square test was applied as a part of cross-tab analysis (Table 10).

Table 10

Cross-tab with observed and expected results – Hypothesis H_3

			Unethical behavior		Total
			No, never.	Yes	
Company size	Micro	Count	96	33	129
		Exp. Count	97.7	31.3	129.0
	Small	Count	129	37	166
		Exp. Count	125.7	40.3	166.0
	Medium	Count	215	71	286
		Exp. Count	216.6	69.4	286.0
Total			440	141	581

Source: Own processing

According to the Table 10, the rule of conducting the test is not violated, the value is not less than 5 in each case. The values in the Table 11 below can be interpreted as the following:

Table 11

Results of Chi-square test – Hypothesis H_3

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.523	2	0.770
Likelihood Ratio	0.528	2	0.768
Linear-by-Linear Association	0.000	1	0.990
N of Valid Cases	581		

Source: Own processing

The value of Chi is extremely low – 0.523. It is lower than 5.991 indicated at determined level of significance (p = 0.05) and the degree of independence 2. Thus, the value of test function is lower than the critical value of Chi-distribution ($\chi2 < \chi2crit$.). The level of empirical significance is 0.770, which is much higher than the significance level (0.05) determined in our research. Based on the obtained results, the null hypothesis cannot be rejected, which means that there is no relationship between the company size and ethical behavior. It means that the original hypothesis H_3: *"The occurrence of unethical behavior depends on the size of the company the individual works for."* is rejected.

Conclusions

The main goal of our research was to examine which factors have the greatest influence on ethical behavior within a company. The companies were approached from the employee's perspective.

In order to test our hypotheses, the results of the employee questionnaire survey were processed. Hypothesis H_1 was approved, since there is a relationship between the existence of ethical institutions and the size of the company. Hypothesis H_2 was approved partially. According to the results, the qualification influences the ethical behavior, while the gender and age group the respondents belong to has no impact on ethical behavior. The respondents with higher qualification find their workplace behavior ethical. Hypothesis H_3 was rejected, since no relationship was found between the company size and the occurrence of unethical behavior. This contradicts the statement of Csókás [7], as unethical behavior shows higher frequency in micro-enterprises. We have to highlight that Csókás asked the respondents whether they have or not experienced unethical behavior in their workplaces. The current research asked the respondents to provide information about their own workplace behavior. This may therefore be related to what we stated before that the employees are unlikely to be critical with their own ethical behavior.

We had to face certain barriers in our research. These barriers were financial and the lack of time was also an obstacle to our research. We also have to highlight the criticism related to quantitative research methods. Since the respondents had to report about themselves, it could happen that they interpreted the questions from different perspectives. These test results show, how individuals see themselves and their qualities, but it can differ from the reality. It is important to mention the scope of our questionnaire as well. We expected that not many respondents will fill in the questionnaire. Unlike our expectations, we received adequate number of answers.

The introduction of a Code of Ethics is strongly advised for companies, as the incidence of unethical behavior is frequent in the companies and the Code of Ethics is the easiest corporate ethical institution to introduce.

It would be useful to use further research methods in the future; as self-administered questionnaires do not necessarily, reflect reality. There are no specific scales to measure the ethical behavior, so we had to rely on the responses of employees. These provided the necessary statistical basis for our research. We would like to contact more potential respondents to complete the questionnaire, as well as, use offline opportunities, to obtain more detailed information. We would also like to conduct interviews, to study the opinions of managers and company leaders. We plan to expand our research in national and international scales. Opportunities are also possible by examining the further factors of emotional intelligence [6] and/or artificial intelligence [33] [34].

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How do Digitalization and the Fintech Phenomenon Affect Financial Decision-Making in the Younger Generation?

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Abstract: Generation Z, who can handle almost everything online, from the picture taken by their mobile phone to purchasing or transferring money. Therefore, using several tech solutions, they are not looking for traditional banking solutions, like the ones where physical presence is needed. Their wish is to obtain secure, fast, easy financial solutions, and services. Additionally, to ensure payments can be easily made and investments are available on hand. All of this being virtually available any time when it is needed, even from their mobile phones and also providing a high-level of personalization possibilities. In our study, we surveyed risk attitudes governing individual investment decisions based on primary research conducted on a large sample size among university students. When surveying risk attitudes, we presented a group of university students studying in Hungary with questions of a test published in an international journal article by John Grable and Ruth H. Lytton (Grable – Lytton, 1999). Between early December 2020 and 15 January 2021, more than 2,000 students filled out our questionnaire. The results of the questionnaire show that risk attitude values among the group of Hungarian university students are in line with international experiences. Primary data collection will continue in the spring of 2021, and it will subsequently allow a comparison to be made between the attitudes to risk and investment of university students from different fields of study. The composition of the questionnaire's respondents will make it possible to survey and compare the 'Z' generation's attitude with that of other generations.

1   Introduction

The outbreak of COVID-19 in 2020 also supported the need to understand how different technologies affected behavioral changes in terms of investment decisions and payment methods used. According to the research of Arner et al. [1], Fintech was already present a long time ago, starting from 1866 as version 1.0. Fintech already had three stages, first one, 1.0 (1886-1967), focusing on infrastructure, globalization, as technology supported by telegraph, starting from the laying of the transatlantic cable (1866) and in time Fedwire in the USA (1918) to support the rapid transmission of financial information across borders. All these rely on old technologies like telegraph or Morse code transmissions.

The second stage of Fintech, 2.0 (1967-2008), was the period, transformation of analog to digital. The first hand-held calculator had been developed, first ATM had been installed by Barclays bank in 1967. In terms of payments, today's Banker's Automated Clearing Services (BACS) base had been established as Inter-Computer Bureau in 1968 and also Clearing House Interbank Payment System (CHIPS) within the US in 1970. To further improve domestic and also borderless communication related to payments Society of Worldwide Interbank Financial Telecommunications (SWIFT) had been established in 1973, which is still the most commonly used protocol between financial institutions for cross-border transfers. Within the same time frame with the rise of "digital calculators," computers, and also having the internet spread across the globe further linking sites and increasing the speed of communication, online banking and e-commerce got heavily expanded and also by the beginning of the 21st Century the banking processes, interactions, both internal and external got fully digitized. This flourishing stage of Fintech ended with the Global Financial Crisis in 2008 after the general public developed a distrust over the traditional banking system.

Due to the general opinion against traditional banking and also taking slowness and prices into consideration the next stage of Fintech needed to be delivered, called 3.0 (2008-Current), which includes an era of further innovations, born of start-ups and the build of a changed financial system, in line with corporate competitiveness [35]. This period integrates the release of Bitcoin, a blockchain technology-based decentralized cryptocurrency, which is a digital or virtual currency that is secured by cryptography. Also, within the last couple of years, the widespread of smartphones and internet accessibility for millions of people triggered several new financial and payment solutions like Google Wallet, Apple Pay but also born and extensive growth of localized payment solutions like WeChat Pay or Alipay in China. Based on EY's Global Fintech study [4], it is

visible that developing countries, like China or India, due to the low spread of banking infrastructure, were and are more open and more developed to new fintech solutions on personal but also in company levels.

As a summary, we reached a time when money in some cases already lost its physical presence and had been digitized. Meanwhile, the role and functions of banks or financial institutions had evolved to the point, where the world economy would be dysfunctional without them. This development is not only reflected in the tangible technical acquis, but also services that by now became natural, such as a simple bank account management, or payment by credit or debit card. Today, we reached the point where the physical presence of credit or debit cards is not even needed, it can easily be replaced with a mobile phone using NFC technology.

Generation Z, or even further the Alpha Generation, who can handle almost everything online, from the picture taken by their mobile phone to purchasing or transferring money. Therefore, using several tech solutions, they are not looking for traditional banking solutions, like the ones where physical presence is needed. Their wish is to obtain secure, fast, easy financial solutions, and services. Additionally, to ensure payments can be easily made and investments are available on hand. All of this being virtually available any time when it is needed, even from their mobile phones and also providing a high-level of personalization possibilities. Due to various regulations and increased customer expectations, the main goal of the FinTech companies is to develop services and technologies with long-term potential. For people, the primary device used to surf the Internet is no longer a personal computer or laptop today – instead, it is their smartphone. The role of various digital wallets (WeChat Pay, Ali Pay, Apple Pay, Google Pay) had grown to such an extent that the number of transactions initiated through these systems exceeded one trillion – one thousand billion dollars, in 2019.

2   Fintech Innovations

The spread of COVID19 across the globe hardly impacted economies not only in terms of the environment but also it is expected to drive a change also related to payment habits. This transformation was already under way before the pandemic, the absence of a requirement to key in PINs and/or codes has made contactless payments more popular, especially via digital wallets.

The banks behind the card schemes are themselves under threat from a wave of neobanks, or digital-only banks such as Revolut, N26, and Monzo. Unheard of ten years ago, more than 20% of US households now use neobanks, with a further 8.8% planning to open neobank accounts this year [6]. Faced with such competition and supporting an unsustainable cost base, Europe's "bricks and

mortar" financial institutions are reducing in number, and their branch networks are slowly declining as internet banking becomes the preferred way to the bank.

Younger consumers born after 1998, who have grown up with the internet and digital technologies, overwhelmingly prefer contactless payments and remote payments to the traditional use of cash or cards – though to provide a note of calm, debit cards remain Europe's preferred way to pay across all age groups [6].

Having mobile commerce sales expected to grow even further to $3.56 trillion by 2021, e-commerce store owners can no longer afford to neglect the importance of having a mobile-optimized online store to attract customers and grow their business [13].

Based on McKinsey's Global Payments Report (2020) within the last ten years the cash usage had dramatically decreased. One of the areas supporting digitalization in terms of payment habit changes was mobile and smartphone device functionality growth but also their availability. As stated by BankMyCell the number of smartphone users increased to 3.5 billion also if considering smart and feature phones together in 2020 it is already at 4.78 billion which compared to the world's population is 61.04% [12].

Another area needed for changes in terms of technology was the coverage of the internet. Within the last 20 years, the spread of the internet as visible in Table 1 below had shown in some cases even a 5-digit growth. The coverage and the ratio to the overall population is showing a significant ratio unseen before.

Table 1

TOP 10 Countries with the highest number of internet users

#	Country or Region	Internet Users (in million)		Population (in million)		Internet Growth	Internet users vs Population
		2020 Q1	2000 Q4	2020 Est.	2000 Est.	2000 - 2020	2020 Q1
1	China	854	23	1,439	1,283	3,796%	59%
2	India	560	5	1,369	1,053	11,200%	41%
3	United States	313	95	331	282	329%	95%
4	Indonesia	171	2	274	212	8,563%	63%
5	Brazil	149	5	212	175	2,981%	70%
6	Nigeria	126	0	206	123	63,039%	61%
7	Japan	119	47	127	128	252%	94%
8	Russia	116	3	146	146	3,753%	80%
9	Bangladesh	94	0	165	132	94,199%	57%
10	Mexico	88	3	132	3	3,244%	67%
	TOP 10 Countries	2,591	183	4,401	3,537	1,415%	59%
	Rest of the World	*1,983*	*178*	*3,396*	*2,608*	*1,115%*	*58%*
	Total World	4,574	361	7,797	6,145	1,267%	59%

Source: Internet World Stats, 2020 (https://www.internetworldstats.com/top20.htm)

As for mobile payments, within the last ten years, this segment increased significantly. However, across the globe the trend is moving in the direction of a cashless society, some countries were more adaptable to this change than with others. On one hand, the delivered solutions were mainly driven by availabilities, country specifics, like in the case of emerging countries where the fast spread of payment digitization was partly triggered by the under-banked country situation but also having all technologies supporting needed to be available.

2.1 Technology-driven Regulation or Regulation-driven Innovation?

Information and communication technologies (ICT) affect people's everyday lives in many ways, both at work or home, for example, when communicating or buying goods or services online or through new FinTech innovations even at the point of sale. EU policies range from regulating entire areas such as e-commerce to trying to protect an individual's privacy. The development of the information society is, therefore, regarded by many as critical for providing the necessary conditions to promote a modern and competitive economy.

The European Commission (EC), and the European Central Bank (ECB) working with the Eurosystem, created the Single Euro Payments Area (SEPA). The Eurosystem is supported by the European Payments Council (EPC), which is charged with bringing together the European payments industry. SEPA enables citizens, companies, and other economic actors to make and receive payments in euros (EUR) between and within national boundaries in Europe with the same basic conditions, rights, and obligations, regardless of their location [9].

In 2007, the EU had set up common rules for payments with the adoption of the first payment services directive (PSD 1).

The payment services directive established the same set of rules on payments across the whole European Economic Area (European Union, Iceland, Norway, and Liechtenstein), covering all types of electronic and non-cash payments, such as

- credit transfers
- direct debits
- card payments
- mobile and online payments.

The directive laid down rules about the information that payment services providers have to give to consumers and about the rights and obligations linked to the use of payment services. Besides it also introduced a new category of payment service providers other than banks – the so-called 'payment services' and also laid the groundwork for the single euro payments area. This has increased competition and choice for consumers.

In 2015 the EU adopted a new directive on payment services (PSD 2) to improve the existing rules and take new digital payment services into account. The directive became applicable in January 2018. It includes provisions to

- make it easier and safer to use internet payment services

- better protect consumers against fraud, abuse, and payment problems

- promote innovative mobile and internet payment services

- strengthen consumer rights

- strengthen the role of the European Banking Authority (EBA) to coordinate supervisory authorities and draft technical standards

The directive is part of a legislative package that also includes regulation on multilateral interchange fees. Together, the regulation and the second payment services directive,

- limit the fees for transactions based on consumer debit and credit cards

- ban retailers from imposing surcharges on customers for the use of these types of cards

Regulatory initiatives such as open banking and the EU's second Payment Services Directive (PSD2) are helping open doors to further payment innovation. These initiatives allow third parties to facilitate payments from customers' accounts. The EU's second Payment Services Directive (PSD2) goes farther by making consumer banking data available to third parties with proper authorization from consumers where financial institutions have historically controlled direct payments between consumer and business bank accounts. PSD2 and similar initiatives open the door for FinTech competitors to also offer these services [10].

Regulatory efforts have an overall aim of facilitating safer payments, like the provisions of PSD2 that require Strong Customer Authentication (otherwise known as SCA) for all electronic transactions in the European Economic Area. Tokenized credentials, multifactor authentication, and Dynamic Linking technology offer additional protection to consumers. PSD2's authentication mandates may also help to replace screen-scraping methods by FinTech companies with direct API access to authorized customer data. This API access would open up new possibilities within the checkout experience. Merchants will have the ability to present shoppers with a view of their available bank accounts including their account balances, to select their most desirable payment source. Funds can then be transferred through ACH for near-instant access between business and consumer [5].

Besides regulations, the need for standardization also arose. Before the arrival of ISO 20022, there were many different standards used by all parties involved in the payment communication chain which was not as efficient as it should have been. European Payments Council (EPC) providing SEPA data formats had been developed into a global open standard, named ISO 20022 by International

Organization for Standardization (ISO). It aims to specify the formats of the data of a transaction (credit transfer or direct debit) appearing within IT systems enabling proper processing done by all the different parties. ISO 20022 is not just a set of message standards but also a recipe proposed by the ISO to develop message standards for all domains of the financial industry [11].

Although standardization of communication and also implementation of regulations are in place within Europe several other initiatives had also been started recently. In 2019 six mobile wallet service providers, Austria's Blue code, Helsinki-based ePassi, Spanish payments app Momo Pocket, Pagaqui of Portugal, Finland's Pivo, and Oslo-based Vipps, all together resulted in a five million user base and 190.000 merchant network, teamed up with Alipay to further develop their systems adopting unified QR code payments providing to both continental and Chinese travelers. Being interoperable and utilizing QR codes, the system could bypass the networks of global schemes like Visa and Mastercard, as well as banks, which will result in quick and most importantly cost-effective implementation [3].

3   Hungarian Scope in Digital Attitude

Even though the high differentiation regulators are putting hard efforts onto some sort of harmonization through directives, like PSD2, related to fees but also related openness of the payment network, further enabling FinTech innovations.

Besides the infrastructure related to connectivity, there had been enormous changes within the payment sector as well. Based on the statistical data from Hungarian Bank Association (HBA), as seen in Figure 1, the number of physical stores accepting card payments had doubled within the last 10 years, showing an unstoppable upward trend, but also beside the high number of stores, obviously, POS terminal numbers also increased heavily.

In terms of regulations Central Bank of Hungary (CBH) is working hard on easing and further developing the country's payment system.

The new era within banking, PSD-2 in Hungary had come into effect from 14th Sept. 2019 having for some of its elements, an extended 12-month grace period given to rolling out. This initiative aims to further strengthen security, enable 3rd parties to attend to finance services, also provide guidelines, standards about electronic communication between parties further enabling end-user authentication via even email addresses and triggering cost reduction due to the above and transparent methodologies.
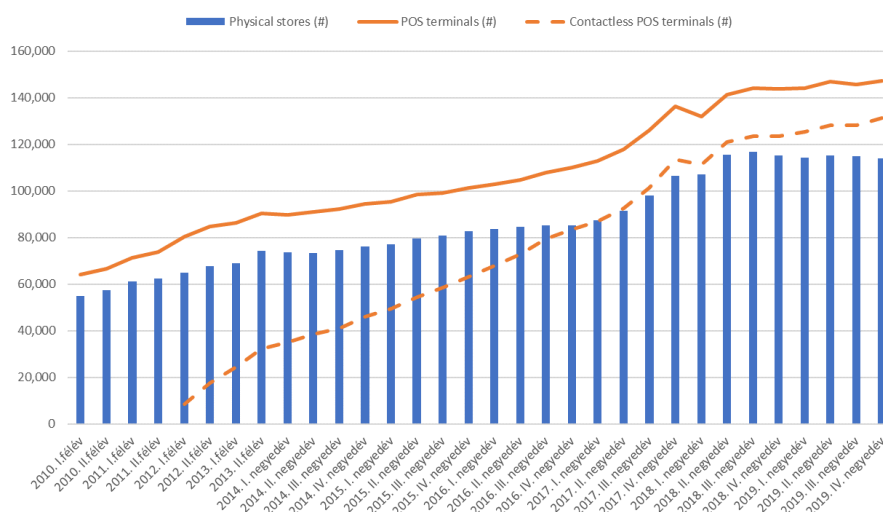
Figure 1

Number of physical stores accepting card payments via normal and contactless POS terminals

Note: negyedév = Quarter

Source: Central Bank of Hungary, 2020

Unifying the EU banking market, increasing competition among new players, and accelerating, promoting technological developments PSD-2 provides the opportunity to introduce new, modern and secure services for new financial market participants under a simplified procedure. These services may include current account-based electronic payment solutions (PIS), card-based payment instruments (CIS). In addition, new entrants may also develop new credit rating procedures, agency and sales models, lending processes, or other future-proof financial services even using technological advancements, like artificial intelligence (AI).

In 2020, the Immediate Payment System (IPS) had been launched supporting money transfers happening 24/7 in a max of 5 seconds.

The trend of card payment habits of Hungarian people was showing a significant increase both in value and number of transactions, The purchases done on the internet were reaching even higher peaks [25].

Research conducted by EFISZ, having 1.000 respondents, had shown that due to pandemic 35% of the participants had changed their payment habits onto digital. Besides, 75% had answered they heard about the IPS launched in March 2020. Still in terms of payment preferences cash is the one leading but also the card payment segment had grown both contactless (62% in 2019 changed to 79% in 2020) and regular payment types (57% in 2019 changed to 66% in 2020). Besides, online payment by card had grown a lot (36% in 2019 vs. 58% in 2020) also

mobile payment had shown the same increase in time (19% in 2019 vs. 40% in 2020). Another interesting increase was shown on prepaid cards like Revolut is providing, which grew from 14% to 25% this year. This growth is also visible in the increase of Revolut's user number which in 2019 had reached 250.000.

Besides all previous market research done it is obvious that the outbreak of the COVID-19 pandemic within 2020 will further change consumer habits. In addition to several government actions at both public (physical distancing measures, limits on business activity) and private (anticipatory and causal shifts in consumer and commercial behavior) levels, there were several others also impacting customer behavior.

4   Research Method and Results on Financial Habits

The database we created is the summary result of a questionnaire querying more than 3500 students learning in Hungarian higher education. We aim to profile the complex financial, risk, and digital attitudes of this population. To build up a complex profile of the study population, 11 research dimensions were identified and a questionnaire survey was chosen to explore them. To design the questionnaire, a five-step iteration process was created, which after two iteration rounds eventually resulted in 51 questions. Our questionnaire is closed questions, but in some cases, we used multiple-choice questions and a 5-point Likert scale. The questionnaire was administered using Qualtrics Online Questionnaire Software. The questionnaire was launched on 29. November 2020 and is still being implemented.

We applied Grable and Lytton's test measuring the level of financial risk tolerance assesses the financial risk attitude of respondents by assigning scores. The questions of our test do not deviate from the questions included in the study referenced above which the co-authors published in 1999. The revised version of the test published in 1999 assessing risk attitude has of course been used subsequently as a foundation for several scientific studies. Professional literature has widely discussed the assessment of risk attitudes and the examination of the drivers behind it. Kuzniak et al. [20] performed a new test of the corrected, revised model based on their primary research, conducting a year-long retrospective review.

Outreville's study published in 2014 [22] examined individual components of risk aversion, risk behavior, and attitudes to insurance segment and services, in a broad system of correlations. Schildberg-Hörisch's study published in 2018 [26] attempts to find an answer to the overarching question, i.e. how stable in time may risk attitudes and preferences be considered. According to the essence of her study, the general understanding in economics that individuals' risk preferences are stable

needs to be revised, as it is more typical, based on her findings, that individuals, by specific life situations, are sometimes more open and sometimes less open to making high-risk decisions. Meanwhile, when assessing financial risk tolerance, considerations must also be made for the role that the so-called biopsychosocial factors and environmental factors play in creating risk attitudes [27]. These factors, according to the authors, may include age, gender, race, birth order, self-esteem, personality type, sensation seeking, financial satisfaction on the biopsychosocial side; and income, networth, financial literacy, home ownership, educational attainment, family status on the environment side. Only after these factors have fully been surveyed can we establish a stable assessment of financial risk tolerance.

In their work, Magendans et al [21] examined psychological factors which financial market regulators should pay attention to when assessing risk tolerance. They found that the so-called buffer savings created to cover losses may serve as a starting point for future studies as this was what they associated the highest significance with during their primary research. Kannadhasan's study [19] looked at retail investors exclusively to determine which factors from the gender, age, marital status, income, occupation, and qualification of the investors may have significance concerning risk tolerance, these factors are very similar to the biopsychosocial and environmental factors presented earlier.

The reviewed literature items we introduced above, therefore, introduce in general the motivations and drivers behind financial risk attitude, and they draw up a general picture by applying statistical analytical methods, descriptive literature review methodology, and behavioral economics paradigm to the question. An expanding literature base indeed means that authors of individual studies only elaborated on some of the sub-questions. Such factors may include national affiliation and gender, social, demographic status, too.

Jianakoplos and Bernasek [18] examined risk-taking levels on an international sample based on age cohorts, distinguished by year of birth. Lawrenson and Dickason-Koekemoer's study published in 2020 [28], for example, worked out a theoretical model for assessing the specific financial risk tolerance of South-African female investors. The main finding of the study is that male investors are significantly more risk-tolerant than female investors, furthermore, educational attainment level is also an insignificant factor that does not depend on biological sex.

National affiliation is another important factor that creates identity in people's lives, this may, of course, impact risk attitude, too. A study carried out on an Egyptian sample called to our attention the significant role played by financial literacy [24]. A study analyzing a Chinese sample looked at how the willingness of individuals to take risks changes in that national medium under the influence of pressure, performance pressure [29], in that study university students were asked to fill out two tests, titled: Emotion Regulation Questionnaire and the Grable and

Lytton Risk Tolerance Scale Test. Another co-authored study [17] undertook to measure an interesting intercultural risk attitude. It examined the financial management behavior of people of Korean nationality living in the United States of America. Koreans reached higher, more reliable scores in terms of responsible financial management behavior than Americans. All in all, according to the study, financial knowledge showed a positive correlation with responsible financial behavior, Koreans were better in this respect. The location of the survey and the size of household income did not show a significant correlation with responsible financial behavior. A study by Rodrigues et al. [34] applied the Grable-Lytton test to a Brazilian sample, distinguishing between respondents of a Portuguese or English language background. According to the study, risk attitude is mostly linked to savings- and consumption-related expenses. A study examined Romanian financial risk-taking attitudes during the periods directly preceding and directly following the global financial crisis [14]. The conclusions drawn based on the Romanian sample were the followings: the crisis encouraged every social layer and age group to avoid risks, people with more in-depth financial knowledge responded more quickly to the crisis, women investors responded to the crisis more swiftly and with greater sensitivity, willingness to take risks decreased with the age.

Several authors assessed risk tolerance explicitly among university students [15, 23, 30, 31, 32, 33]. Bayar et al. in their study, published in 2020, surveyed the drivers behind individual investment decisions also in a university setting. In that work, demographic, income-related, qualification-related, and socio-cultural factors behind risk attitudes were surveyed in the entire personnel of USAK university.

Our database, which stands out from the literature because of the high number of its respondents, follows this line of literature research.

4.1   Perspective on Digital Transformation and Habits

All of the respondents had fixed or mobile internet subscriptions and also smartphones, out of which 96% owned laptops or PC and only half of them were using a tablet. In terms of preference, 88% of the respondents were chosen a smartphone as primarily used to surf the internet, and only 11% who better used a laptop or PC. When taking a closer look at the habits, what is the purpose, why people are using the internet it turned out the majority, more than half of those who responded were using the internet for social media and emailing, communication, and besides, other interesting proportion was given by that 36% who are working from home, globally present changes within the environment caused by COVID19. Also, only 17% of the total participants were conducting regular online purchases and online banking is even worth it, having only 8% proportion out of the total. The respondent's knowledge level of different types of payment methods seemed to be sufficient as the majority already heard about the

different ones. When looking at the preferred payment method, the picture was showing fragmented results, the majority, 41% were chosen contactless bank card payment method, the other significant portion had been given to online payments via bank card. If considering these two and adding up swiping bank card, like means of bank card payment methods it is visible that majority, 72% is putting his/her vote to bank card payment.

4.2   Financial Knowledge and Decision Making

A total of 3543 people – from the 18-23 age group – completed the questionnaire, which allows reliable, unbiased conclusions to be drawn. Regarding the gender distribution of the respondents, 1630 men (55%) and 1913 women (45%) completed it. As for the distribution by place of residence: most (38%) completed the questionnaire from the capital. In second place are cities (32%), followed by county seats (17%) and the smallest group are those living in villages (12%).

Summarizing the responses of Generation Z, the most populous group became those with moderate risk tolerance. Within this, most of those who score 26 points, which is in the second half of the medium-level risk tolerance, are thus closer to the group of those who take a high level of risk than to the group of those with a low and moderate level of risk. (Figure 2)

There are 848 people in the group of low and moderate risk-takers, and 1738 people in the middle level, i.e., the most populous group, 697 people have a higher risk tolerance, and the remaining 260 people are highlighted as high risk-takers. Based on a percentage distribution, this is as follows: low-rated and measured risk-takers 22 percent, medium-risk takers 52 percent, and those with above-average risk tolerances 26 percent.

Of those who completed the questionnaire, women proved to be much more cautious than men in most cases. This is confirmed by the question of what you mean when you hear the word risk. Here, almost as many men chose the "opportunity" answer (42%) as they had "uncertainty" (47%). In contrast, women were the most likely to receive uncertainty (66%).

Overall, Generation Z in the questionnaire has the highest number of mid-level risk-takers. If the members of the group wants to keep their savings in investment forms with the same risk level as the risk tolerance attitude achieved on the G&L scale, stable financial knowledge is important, as this category no longer includes Hungarian government securities and low-risk investment units with stable returns, but also a variety of corporate bonds, stocks, medium and high-risk funds.

The other very populous group is the group of those who take higher risks than moderate risk tolerance. In their case, investment opportunities of a similar level are as follows: high-risk takers: leveraged ETFs, turbo warrants, call options, etc., exceptionally high-risk takers: option call, futures, investment credit, CFD,

leveraged currency, etc. These options already require extremely broad and secure financial knowledge.

Based on all this, we could expect that young people have stable financial knowledge, otherwise most of their money and savings will be at risk.
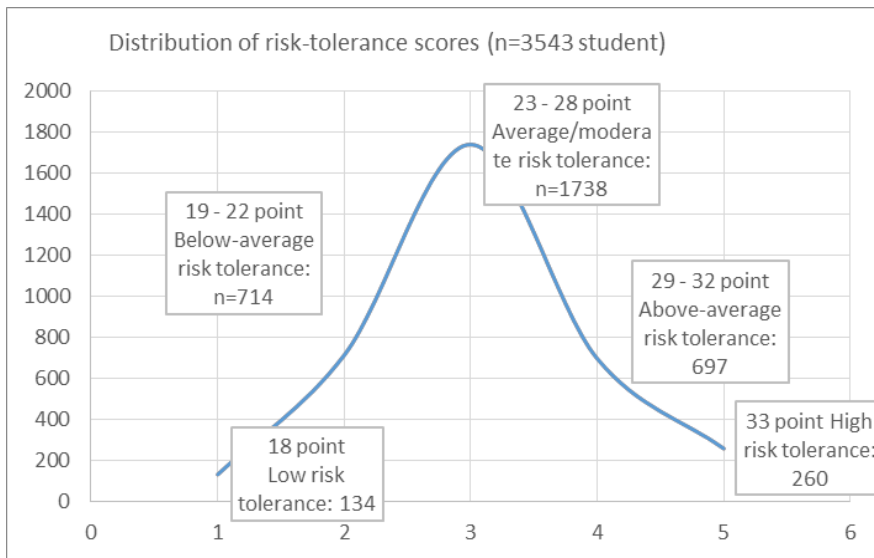

Figure 2

Risk tolerance levels

Source: Own survey on "Financial Literacy-Financial knowledge-Digital attitude" by Pintér, É.;

Bagó, P. (2020)

Surprisingly, 45 percent of young people gave themselves a grade 3 on their financial knowledge and knowledge-based on self-reports, and only 6 percent rated their knowledge as outstanding. Considering gender, it can be said that men are much more confident in their knowledge than women. On the positive side, financial knowledge and experience increase with age.

Another question related to financial knowledge was "Who does/would you give financial advice to?". Of concern is the fact that 65 percent of young people who gave grades one and two to their financial knowledge, give financial advice to others. Of those who rated themselves as mediocre, 78 percent "help" others. And 89 percent of those with higher levels of financial literacy provide financial guidance to others.

It is also surprising that 25 percent of those with the least financial knowledge (grade 1, 2) make their financial decisions independently. Most of them decide on their finances with their families and few with a bank clerk or financial advisor. Those with higher financial literacy are more likely to make their own decisions

and rely less on their families but are more likely to turn to professionals for advice.

We consider it important to examine the values given to the respondents on their financial knowledge and their score on the Grable-Lytton scale, as many things can be deduced from these. In terms of the results, remarkable and unsettling correlations emerge.

Twenty-five percent of those with low-risk tolerance gave themselves four and 4 percent gave themselves five.

For mid-level risk-takers, respondents are distributed as follows: 2 percent gave grade one (inadequate), 17 percent two, 48 percent three, 28 percent four, and 5 percent five.

However, in the case of those who took high and special risks, 2 percent gave grade one, 11 percent gave grade two to their knowledge, and 40 percent rated it as grade three. However, investment opportunities with a similar level of risk would require the consumer to have an even higher level of financial knowledge than a three, otherwise, they are exposed to very high financial risk.

While the young generation has an excellent digital attitude and average financial literacy, which could be said to require improvement, they are nevertheless confident in giving financial advice to those close to them. More remarkable is the discovery in the analysis of the data about who they take financial advice from beside their family. One might think it would be from banking professionals, but this is not the case. They look to the internet for guidance, to trusted financial experts, who are respected, and whose advice is valued. This is a new category of financial advice.
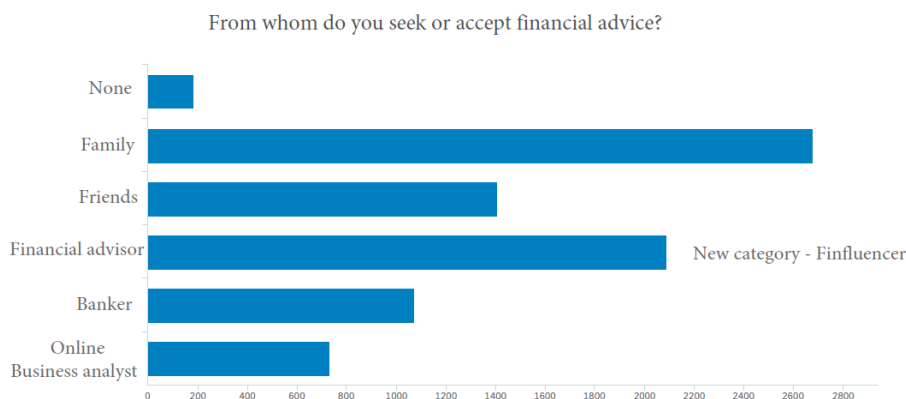

Figure 3

Financial advisory question

Source: Own survey on "Financial Literacy-Financial knowledge-Digital attitude" by Pintér, É.;

Bagó, P. (2020)

Chatbots are distrusted because they are impersonal, business analysts and bankers are not necessarily neutral enough. So the new financial influencers are personalities who can motivate young people while still providing them with reliable information. This category can be made up of successful professionals and professionally experienced educators around them. In all of this, social media plays a big role in generating communication.

Summary

Digital innovations both at a global level but also in Hungary are impacting cash usage definitely, both payment methods are driving general cash consumption into a negative trend. On the other hand, card usage and other, QR based technologies are not linked to each other. Most probably within Europe or Hungary, there will be minor cannibalization QR code versus card payment as the QR service probably would be relevant within the area where not even card payment is available. The technology is there, internet availability had spread across the country, in terms of wired but also mobile subscriptions. COVID-19 pandemic is and will change a lot globally, in terms of consumer payment habits.

Research findings indicate that most young people today assume a trade-off between financial literacy and digital attitudes, and very few perceive the need for continuous development in both areas. Not only the transfer of experience to the family and parents, but education and the development of financial culture have and will play a big role shortly. Without it, financial services innovation will not achieve its goal for both banks and consumers.

Overall, Generation Z is willing to take risks, but moderately, they have criteria they adhere to. They are open to novelty, their digital attitude is appropriate or even outstanding, they rely on traditional forms of financial services and they welcome banking innovation. What they cannot solve there, they will find another solution. The critical challenge is how to reach this age group. Who should be the new "influencers" of the financial sector? Banks, education and the community have a role to play in providing credible, experienced professionals to develop the financial culture, knowledge and engagement of young people.

Acknowledgement

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Defining the Economic Role and Benefits of Micro, Small and Medium-sized Enterprises in the 21st Century with a Systematic Review of the Literature

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Abstract: There has been a lot of research and studies on the running of small businesses. The objective of this paper is to provide a comprehensive picture of the potential of the micro, small and medium-sized enterprise sector. In the analysis, the world of small businesses will be reviewed in the broadest possible sense and the focus will not only be placed on SMEs, but also on the MSME sector, which includes very small micro-enterprises. The study will seek to shed light on the potential benefits of this sector. It highlights the importance of the sector, as well. All this has been done earlier, but this paper goes beyond general statements. It explains why it is good to be a small company, why it can be beneficial to operate as a MSME and what the real impact of this sector could be on economic growth if the necessary support and the right business environment were provided. By now everyone knows that the MSME sector is one of the engines of growth. Everybody knows that this sector has very different characteristics from large companies. However, what is less understood is why the economy actually needs so many small companies and why they are really important. This paper attempts to briefly summarise why this sector should be considered as a strategic priority and what makes a small business really valuable for economic growth and competitiveness in the national economy.

Keywords: competitiveness; SMEs; economic growth; economic development

1 Introduction

Small and medium-sized enterprises have long been in the centre of research. Many researchers and scholars have addressed issues about why this sector should be given a priority. There have been many papers, books, articles, and other publications on the subject and most of them have come up with the same findings. Nobody questions the importance of the SME sector, yet we are not doing enough to support and develop these businesses. The situation of large companies is completely different and the smaller companies that make up

the MSME sector are experiencing change in a different way. The study deliberately uses the term MSME rather than SME (small and medium-sized enterprises) to refer to the sector. In this way, giving a sense of the presence in this entrepreneurial sector of very small enterprises, micro-enterprises are also intended, which are in many cases even more vulnerable and fragile than their significantly larger counterparts. However, regardless how small they may be, these businesses have just as much impact on the performance of the national economy, and this point can hardly be argued. It is not enough to talk only about SMEs, because the small business world also includes very small micro- firms. The study thus emphasises the economic importance of MSMEs and their impact on the economy.

1.1 Interpreting the MSME Sector and its Relationship with the Economy

Companies are an integral part of society because they not only exist, but they can also create value both for themselves on the one hand, and for the economy and society, on the other hand. [51] Entrepreneurship is important for the long-term survival of the economy as it helps maintain the competitiveness of the business through value creation. [76] National development levels and economic indicators are also related to productivity. However, productivity gains are based on the performance of companies doing business in a country [68] and have a fundamental impact on the competitiveness of the national economy. [79] [4] Despite the importance of this sector in the economy [61], there is no clearly agreed definition of the concept of MSME. [38]

We cannot create a competitive country without a competitive business. Large companies are not the only ones who can play a role in that. Strengthening economic growth and competitiveness requires a stable, development-oriented, innovative business sector [82]. The MSME sector is just as important as large companies in strengthening the country's competitiveness, as these are important requirements not only for large companies but also for MSMEs. This has already been confirmed by many studies [43], but many also confirm the role of MSMEs in the national economy. [13] [28]

To interpret the sector, the same size categories are used as in other EU countries. This category system defines the types of MSMEs based on the number of employees and total balance sheet turnover. Act XXXIV of 2004 (hereinafter referred to as the MSME Act) defines SMEs as an enterprise with less than 250 employees and annual net sales not exceeding 50 million forints or a balance sheet not exceeding 43 million HUF[1]. However, the EU classification and MSEA Act

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[1] the aggregated balance (amount) of assets and liabilities. Source: balance sheet (statement of assets and liabilities)

define more precise size classes based on the above criteria. Accordingly, we can discuss micro, small and medium enterprises.

Table 1
Size categories of the MSME sector

MSME classification	Number of people (persons)		Annual net turnover (in EUR)		Balance sheet total (in EUR)
micro-enterprise	<10	and	≤2.000.000	or	≤2.000.000
small enterprise	<50	and	≤10.000.000	or	≤10.000.000
medium enterprise	<250	and	≤50.000.000	or	≤43.000.000

Source: author's own editing based on www.ksh.hu [47]

These size categories give a fairly wide range for interpreting MSMEs. Perhaps for this reason, it is not surprising that 99.8% of the companies operating in the European Union are classified in the MSME group and only 0.2% are considered large companies. [71] [23] This percentage is found in most EU member states, and Hungary is no exception. The following data show the status of MSME in Hungary. The MSME sector accounts for 99.2% of all active enterprises, while micro enterprises account for the largest proportion in the sector. With 94% of the MSME sector being micro enterprises, 5% being small businesses and 1% being SMEs, this sector is primarily about micro enterprises. It should also be pointed out that the shares of the various types of companies within the MSME sector have not changed significantly. Micro enterprises have been stable for the last few years.

The public transport sector is not only an important economic factor in terms of numbers. Its role in the economy can be assessed using a range of macroeconomic, financial, quality of life and sustainability indicators. Whichever indicator we look at, they all confirm the importance of the sector. The sector's contribution to GDP or employment is the main highlighted indicator. [6] The sector accounts for about half of the gross domestic product, which has not changed significantly over the past decade. Small businesses play a significant role in employment [60], employing nearly two-thirds of the workforce. [47]

The role of small businesses can also be examined in terms of their share of total business turnover, their contribution to investment and their ability to produce (supply) for export markets. In the latter, large companies perform better because they generate higher turnover, are more export-oriented and more willing to invest (70% of investments are made by larger companies while the MSME sector alone generates 40% of the turnover available on the market).

However, the role of the public transport sector is undeniable, and it is also clear that the public transport sector is one of the engines of economic growth. For example, its employees contribute significantly to the budget through purchases and related tax payments. It should be emphasized that they are important not only for economic growth, but also for improving the quality of life [32]. In more developed

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countries, priority is also given to the sector, the development of entrepreneurial skills and abilities, and that of entrepreneurship and self-employment, which contribute to the development of rural areas and the fight against poverty [3]. Enterprise development is not only about creating a suitable business environment for them. Enterprise development should be an important process for all enterprises. [55] Entrepreneurship should be improved, strengthened, developed and understood as an engine of growth. [74] Small business managers can also quickly identify areas where they need to acquire the right skills or knowledge. Intellectual capital is important not only for employees, but also for entrepreneurs. In this regard, managers play an important role in shaping business goals and decision-making. [8] There is also a very important link between managerial competences and performance. [20]

Some developed countries emphasize the importance of a supportive business environment[2]. A review of the results of the competitiveness report (IMD[3], WEF[4]) shows that the most developed and most competitive countries are working hard to provide suitable conditions for their companies. They do this by providing a predictable business environment, reducing red tape and corruption, working to promote innovation, and providing sufficient funding. IMD and WEF have thoroughly studied the determinants of the business environment, and both competitiveness research organizations believe that without a supportive business environment, these businesses cannot be truly enabled. [40] [80]

1.2 The Choice between Large and Small Firms: Which is Better?

A competitive MSME sector does not come into being by itself[5]. It requires circumstances and conditions that have a multiplier effect on the competitiveness of the sector and enhance its position.[50] A dynamic, innovative and competitive entrepreneurship sector is a prerequisite for the long-term economic and social competitiveness of a country. The potential of the MSME sector is no less than that of large companies. However, for some reason, there seems to be a belief that large institutions can do more because they have more capital, a greater presence in the market and more connections. [18] At the same time, a smaller enterprise can achieve significant business success as according to the principle of "many small businesses make a difference" because over time, the entire economic structure can undergo a competitive transformation, for example by improving its innovation capacity and increasing its new added value locally if an increasing number of small

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[2]   such as the Nordic countries or Germany
[3]   IMD (Institute for Management and Development). Competitiveness studies. (World Competitiveness Yearbook)
[4]   WEF (World Economic Forum) Competitiveness Studies. (Global Competitiveness Report)
[5]   for example, stimulus policies are also necessary

businesses enhance their competitiveness. However, this is not the only reason why small and medium-sized enterprises (MSMEs) need to be more competitive. There are also social reasons why these businesses need to be long-term viable and stable, develop and be able to participate in global markets. MSME companies can flexibly adapt to change [12], carry out important innovative activities, expand consumption and employment opportunities, and do more for a more sustainable and healthier future and its immediate environment. In particular, this sector needs to pay more attention to understanding youth preferences in terms of employment and location. [25] In particular, high-value family businesses have great potential in this regard. Most jobs are created by young companies and start-ups. MSMEs have the potential for rapid growth as they can be more flexible and innovative than most large companies. [16] This can be further enhanced by an open business model. Mettler pointed out that these companies rely the most on highly skilled labour because this may be the main source of competitive advantage for small businesses. He also emphasized that SMEs can be an international company and should be able to take advantage of the Internet and information technology. [56]

If these companies have sufficient innovation capabilities, apply modern technology, and can accumulate and effectively use knowledge capital, they can even cooperate with large companies. [54] However, they must have a modern business model, not lagging behind in technology, management or other innovations. [26] Innovation can be seen as a critical key to growth. [36] [42] In these days and age, technology also provides many opportunities for companies. [71] Only in this way can they develop a win-win business relationship with large companies. It should be mentioned that there is also a strong correlation between knowledge capital and organizational performance, so the MSME sector should also tackle the proper management and exploitation of knowledge. [49] [30] Applying knowledge in well-known fields can increase productivity. [27] In the long run, the performance of the MSME sector depends more on knowledge capital than on the existing level of social relations, although the latter can also play a role in enhancing competitiveness. [69] In addition, the domestic MSME sector needs to be at the forefront of small-scale and large-scale improvements and investments. The latter is, of course, risky but without targeted and rational investment there is little scope for efficiency improvement [77], so it also needs asset replacement and maintenance, without which the costs of doing business will only increase. [58]

Statistics show that the MSME sector in both Europe and Hungary, for example, is less productive and growing than the MSME in the US economy[6]. On the other hand, in our country no sufficient attention has been paid to the proper development of entrepreneurial and management skills in education. Both primary and secondary education should focus on areas such as entrepreneurial skills, legal basics and financial awareness. The latter is important not only for entrepreneurship, but also

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[6]   data source: KSH (Central Statistical Office) (2018): Characteristics of small and medium-sized enterprises

for our daily lives. For the competitive MSME sector, financial literacy and networking capabilities need to be emphasized, and the sector needs to be very good at this. [37] The financial awareness of MSMEs can increase their access to finance by getting information quickly and efficiently. [7] For the past few years, the financial viability of a company has been a major issue, according to the well-known competitiveness research institutes (WEF, IMD). This issue was not solely due to the lack of widespread access to financial and capital market products for small businesses. It was also caused by the fact that entrepreneurs could not easily find financial resources to ensure the smooth continuation of their activities. However, this is not just because banks are reluctant to lend to this sector. Entrepreneurs also need to learn more about the range of available resources, the possibility of project applications, new types of financing, and most importantly, how and where to learn more. Access to information is particularly important for companies because there is a positive correlation between the use of information and the performance of MSMEs. [52] Exploring funding sources is also part of entrepreneurship, but it requires a certain level of financial knowledge. A previous study by the World Economic Forum emphasized that financial institutions are missing out on opportunities in this regard because SMEs form a huge base for potential borrowers. [81]

It should also be emphasized that, compared with countries such as the United States or Germany, young people in Hungary are still not open enough to become entrepreneurs or self-employed. In an EU comparison, compared with peers in other EU countries, fewer young people want to start their own businesses[7]. Part of the society thinks that entrepreneurship is too risky and does not think it is a stable way of earning a living. In some cases, the term "entrepreneurship" has been associated with "cunning" and "loopholes." In many cases, the media portrays entrepreneurs in a negative light. This is not conducive to wider acceptance of entrepreneurship. These negative stereotypes need to be eliminated first, so that entrepreneurs are not seen as cunning or corrupt, but as renowned and valuable contributors to society.

Entrepreneurship education in higher education should also be promoted. More than half of young people in higher education (63% of 37,000 respondents) would like to work in a large company because they see a more secure career, position and living conditions in large companies[8]. Young people need to realize that SMEs can also offer great career paths, and that there is room for progress in start-ups and fast-growing businesses, especially if they are in a dynamic growth path. [29] According to the above survey, only 28% of respondents said they would like to work in a start-up. The results clearly show that young people are still aware of the potential for personal and professional development in large corporations, and that the SME sector is at a disadvantage in this regard. Higher education and media responsibilities in this regard need to be emphasized. If education and the media

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[7]   data source: the Hungarian Central Statistical Office (KSH)

[8]   a survey of 37,000 young people by Market and Profit

continue to spread the idea that truly great careers and career paths are only possible in large companies, there will be no meaningful change in this area in the long run. It must also show why it is worth starting your own business, what opportunities young people have as entrepreneurs, and how to make entrepreneurship more attractive to the younger generation. It could also help make the business environment for small businesses more friendly, predictable, and less bureaucratic. Research into becoming an entrepreneur is especially important for investigating and identifying differences between generations [35]. It can also be raised that SMEs have low social credibility and therefore often lack proper partnerships and collaborations in the economy. This is confirmed by the competitiveness reports of international competitiveness research institutes (WEF, IMD). Social capital is the mutual benefit of economic agents resulting from cooperation, collaboration and projects. [39] Certainly more emphasis should be placed on strengthening this, but companies themselves can more consciously look for opportunities for cooperation that could bring mutual benefits for all parties involved. The strengthening of SMEs is also a priority in the European Union and the (M)SME strategy has already been published in Hungary[9]. Countries are using a variety of instruments to empower the small business sector. These include reducing administrative burdens, fighting corruption and making it easier to set up a business.

2   Analysis of the MSME Sector

It is possible to start a business in a short period of time, but the big question is how to run a business with long-term success and profit. It is not just the administrative burden that can hinder SMEs. They need help with access to finance, need to be more entrepreneurial, and especially need better access to tendering opportunities. Like many developed countries such as Austria and the United States, this should be supported by a wide range of free advice from the government. While it is possible to set up a business in a short time, a big question is how to run it successfully and profitably in the longer term. It is not just administrative burdens that can hinder small businesses. They need help in accessing finance, they need to be more entrepreneurial, and they particularly need better access to tendering opportunities. As in many developed countries, such as Austria and the US, this should be supported by a wider range of free advice from government. The European Union has identified essentially the same important areas for the development of the SME sector: competitiveness by promoting initiatives, improving business cooperation, promoting R & D and innovation, and access to continuing learning opportunities. Progress in these areas is assessed annually by the EU of each

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9   Ministry of Innovation and Technology (2019): Strategy for Strengthening Hungarian Enterprises 2019-2030

member state. An important step has also been taken in formulating the principles of "Think Small First," [22]. This creates a business

friendly environment by advising that any public rule change should be assessed by national policy makers for its impact on small businesses before it is introduced. The Small Business Act for Europe (SBA) called for a breakthrough to foster entrepreneurship, make entrepreneurship more attractive, promote self-employment and create better business and social conditions for businesses[10]. These include improving access to finance for the sector. In an earlier study, the Boston Consulting Group showed[11] that it could be much more profitable for commercial banks to finance the business sector than the retail sector, yet domestic and international banks have based their operations on retail banking.

[14] This is currently changing as more and more commercial banks are recognizing the potential of the MSME sector. However, sector development is not only important in the financial field. The European Union's new Multi-Annual Financial Framework (MFF) from 2021 to 2027 also assigns an important role to the MSME sector. Some innovations have not been included in the development policy of this sector in the past. Financing and funding continue to be a priority area, as without adequate financial resources, no major successes can be achieved.

At the same time, rapid environmental changes are creating new challenges, especially in the areas of digitalization and the circular economy, offering significant innovation opportunities for businesses and, of course, MSMEs. In this context, this programme aims to help the MSME sector make the digital and green transition. It will support investments that also contribute primarily to green objectives. These include the achievement of a fully climate- neutral economy by 2050 ("Green Europe"), which will also ensure the consumption potential of future generations. This green approach is far from the wasteful, inefficient use of resources, pollution and air pollution, and seeks to tackle the harmful effects of global warming. It is not difficult to see that the business sector, whether large or small, can expect a significant improvement in competitiveness if it is smartly integrated into these new trends. Business can do a lot to make these green goals a reality and the MSME sector has a role to play in this.

It holds true that special attention must be paid to the financing needs of the sector, however, at the same time, we must not forget about the soft factors. A primary element of this is the development of an entrepreneurial culture. It is not just about better entrepreneurs but also about creating a business environment in which many new businesses can be established, and which helps young people to realise their ideas and visions. Becoming an entrepreneur should be as "fashionable" as, for example, getting a middle or senior management job in a large multinational

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[10]   https://ec.europa.eu/growth/tools-databases/sme-best-practices/SBA/index.cfm?fuseaction=welcome.detail
[11]   https://image-src.bcg.com/Images/FIBAC-Report-2018_tcm21-200775.pdf

company. It should help ideas to be implemented and brought to market. Help everyone to realise the potential of owning their own business, even if it seems risky to start or run a business. It is also important for national competitiveness that the economy is characterised by dynamic change and continuous innovation. In characterising the SME sector, several advantages over large companies can be highlighted [75]. The size of a small company means that it can adapt much more quickly to environmental changes. Large companies often face bureaucratic and administrative obstacles when they want to implement a change. This is because there are usually many levels of management and decision-making in a large company, which makes decision-making and implementation more difficult and slower. In a large company, there are many more people to get on board with the change. In a smaller company, this can be much easier and require less time and effort. For large companies, organisational bureaucracy is a slowing factor, even if the organisation has previously tried to build a more flexible decision-making mechanism. A large company is much slower to put anything into practice, as it takes more time to inform, involve, prepare, and document. In short, larger organisations need to mobilise more at once to successfully implement change. The same process for a smaller company, where the organisation is less tied, can be faster, the company can change direction, expand its profile or change its business, and it can be able to implement a new management or strategic decision more quickly. [66] It should also be mentioned that strategic planning can be essential for MSMEs, which can contribute to improving the economic performance of these firms.

The advantages of small businesses are speed, agility and flexibility. They may be able to change their organization in less time. Start-ups and young companies can change even faster. A feature of start-ups and gazelle is that they can "leap" in a short amount of time, which large companies cannot do at the same time. This leap is reflected in the expansion of the market and the growth of profits. Flexibility, speed, variability and innovation are important competitive factors for SMEs. Adapting to change is a strategy for business success [57]. Today, teleworking, artificial intelligence, IoT[12], mobile apps and social media have contributed to making SMEs more agile. [17] [48] For companies today, being able to meet their customers and clients can also be a business success.[63] To achieve this, there is a need to build more intensively on human and customer relationships, with a greater emphasis on human-centricity at all levels. It is precisely this that can be one of the biggest weapons of the MSME sector, that they can be closer to the people, closer to the customers than larger companies. The managers of a small business can know the employees much better, as they work together in a much smaller organisation. To innovate you need thoughtful, value-creating, creative and collaborative employees, people who are willing to contribute the best of their skills to the running of the business. For this reason, entrepreneurs need to build on their people and

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[12]   IoT: Internet of things: the smart world

create an environment in which they can deliver the best results. Moreover, as we are talking about a smaller organisation in the case of an MSME, there is also a better chance to get to know your employees better. This can allow the company to implement the best management practices that suit the employees. Another advantage of MSMEs is that they can identify more quickly if an employee needs competence development. As mentioned above, one of the biggest competitive advantages of MSMEs can be continuous learning, transforming the company into a learning organisation, but beyond that they must also constantly strive to gain further competitive advantages. [9] MSMEs can be close to local markets and needs. They may also be able to meet consumer needs that large companies cannot or will not. The 'bring the economy home' principle means that efforts should be made to meet consumer needs locally, through the activities of local producers and service providers, thereby reducing the environmental pressures of global supply chains and improving the chances of sustainability.

Localization is also a solution to major ecological problems of production and consumption. If local needs can be met, the need for transportation, logistics networks, sales and distribution channels will be reduced. This is because the international movement of goods and raw materials creates an environmental burden and greatly contributes to global warming and the expansion of the ecological footprint. Local and family-owned businesses can also play an important role in addressing environmental issues due to their inherently low ecological pressure on the planet.

However, this is not the only reason why the localized market and the public transportation sector are important. These companies have a better understanding of local habits, needs, consumer culture and people visiting the local market. This is also an advantage of sustainability. Large companies invest a lot of resources, money, time and energy in market research and data processing. But usually this does not provide a sufficiently credible and accurate picture of consumer expectations. This is also because international companies often misunderstand market information. This is due to the lack of investigation or analysis of the factors that have the most market (consumer) characteristics. These include, for example, cultural factors, which are often not sufficiently explored. Thus, the market research results obtained can be misleading. However, a small local business may have a better understanding of local markets (as it lives and operates in them), especially if it is a company with a long history of operation. Therefore, all the costs of market research can be saved by a business that is embedded in the local context. Local enterprises are, of course, not only manufacturing companies in the classical sense, but also local crafts, craft workshops, family or garage businesses, one-man firms and sole proprietorships. Although these are the smallest players in the economy, their numbers mean that they offer a great deal of potential. They can mean innovation, the emergence of new things, the possibility of rapid change, sustainability.

MSMEs can also play an important role in addressing regional disparities. Large companies are often regionally concentrated, with production and activities concentrated in specific regions or cities. The right business environment should be created to attract more businesses that can provide good jobs for local people. These firms can not only develop themselves but can also have a positive impact on their immediate environment. Where there are no jobs, people move away, and villages become depopulated. This ultimately hinders the development of the country as a whole and causes social tensions. While social harmony, a strong and cohesive society is itself a factor of competitiveness and crisis resistance. The MSME sector needs to learn how to be more resilient to crises and a smaller firm can adapt faster, change direction more quickly even when faced with a crisis phenomenon. [19] [11] In the post-crisis era, the creation of new businesses was also seen as an important economic factor, as these entities play a crucial role in real GDP growth and especially in job creation. In times of crisis, it is the new jobs that would be most needed. [44] Small firms can therefore also be an important crisis management tool, as they are the most likely to absorb labour if they can continue to grow and have the necessary resilience.[13]

The advantages of small businesses include not only organizational advantages, but also management advantages. Because they are small or tiny, their management methods are different from those of large companies. Managers can try new methods more frequently because the time and risk involved in making changes is lower than in large companies. If something does not work, you can choose to quickly revert to the previous solution or let the company test and try something completely new. Of course, innovation and seeking new things are also the characteristics of large companies. However, large companies still need to "leave more stones unturned" to introduce an innovation. Companies in the MSME sector could therefore be organisations of experimentation and continuous innovation. Rapid changes of direction, the constant search for new things, trying out and experimenting with new things could also contribute to the dynamism and continuous renewal of the whole economy. However, the implementation of innovation should not only be reflected in management methods or strategies. With the right will to grow, the capacity to innovate and people-centred leadership, the MSME sector can significantly strengthen the competitiveness of the national economy. Innovation is a factor that small firms can use to make a fundamental contribution to the growth of GDP and the national economy, not to mention their own results. [2] For MSMEs, innovation usually refers to new products or processes that enable them to meet customer needs more competitively and profitably then before. [59] The main driver of innovation practices of firms is the desire to realise higher returns by achieving better performance. Innovation is, therefore, defined as changes in a company's practices that are designed to improve performance. [24]

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[13]   resilience: crisis resilience, flexibility, resilience

There are many things that the micro, small and medium enterprise sector can do to strengthen social capital. If the level of confidence in the economy is appropriate, it can make a significant contribution to innovation success and competitiveness. MSMEs can also become part of various loose networks, alliances, and collaborations. [70] However, weak collaboration is also a problem because it affects the scale and level of innovation. [72] [83] Cooperation can make innovation more efficient, enabling joint development and brainstorming. [64] Enterprises in the small, medium and micro enterprise sector can cooperate with higher education institutions, social and civil society participants. It would also be beneficial to develop such cooperation with foreign partners. The European Union's Erasmus+ programme no longer provides mobility opportunities exclusively for students and learners, but also for entrepreneurs. It does this to provide opportunities to acquire new professional skills and competences and to build contacts abroad.

3   Results and Conclusions of the Analysis

Based on the numerous literature sources and research reviewed, it can be argued that the MSME sector is indeed a key engine of economic growth. Nor can there be any disagreement with the works that depict the sector as a key to the development of the national economy. The analysis has confirmed what has already been known, but it has also made the role of these businesses even more important. The analysis has reviewed why the MSME sector should be given much higher priority in national economic policies and strategies. To sum up, the following key areas of importance for the sector can be highlighted (expressed in D points, each of which could open a development path for the economy):

D1) a dynamically developing and competitive MSME sector can make a greater contribution to strengthening the national economy and increasing its innovativeness. D2) a more competitive MSME sector can improve knowledge-based exports. D3) a developing and competitive small business sector could further expand employment, not only in quantity but also in quality, through firm growth. D4) through their development, small businesses can also promote the development and learning of individuals, offering quality jobs and choice to job seekers. D5) a more competitive MSME sector can be a more active player in the country's innovation system. D6) a more competitive MSME sector is better able to develop partnerships with national and international companies and to participate in international projects. D7) a more competitive MSME sector would be better able to take advantage of the EU common market. However, this requires openness, awareness and greater entrepreneurship, not neglecting good management skills and language skills. The latter also need to be improved if the sector is to truly exploit the potential of the single market. D8) it is particularly important that local small businesses can also help lagging regions to catch up economically. Local businesses can contribute to the catching-up of their immediate environment and the

preservation of environmental assets and can strengthen local communities. D9) the MSME sector can do much to promote sustainability and achieve green goals. D10) a more successful and profitable MSME sector can generate important tax revenues for the central budget. The financing of growth-oriented firms could allow room for new financial innovations and a broader lending policy. D11) a more competitive MSME sector could do much to improve the country's image. D12) a more open and cooperative MSME sector could help to build social capital and confidence.

It is true that that the points above would be important to development, but we cannot expect them to change until the sector itself must be helped, as well. The competitiveness of a nation is also determined by the competitiveness of a company, and vice versa. Without the right environment and support conditions, it will be more difficult for businesses to achieve results. Therefore, it is important to give the MSME sector strategic priorities.

Summary

A good MSME sector is essential to creating a solid industrial sector in the economy. For continued and sustainable economic growth, we need a well-functioning MSME sector. [65] This study highlights the important role that the MSME sector can play in promoting economic and social development, achieving sustainability goals, and generally improving competitiveness. It is said that this idea is especially important for adapting to new post-pandemic economic conditions, innovation, rapid change, and finding appropriate solutions to new needs for new skills. The rise of the US economy after World War II tells us a lot about the strength and role of MSMEs. From 1945 until the iconic day of September 11, 2001, the United States was considered a leading country in the world economy. This period was successful for the US economy not only because it was one of the victorious powers in the world war and did not suffer significant territorial damage as a result of the world war. The prosperity in the US economy was fuelled by many fast- growing businesses that had not even existed a few years earlier. Within a few years, garage firms and family businesses had grown into medium-sized and then large companies that made a significant contribution to the strengthening of US leadership. It is not by chance that the country has been called "the land of opportunity". Everyone had the opportunity to freely start their own business and create a company they dreamt of. And if the first venture fails, you can start again, try, create, and innovate. A similar example can be found in the German economy, where many innovative medium sized enterprises were established, resulting not only in employment but also in market power and export potential. [73] It is very important not to attribute the situation of the sector solely to external factors. The will and ambition of the individual (entrepreneur) are equally important to business success, so the entrepreneurs themselves must also want to develop and achieve better results. [46] [5] Of course, an enterprise-friendly economic and development policy would be as important a condition as an enterprise-friendly business environment. Without them, the opportunity for the industry to flourish will be reduced. We are again in a special situation. The global economy is

characterized by large and rapid changes, uncertainty and increasingly complex conditions. Therefore, it is worth paying attention to the micro, small and medium enterprise sector and its renewal potential. If the sector were indeed given more attention and adequate support, it would be better equipped to face future crises.

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Circular Pathways Influential Factor in Albania through Green Products Approximation

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Abstract: Diminishing resources, climate change, and environmental challenges emphasize the need for sustainable development. The circular economy is considered a concept that faces and contributes to overcoming such challenges. This research aims to identify circular pathway influential factors in Albania by exploring green product consumption patterns. Primary quantitative research was carried out in an online survey in Albania. Exploratory factor analysis and multiple logistic regression are performed. The main influential factor on green products purchase behaviour that can serve as an influential factor to shift into the circular economy in Albania is product labelling. This evokes and supports environmental sensitivity that contributes to favouring green products. Further supportive factors are product recycling, instruction manual, and details about the ingredients, while hindering factors are the absence of interest and time pressure. However, consumption of green products depends on education level: graduates and postgraduates should have been targeted to attract novel target groups.

Keywords: circular pathways; green products; sustainable consumption; sustainable development factor analysis; multiple logistic regression

1   Introduction

Green products are characterized by all the elements of standard products (manufacturing, technologies and practices) but have the concept of sustainability integrated into each of them, and they are eco-friendly to people, nature, earth, etc. [1]. In the current international policy discourse, efforts towards sustainable development have been mainly rooted in the Agenda 2030 and the Sustainable Development Goals, adopted by the United Nations in [2], and the Green Deal Agreement endorsed in 2015 by the European Union with the 2030 Climate

Target Plan, the Commission proposes to raise the EU's ambition on reducing greenhouse gas emissions to at least 55% below 1990 levels by 2030 [3].

In the face of diminishing resources and environmental challenges, concerns for sustainable development is on the rise. There is a need to tackle sustainability, which can be achieved by integrating national and international policies regarding the circular economy (CE), the green economy (GE), and the bio-economy (BE) These concepts offer various solutions to make economic, social, and environmental objectives sustainable. The EU has increasingly stressed their importance and has made a continuous effort to shape the opinions and raise awareness with the action plan for the circular economy [3].

CE practices necessitate the commitment of all stakeholders to have a proper shelter and a successful implementation. The decision making bodies and governments are trying to make further developments, but additionally, it needs the full commitment and engagement of companies [4] and consumers as the end end-users and ultimate decision [5], [6]. The transition towards a circular economy is not possible without a fundamental change in consumer behaviors regarding the green purchase, adaptation to new business models and acceptance of product upgrading [7]. In this regard, green consumption and the demand for green products must be increased.

Fraccascia et al. [8] define green products as products that ensure the same utilities as the other products and maximally reduce the environment's adverse effects. Recently, the green products have seen raised attention and are more eco-friendly, environmentally friendly: their characteristics include the recycling concept, proper manufacturing, and taking care of human health [9] [10]. Similarly, the circular economy has gained importance as an extension of sustainability by addressing environmental implementation and providing useful business applications [11].

Green products have gained increasing attention in recent years because consumer environmental consciousness is a driven factor that facilitates green product development [12]. There are social, economic, and environmental aspects that need to be identified about them, and additionally, practical and managerial elements must be transmitted to societies, and must be translated into sustainable actions, despite the fact that environmental literacy is sometimes lacking [13] [14].

In this vein, the transition from one economic system to another needs to be drowned as a pathway. In developing countries like Albania, this pathway seems to be even more complex and will need more time. The EU Acquis's adoption, and implementation on the environment as part of the Green Deal Agreement is Albania's obligation in the stabilization and association framework. The circular economy pillar implies the development of strategies by 2023 that would cover the entire life cycle of products [15]. However, the successful adoption of EU policies in countries like Albania needs an important stock of social capital [16]. Indeed, the application of circular systems mandates a collective effort of

businesses, and governments, and especially, *the role of consumer behavior is a critical factor in defining the long-term success of 'sustainable production and consumption' initiatives* [17]. Similarly, Grafström and Aasma [18], state that other market and cultural barriers can hinder green approximation and collective efforts absence.

Circular economy underlies the green economy's umbrella, which is joined by the common ideal to reconcile economic, environmental and social goals. Despite their very close similarity, regional trends on them [19]. For this reason, 'green products' are chosen as a proxy of the pathway: firstly, it is a common concept to both of them, and secondly, the green economy is more common in developing countries, such as Albania. Other studies in Albania have shown the environmental aspects of the buying decision of food products [10], [20].

This paper aims to analyze the consumers' consciousness (awareness) and their information and general behavior about green products (pathway). The research investigates factors and aims to identify those that are more influential. The main objectives of this study are to identify influential factors that determine Albanian consumers' consciousness and serve as a circular pathway. It further seeks to analyze the hidden attributes of the awareness of the green products and, finally, explore the main factors impacting the circular pathway.

This paper is structured in the following way. The first section introduces the topic by giving its aims and objective; it continues with the theoretical framework, which provides a critical analysis and a hypothesis development. The next section deals with the methodology. The empirical sections implemented explanatory factor analysis and multiple logistic regression. Finally, outcomes are interpreted and possible theoretical and practical recommendations are provided.

2 Literature Review

2.1. Theoretical Framework

The circular economy concept has been accepted as a way to address sustainability, by not preventing current economic benefits and future generation's opportunities: it serves as an alternative business model and as a way to create additional job opportunities [11]. Green products assure the same opportunity, and in the same vein, they serve to sustainability [5]. There is a vast literature emphasizing all the dimensions of green products, from the design, manufacturing, packaging and other attributes [21], but very few of them present their consumer acceptance level and the benefits to circular shift they can offer green products [22]. Thus, there is an immediate need to understand consumer

awareness toward green products. The framework on green products appears to be best suited to draw a circular pathway.

Consumers purchase decisions are likely to be influenced by this increasing consciousness and inclination towards sustainable consumption [23], [24]. In addition, Modi and Patel [25] suggest that such consumption will tackle sustainability. Panda et al. [26] also add that policymakers, and supply chain actors must understand consumer preference in green products.

The basic idea of circular products refers to that the products must be conceptualized, designed, and manufactured to remain in a closed-loop cycle, have restorative and qualitative elements and have an ultimate objective reduction of wastes. Thus, a product is considered circular when produced to keep its initial form or redesigned only with smaller modifications, which does not cause further environmental damage. It is also capable of maintaining or redesigning its value [27]. From the consumer side, results from Albanian studies show that Albanian consumers are worried about environmental issues [20] and have a positive attitude towards them. However, this is not always positively reflected in purchase behavior [28].

On the other hand, there is an Assessment of Albanian Government Policies on the Greening of SMEs Principle 9 of the Small Business Act, which aims to turn environmental challenges into opportunities. The planning and design of environmental policy in Albania have a low score of 1.27 out of 5. Albania does not provide regulatory incentives to reduce the inspection frequency of low-risk facilities; neither is there any financial support for the greening of the economy.

Based on this situation, the following research questions are raised:

RQ1: Do Albanian consumers show sustainable consumption behaviors?

RQ2: What are the main influential factors of their green consumption?

RQ3: How can be a circular pathway in Albania ensured based on the green consumption patterns?

2.2. Hypothesis Development

2.2.1. Environmental Information and Sensitivity

Consumer environmental consciousness is a critical factor derived from the marketplace, which is the initial element of green product acceptance. Environmental knowledge refers to an individual's environmental knowledge [29]; environmental information and sensitivity are included within this concept. Environmental knowledge is analyzed concerning the attitude toward the environment [30], environmental effects of consumer behavior, acceptance of green products showing this with readiness to allocate additional funds on green

purchases [31], behaviors that are environmentally friendly and do not damage it [32], and pro-environmental behavior [33]. Environmental responsibility has also been studied concerning product assortment related to consumer choice, as this is the core of the circular economy. In this regard, we suggest that individual responsibility toward environmental protection will serve as a signal that contributes to increased consumption of green products and facilitate circular economy pathways. One of the main objectives of the circular system is to take care of the environment. Kaiser and his co-authors [34] state that individuals with environmental knowledge are more likely to be environmentally aware and deal with the associated problems, causes, and possible solutions. On the other hand, Hasan et al. [35] believe that human interventions and their contributions are related to the degree of sensitivity and affiliation towards the environment. Based on the literature above, the first hypothesis is defined:

H1: *Environmental information and sensitivity towards environmental protection influences positively circular pathways.*

2.2.2.   Purchasing Influential Process Factors

Purchasing is a complex process and is associated with many factors behind. Moreover, green consumers are sophisticated buyers, and marketers have to be aware of their preferences and the influential factors of their decisions while designing a green product [36]. Basiri and Heydari [37] analyse green products from both perspectives, from the decision making process and the level of green sales. Hopkins and Roche [38] present the additional utilities of green products that make them preferable to the customers, among which are qualities and other functional characteristics.

H2: Purchasing influential factors contribute to finding circular pathways.

2.2.3.   Source of Information

Every market is about information, and in order for the market to be efficient, there must be available information. This information is secured through different channels. The relation between available information and market efficiency holds in all fields, and in this regard, environmental information is also crucial to foster green purchases. Not knowing the benefits of a green product can be a serious barrier to public acceptance. The source of information is also very important because it will serve at different psychological levels of customers based on the source. Moore and Tjornbo [39] state that the source of information can have different emotional impacts on the customers. In this vein. While Taufique et al. [40] conclude that the source of information in research improves the overall understanding of customer attitudes and behaviors.

H3: Additional information can increase green product consumption, whereby positively influencing the circular pathway.

2.2.4.   Green Products Purchase Encouraging and Discouraging Factors

There are many reasons why a consumer can decide to buy or not buy a specific product, especially, when it needs additional attention. Maniatis [41] shows that consumers who are loyal to a brand are more likely to accept the validity of the branded green products. The study of Leire and Thidell [42] is more context-specific as they examine specific products and suggest that the focus should be on the dynamic context of the diverse purchasing situations. Ahmad and Zhang [43] analyze consumers psychological factors as determinants to green purchase and emphasize the effect of the perceived values as influential factors. For this reason, we find it worth raising a hypothesis, as below:

H4: Possible green products purchase encouraging or discouraging factors can facilitate or hinder circular pathway.

2.2.5.   Green Products Labelling

Higher consumers' credibility of eco-labels led to higher green product purchasing intention [44]. Schuhwerk and Lefkoff-Hagius [45] present the important role of detailed information on every aspect of the product we buy. Chitra [46] presents product labelling as the best alternative to offer details about products we buy as they balance the information.

There are also cases when labelling as green product may not serve as a good element to convey the purchase [47]. Due to these contradictory results about the product labeling, we formulate the following hypothesis:

H5: Green product labelling accelerates and positively influences circular pathways.

2.2.6.   Other Related Factors

Many aspects may be included in this work, which sometimes appear to be very influential and sometimes not. Padel and Foster [48] and Taghian et al. [49] list the product's category as an influential factor in purchasing a green product. Based on their findings, consumers generally choose to buy green products in the case of purchasing durables. Since customers expect longevity and reliability when buying new products [50], thus, it leads to a progress towards engendering sustainable consumption, enacting the circular economy. In contrast, Azizan and Suki [51] emphasise health-related issues as a very influential factor in green purchase. One other important factor to measure may be, how Albanian consumers perceive the role of government in the process of passing to a circular system. Parikka-Alhola [52] and Cai et al. [44] state that buying a green product is tightly related to the government roles and mandatory regulations. However, Kokthi et al. [53] show that Albanian consumers do not trust in the institutions

that issue certification on organic products. Trust might be an inhibitor factor in green product purchases.

2.2.7. Control Variables

Several authors agree on the fact that demographic data like age, gender, educational level and income level are accepted as control variables [54]. Responsiveness to product labelling systems also appears to be dependent upon the customer's demographic characteristics. The income of respondents, for example, are consistently associated with a higher willingness to pay [55]. However, when environmental consciousness is becoming more and more prevalent. Lower-income customers can also be engaged in green-thinking [58]. Female respondents are typically more willing to pay for green products than males [57], [58]. The age of the respondents' matters in some studies, although the results are contradictory: Vecchio Annunziata [57] find that willingness to pay increases with age, while Sønderskov and Daugbjerg [55] supported the opposite.

2.2.8. Conceptual Model of Circular Pathway

The circular economy is a concept that needs to have the appropriate policy framework and infrastructure to be implemented. The link between circular economy and green economy is well known. Their systems and final objectives are the same. However, they are differently applied and take different regional forms and contexts. We have also seen that Albania, in this regard, is in the infancy stage. Worldwide contexts also suggest that a green economy is rather than a circular economy initiates the circular pathways. Due to these inter matches of facts, the main measure chosen by this work to measure the circular path is conscientiousness, and the proxy of measurement is green product.

The logic flow starts with identifying elements that may raise awareness about green products. Five different constructs are considered: (1) Environmental information and sensitivity; (2) Purchasing process influential factors; (3) Source of information; (4) Green products purchase encouraging and discouraging factors; (5) Green products labelling. Awareness in its form is abstract; that is why multiple scales are applied. Based on the previously mentioned literature, there is a high-level of awareness, but this is not translated into concrete factors. The logical flow requires showing the possibility of this attitude to be turned into behavior. The theoretical framework is depicted in Figure 1.
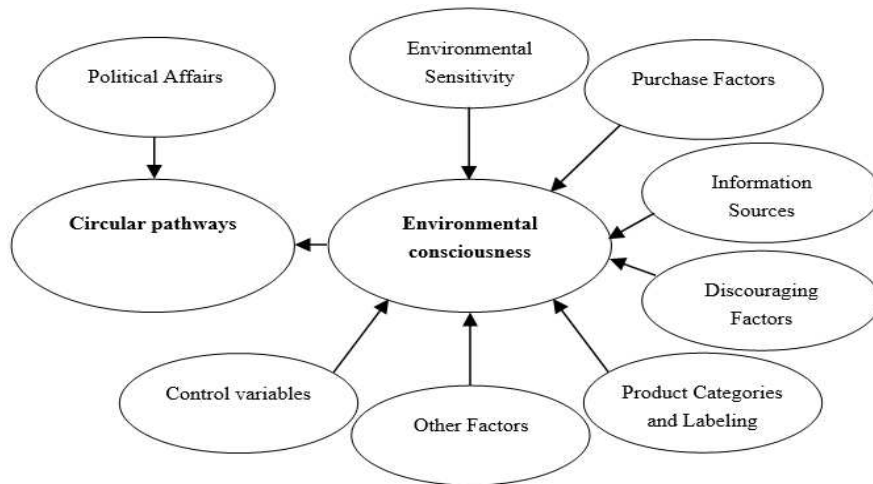
Figure 1
Conceptual Model of Circular Pathway

Source: Authors'construction

3   Methodological Framework

3.1. Methods

This empirical quantitative research aims to examine the proposed model, including five constructs, and the influence of these factors on circular pathways. The theoretical and conceptual structure have been tested. The study has applied a deductive approach and used survey as research material. The research is based on a sample consisting of 131 participants.

The initial part of the questionnaire referred to consumer consciousness on green products, and the last section looked into the demographic details. At the beginning of every section, the terms and concepts were explained. The questionnaire included scale items for each research construct that was adapted from the analyzed literature and employed variation of a five-point Likert-type scale where anchors included "strongly agree" to "strongly disagree" and "very unimportant" to "very important". Detailed information about the constructs and their indicators are presented in Table 3.

The collected data are processed through SPSS statistical package and all the hypotheses raised are tested. Initially, this study applied a Factor Analysis because

there are many initial factors identified as potential influential, and as an outcome of this analysis, the resulted latent factors are grouped as common constructs, are. These latent factors limit the choices and exclude running a regression analysis. Then, to determine the real effects, Multiple Logistic Regression was carried out.

3.2.   Sampling and Data Collection

The indicators for each construct were first identified from the literature. Data were collected from 10 February to 10 March 2021, in Albania, mainly in Tirana. One hundred thirty-one responses were collected using online platforms, like email, Facebook, LinkedIn, etc. Thus, the research is limited regarding the sample size and the sampling method, the results can be referred to the respondents.

Of the participants, 47.3% are male, and 52.7% are female. We tried to take care as much as possible of the graduation qualification as the minimum criterion for selection in the hope that participants could understand the research topic well. Of 131, 55.6% are graduates, 34.4% have master degrees, and 10% have high school qualifications. The sample distributions are depicted in Table 1.

Table 1
Demographic Profiles of the Respondents

Demographics	Value	Frequency	Frequency percentage
Gender	Male	62	47.3
	Female	69	52.7
Age	18-24	40	30.2
	25-34	62	47.3
	35-44	23	17.6
	45-54	4	3.1
	55-64	2	1.5
	65+		
Educational Level	High School	13	10
	Graduate	73	55.6
	Postgraduate	45	34.4
Monthly Incomes	<100 euro	6	4.6
	100-300	20	15.3
	301-600	49	37.4
	601-900	33	25.2
	901-1200	15	11.5
	>1200 euro	8	6.1

Source: Authors'construction

To evaluate the conformity of the particular data set for the factorial analysis, Kaiser-Meyer-Oklin (KMO) analysis was performed to measure sampling adequacy. As a result, the KMO value is 0.807, which is an impressive result and shows that factor analysis is appropriate.

4　Results

To conduct the factor analysis, questions have been considered in each survey section that measures the circular pathway from different factorial variables. Due to the fact that initially these variables were measured in scales and showed high correlation, to reduce the number of variables and transform them into shrink variables, principal component factor analysis (PCFA) is used. Existing scales of measurement have been used since they demonstrate a satisfactory level of reliability and validity, and modifying those means losing important information.

The promax or orthogonal rotation in which the assumption is that there are inter-correlations between components. This is applied to original factor loadings to minimize the correlation between two factors. As a selection criterion for the number of the factors is used, the minimum eigenvalue and factors with an eigenvalue equal, or higher than one are taken into consideration.

4.1.　Reliability Analysis

Before analyzing the results and hypotheses, a reliability test was conducted. The results (Table 2) reveal that the value of Cronbach's Alpha for the whole construct is 0.872, and it is acceptable for factory analysis studies [59].Thus, this means that the reliability of the questionnaire is very high. The reliability tests for each separate construct are above 0.659 that is considered reliable especially because the results refer to social sciences [60].

Table 2

Reliability Analysis

Construct	Number of Items	Cronbach's Alpha
Environmental Information & Sensitivity (EIS)	12	.688
Purchase Influential Factors(PIF)	4	.659
Source of Information (SI)	10	.887
Green Product Discouraging Factors (GPDF)	8	.849
Green Product Labeling (GPL)	9	.925
The overall Cronbach's Alpha	43	.872

Source: Authors'construction, N=131

KMO test of sample adequacy is used to investigate if the sample is suitable for implementation of factor analysis. This test takes values between 0 and 1 and it is a measure of the degree of common variance among variables of interest, which is the opposite of uniqueness. The lower the uniqueness values are, the higher factor loading and the value of KMO are. A value lower than 0.6 of the test indicates that the sample is not suitable to implement factor analysis. Table 3 presents all the constructs and components that have appropriate KMO values.

Table 3

Principal Component Factor analysis

The main constructs and their indicators	Constructs				
	1	2	3	4	5
Environmental Information & Sensitivity					
My consumption has impact on the environment	.813				
I am responsible to protect environment	.811				
Environmental protection isn't important to me	.784				
Individual should take care about product they buy	.696				
Purchase Influential Factors					
Environmental Impact of the Product		.840			
Product Price		.752			
Product Quality		.567			
Source of Information					
Friends			.828		
Family Members			.821		
Colleagues			.775		
Envirnmental Activists			.764		
Government			.637		
Green Product Discouraging Factors					
Their Absence and Rareness				.812	
Lack of Appropriate Information				.803	
Their higher prices				.720	
Loyalty towards existing products				.708	
Time Pressure during the purchase process				.688	
Indifference towards their environmental benefits				.647	
Green Product Labeling					
Product Manufactured by Eco-friendly Firm					.929
Certified by trusted institutions					.880
Details about the Ingredients					.864
Confirmation about eco-friendly package					.849
Quality of Manufacturing Firm					.824
The amount of gas emissions by manufactures					.766
Guideline about Product Usage					.671

Note: Overall Kaiser–Meyer–Olkin test of adequacy is 0.807

Source: Authors'construction, N=131

5   Regression Results: Path Analysis

After conducting a factor analysis and extracting the factors, a regression analysis by multiple logistic regressions is performed. Multiple logistic regression is applied when one nominal and two or more measurement variables can be included in the analysis. The nominal variable is the dependent (Y) variable; the effect of the independent (X) variables are studied on the probability of obtaining a particular value of the dependent variable. Green product purchase during the previous year is used as a dependent variable, and as independent variables the extracted factors and the demographic data are included.

Regarding the purchase of green products during the previous year was a question with three answer categories, which is why logistic regression was selected. Once you enter the regression "yes" as the reference point, the analysis will be done for two other answers that are in our case "No", and "I'm not sure".

The path analysis of the research model made it possible to estimate the value of regression weights for each path in the regression model (Table 4). Therefore, the confirmation of the research hypotheses is supported by the statistical significance of these estimates at a level of 0.05. In addition to this, the size of the regression weights allows us to assess the strength of the relationship between the antecedent and purchase intention, with the strength of the positive effect of the antecedent on consumer willingness to purchase green products.

According to path coefficient, critical value and p-value, all independent variables affect the dependent variable (green purchasing decision). Hence, all hypotheses are confirmed and based on the path coefficient, the most influential factor appears to be green product labeling.

Table 4

Pathway analysis

Hypothesis/Path Analysis	*p* Value	Critical Value	Regression Weight/Path Coefficient	Results
H1: Environmental information and sensitivity positively influence circular pathways.	0.001	5.553	0.112	Confirmed
H2: Purchasing influential factors contribute to finding circular pathways.	0.042	2.123	0.277	Confirmed
H3: Source of information can increase green product consumption, which influences positively circular pathway.	0.021	5.111	0.149	Confirmed
H4: Possible green products purchase encouraging/discouraging factors can facilitate/hinder the circular pathway.	0.033	3.528	0.191	Confirmed
H5: Green product labelling accelerates and positively influences circular pathways.	0.020	2.122	0.474	Confirmed

Source: Authors'construction, N=131

Table 5 shows that the third level of education, which corresponds to the high school education, is tightly related to the source of information factor, and when they come together, the decision is not to buy green products. It is translated into the result that based on the source of information, the probability of buying green products at the high school education level is very low.

Table 5

Distribution of Demographic Data and not Buying Green Products

Variable	B	St. error	Sig.	Exp (B)
Education Level=3*Factor 3	-1.791	0.699	0.010	0.167
Education Level=5*Factor 2	-2.370	0.937	0.011	0.094
Education Level=1*Factor 3	2.997	1.489	0.043	20.03
Income Level=2*Factor 3	-6.365	2.139	0.003	0.002
Income Level=4*Factor 3	-3.150	1.359	0.020	0.043
Income Level=4*Factor 5	4.789	2.159	0.027	120.1
Male*Factor 5	2.997	1.489	0.044	20.00
Female*Factor 3	-1.475	0.673	0.028	0.229

Source: Authors'construction, N=131

The result of not buying a green product for level 5 of education which corresponds to the post-graduate studies, is related mainly to factor 2, which explains the discouraging factors. The time pressure they have and their loyalty to the existing brands they use to buy can explain this result. The income levels 2 and 4 correspond to the ranges 100-300 euro/month and 601-900 euro/month decide not to buy green products mostly due to the source of information. The income range of 601-900 euro/month is also influenced by factor five, which includes other factors and the product category they use. They believe that clothes have more environmental impact and are responsible for environmental protection. Considering gender, females are mostly negatively influenced by information sources, and males are more likely to act environmentally friendly.

Table 6

Distribution of Demographic Data and not Sure about Buying Green Products

Variable	B	St. Error	Sig.	Exp (B)
Male*Factor 5	2.997	1.489	0.044	20.00
Education Level=4*Factor 3	-1.791	0.699	0.010	0.167
Education Level=5*Factor 3	-2.370	0.937	0.011	0.094
Education Level=1*Factor 3	2.997	1.489	0.043	20.03
Male*Factor 5	-1.039	0.388	0.007	0.354
Female*Factor 4	-0.731	0.306	0.017	0.481

Source: Author's construction, N=131

Males are not sure to buy or not a green product because they do not have clear thoughts about the environmental impact of their consumption activities (Table 6). People who are more educated evaluate the source of information more and consider the information when they buy a green product. Males are less aware of the environmental impact of their consumption activism have, and females think that nowadays, societies are more aware and responsible toward the environment.

6 Discussions

The study examines the green purchase behavior between different latent constructs on a sample of Albanian consumers, where the most and least influential factors affecting the circular pathway are revealed. These results go in the same vein as the study of Xue et al. [5] and Jaiswal and Kant [65] who clearly state that consumers are more willing to pay for environmentally friendly products. Environmental information and sensitivity have been confirmed as the least influential factor toward green product purchase. However, it is not translated into concrete action, and those latent factors are not effective predictors of the circular pathway. The respondents have environmental information and are sensitive about these issues since many factors appear to be present, but at the same time, they are not reactive to such issues. Since the hypothesis is confirmed, such a change in behavior can be realized.

Secondly, product, price, quality, and category are the main influential factors regarding the green product purchase intention, and automatically the main circular pathway influential factors. This study confirms that young and educated consumers are willing to make changes in their purchasing behavior and will choose green products over traditional products. These consumers are ready to pay extra for the organizations that are working towards environmental sustainability. They stated that they feel proud when purchasing green products, but too high price in comparison to their non-green substitute can withhold them.

The main results of the analysis are: 61% decide themselves on purchasing process; 48% buy at physical shops, 50% both physical and online; 48% do not know that what they bought is a green product, and 50% do not buy green products at all. However, they are willing to buy green products even at higher prices. 77% fully agree that they are responsible for environmental protection; 66% are willing to change their purchase behavior; 67% have heard about eco-labeling, and labeling is an important factor for them; 36% think that government must raise the consciousness, and 26% think that environmental education must be regulated.

Conclusions and Recommendations

The article contributes to developing a framework for a circular economy shift in the case of developing countries. The research is primarily based on individual behavior features of the consumers, and it is confirmed that it can work properly as such. In order to have a more compressive and clear understanding of the customer behavior, it may have been better to categorise the latent factors as internal and external influential factors in the purchase behavior.

Practical implications of the study suggest that the future concerns to shape the consumer behavior have to consider demographic data as a must in the circular pathway. Stakeholders have to work strongly with educated consumers on environmental sustainability, push them to take further action, inform he other groups better, and strongly work with the green purchase discouraging factors. Companies have to take care of green products practices, price, quality and category. They have to consider that customers have time pressure due to the dynamism of life activities, and the information flow must better reach them. Therefore, companies should make serious efforts to provide easy availability and improved distribution for consumers to buy such products.

The most influential factor on the decision to buy green products appears to be their labeling which provides us insights to that the circular pathway starts with that factor. Under this construct, there were included many factors like quality of the product, reliability, the effect that the products and manufacturing firm have on the environment, etc. Thus, labeling is a significant factor in greening the economy, and it contributes to increasing trust and associating in the way to corral paths.

The second most important influential factor to circular pathways appears to be identifying purchase encouraging factors on buying green products. Surprisingly, this appears most on the person with the level of education from graduate to post-graduate, which means that they are the target group that needs more focus to convey.

Males generally appear to be less environmentally sensitive and have less information on environmental issues, while females appear to be more concerned about the sources of information. The income level does not seem to be the main factor in the decision to buy green products, but once they are associated with other factors, it seems that the most influential factor is the information level, rather than the income level that is associated with purchasing decision.

Since in Albania the circular economy concept is in its infancy phase and from the questionnaire results also can be seen that they perceive the circular economy as recycling. Based on this, we would suggest undertaking future work on recycling because it is more common to the public, and results will show more accuracy.

We would recommend including a particular green product in future work in further analysis. In this regard, any product from the clothes category can be

chosen since based on the results of this work, they are perceived to have environmental impact by Albanian customers.

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Management under Crisis Conditions - the Impact of the COVID-19 Pandemic on the Formation of Respondents' Opinions within the e-commerce Market, in Poland

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Abstract: The outbreak of the COVID-19 pandemic was an unexpected phenomenon that triggered a multitude of changes within various aspects of socioeconomic functioning. The ongoing pandemic is a threat to health and life. What is more, it negatively impacts the economy and alters social and consumer behavior. These transformations are visible in relation to commercial activities, which have largely been transferred to the online zone. The aim of this paper was to verify the adopted hypotheses whether the pandemic has a statistically significant impact on the opinions of respondents aged 45+ about the e-commerce market. Two statistical methods, such as, chi-squared test of independence and Wilcoxon pairwise rank test were used to verify the accepted hypotheses. Based on the statistical analysis, it has been proven that the pandemic had a significant impact on the opinions of the respondents concerning online safety, unlimited availability of the offered products and the need for further improvements in current technologies. During the pandemic, a correlation has also been established between the gender of the respondents and their opinions on online shopping as a better alternative to brick-and-mortar shopping. Moreover, a relationship was demonstrated between gender and the opinions of the respondents, that further development of new information and communication technologies is necessary. The study showed that the COVID-19 pandemic statistically influenced differences in the distribution of variables, in the area of respondents' behavior, within the e-commerce market.

Keywords: crisis management; e-commerce; COVID-19; consumer; consumer behavior

1 Introduction

The outbreak of COVID-19 pandemic can be identified as an unexpected and crisis situation, which in the initial stage stopped the activities of companies in many industries, thus, disrupting the smoothly functioning management mechanisms. In addition to the economic and financial impact, the pandemic has undoubtedly

affected customer behavior in the area of trade, which has largely moved to the Internet. The basis of this study is a review of available literature sources, industry reports and the results of empirical studies conducted using the CAWI method. The study, based on my empirical research, pays special attention to the change in respondents' opinions about the e-commerce market, before and during the pandemic. The opinions of respondents aged 45+ on e-commerce before and during the COVID-19 pandemic were analyzed. The aim of the paper is to verify the accepted hypotheses of whether or not the COVID-19 pandemic triggered a statistically significant impact on respondents' opinions, concerning the e-commerce market. Therefore, two statistical methods, the chi-squared test of independence and the Wilcoxon pairwise rank order test, were used.

2   Theoretical Background

The success of an enterprise is inextricably linked to the quality of management, which is associated with the ability to direct processes, information or resources in a given entity to achieve the adopted objectives in an effective manner. According to Peter Drucker, management designates the social and economic development that results from it [1].

Management is primarily about people and is deeply embedded in culture [2]. It includes functions such as planning, organizing, motivating and controlling [3]. Planning is the determination of an organization's goals and how to achieve them. Organizing can be defined as a managerial activity directed at determining the best method of classifying the organization's activities and resources. The last two functions refer to regulating the behavior of employees and observing the progress of the organization in achieving its objectives [4]. Some authors recognize that the concept of management is so complex that its explanation is not possible through a single definition [5]. However, the fact that in its essence it focuses on the human factor is undeniable, and so the people employed, while the final result of the taken actions is to be customer satisfaction. Yet, wrong decisions can have the opposite effect [6].

When crisis situations arise, the management of any entity, including those operating in the field of e-commerce, is hampered and made a subject to numerous negative incentives. The very concept of crisis is defined as an unintended process containing a course of events taking place at a specific time, which disrupts the balance of the company and the environment and affects the viability of the organization. Such a situation influences the necessity of making difficult and, most of all, risky decisions by owners, managers or executives, concerning the financial, organizational or personal sphere. Crisis phenomena may also be a threat to the realization of company's goals or even lead to its collapse. Identification of customers' needs and motivations has a significant impact on managing a company

during a crisis and a possibility of taking specific actions to reduce its negative consequences [7]. In the process of managing a crisis situation, a fundamental role is played by the management staff, who take such decisions [8]. Crisis on the basis of management science has a pejorative character and is an event of low probability of occurrence and high impact [9]. The causes of occurrence and its results are usually ambiguous [10]. A crisis can also threaten the safety and even the lives of employees, customers, or the community at large. One consequence of the occurrence of such a phenomenon may be a breakdown of public trust in organizations, which would affect their reputation. The consequences of a crisis can be identified in many ways, ranging from physical, financial or psychological damage, through the depletion of a company's financial resources to its collapse in the end [11]. A crisis is a very difficult occurrence for a company also because of the speed of its development and the fact that its end is extremely hard to define [12]. In addition to the effects of pejorative overtones, it can be indicated that the crisis situation can even lead to renewal of the company, through the forced need to learn [13]. The crisis is then treated as a stage, that enables a new life or the introduction of new technology [14].

The modern world is dominated by information and communication technologies [14]. Technological progress as an expression of widespread access to digital services and mobile devices affects the functioning of users around the world [16]. The driving force behind these transformations in the digital world is considered to be the e-commerce market [17]. Electronic commerce, or e-commerce is an issue whose origins date back to the 1990s, when there was a commercial development of the Internet, with which it is inextricably linked [18]. E-commerce, e-trade or electronic commerce are sometimes treated as the same concept. Despite the multitude of scientific publications, currently there is no uniform definition, due to the continuous technological progress and different emphasis on the discussed issue. Therefore, as noted by M. Lewicki, defining e-commerce depends mainly on the context in which it is used [18]. The Central Statistical Office defines the e-commerce market as: "Transactions conducted over networks, based on the IP protocol and over other computer networks."[20]. In a similar vein, the e-commerce market is defined by other authors identifying it with the type of transactions carried out through Internet technologies. [21] [22]. The OECD, in turn, identifies the concept of e-commerce as an order for the purchase/sale of a service or good, placed using a computer network, the recipients of which may be both private and public, while the distribution and payment for the service received may take the traditional form [23]. The term e-commerce can also refer to the phenomenon of using the global network for activities related to the service, purchase, or sale of the offered products [24]. However, as noted by the WTO [25], e-commerce is not only about financial transactions, because the term also defines such online activities as marketing, data exchange, and sales support. Although the e-commerce market consists of many individual segments, the most popular activity manifests itself through buying or selling activities [26].

The current understanding of e-commerce is inextricably linked to the Internet. The implementation of electronic data interchange (EDI) is considered to be the beginning of e-commerce. Demand, as a result of the expanding number of entertainment or information browsers, contributed to the use of the Internet by households. The gradual expansion of e-commerce to include a range of newer and newer businesses offering their services and products through the use of the Internet contributes to the ever-expanding e-business [27].

Nowadays, e-commerce is considered to be one of the key segments of the economy that leaves its mark on the functioning of entire societies. Hence, e-commerce can be seen as an obligatory enabling element in today's economy [28]. Therefore, it seems reasonable to discuss the advantages and disadvantages of the e-commerce market. Advantages can be considered from the perspective of the various stakeholders i.e. customers, businesses and society. The disadvantages can be classified into technical and non-technical disadvantages as shown in Fig. 1.

Both in the area of traditional trade and e-commerce, the key role and function is played by the consumer. According to Kowalik, a consumer is a natural person who conducts a legal act with the entrepreneur, which is not directly related to his business or professional activity. Consumption is based on the use of material and spiritual goods, in such a way as to meet specific needs [29]. Thus, consumers' needs are the motivation for a purchasing process [30]. Buyers decide to choose the most advantageous offer for themselves, and their behavior is a consequence of innate and acquired needs and aspirations, the satisfaction of which is possible through a combination of conscious and unconscious processes and emotional stimuli [31].

Customer perspective: availability 24/7, convenience, time saving, ability to compare prices, products, reviews

Enterprise perspective: no geographic restrictions, saves money, improves efficiency, can reach the right people, higher advertising returns, easier to manage business, better possibilities to compete at a low capital

The societal perspective: reduced travel and therefore reduced pollution, ability to offer products at favourable prices due to lower fixed costs

Technical: network connectivity, lack of network security - theft of consumer data, credit card fraud, the requirement to constantly update software and hardware, too expensive Internet access.

Non-technical: lack of opportunity to test the offered goods, lack of personal contact, limited consumer services, delayed delivery- spoiled, damaged products offered, ability to choose the cheapest option.
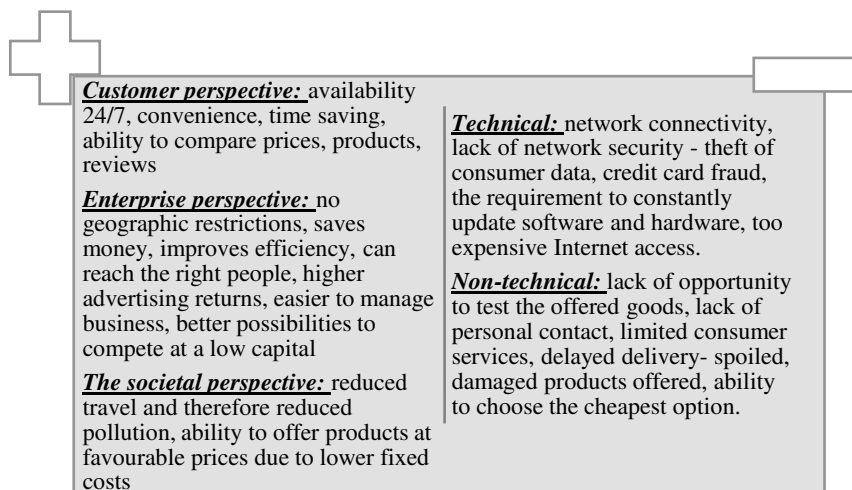
Figure 1

Advantages and disadvantages of e-commerce

Source: Own study based on [32]

One product should satisfy many needs, while one need can be satisfied by a variety of offers. The foundation of marketing decisions is to know the reasons why consumers choose a particular product, as well as to acquire knowledge about purchasing behaviors and the directions of their changes [30].

In the literature, consumer behavior is defined as actions taken by individuals who make subjective choices regarding the purchase of goods and services, as well as ways of using the goods they own or getting rid of used goods [33]. According to another definition, these behaviors are defined as activities related to: seeking, acquiring, using, and evaluating goods and services to satisfy consumer needs [34].

Consumer behavior, through its interdisciplinary nature, can be considered in various aspects. The consumer's decision to purchase a product depends on many factors, including: economic, psychological, social, as well as the components of the marketing mix. Companies care about matching their offers to consumer needs, as well as the possibilities and skills to create these needs [35].

Currently, consumers are more and more frequently and willingly making purchases via the Internet. The behavior of e-commerce customers and customers of brick-and-mortar shops show significant differences. Online shoppers tend to have more products, services, and information at their disposal than during traditional in-store shopping. However, the lack of a direct seller-customer relationship when shopping online limits the elicitation of desired purchasing reactions [36].

Consumer behavior can be divided into: rational and irrational. Rational behavior is manifested when the consumer, receiving a certain income, purchases only such quantities of goods that cause him the greatest satisfaction. Irrational behavior of buyers can be found when they act internally inconsistent, contrary to their own interests, and their actions are dictated by imitation, impulse, snobbery or motives that may lie in their consciousness [37].

The shopping behavior of online and in-store consumers is determined by various factors. A breakdown of factors and their examples are presented in Fig. 2.

External (exogenous) factors   **Internal (endogenous) factors**

☐ PSYCHOLOGICAL CONDITIONS (e.g. personality, habits, habits, motives, attitudes)   ☐ age

☐ ECONOMIC CONDITIONS (e.g. products, income, advertising, price, place of sale)   ☐ gender

☐ SOCIO-CULTURAL CONDITIONS (e.g. family, reference group, social group, leaders)   ☐ education
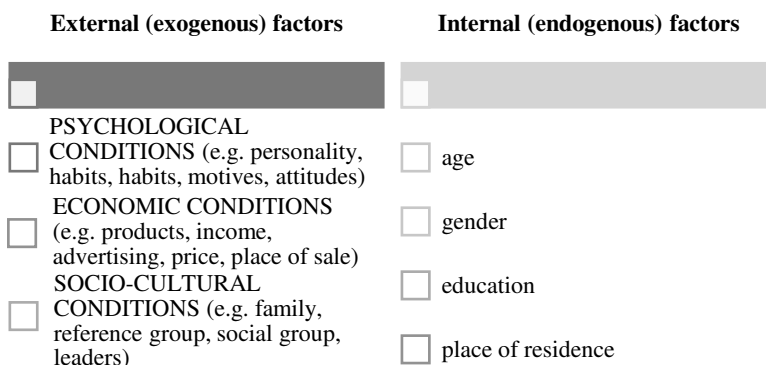
☐ place of residence

Figure 2
Determinants of the purchasing behavior of consumers
Source: own study based on [38]

In the literature we can come across different models of customer behavior in the e-commerce market. According to one of them, consumers see a product for the first time in stationary stores, then they look for additional information about it on the Internet, and eventually they make a purchase. According to another model, consumers first obtain information about a product in online stores, and then decide to buy it in a stationary store after physical contact with the product. These models are often identified with the age of the buyers, the first of which is attributed to young people [39].

All consumers are unique, so the influence of individual factors can determine their behavior in different ways. The most influential factor is considered to be the economic criterion, which is expressed by purchasing goods at the lowest possible price [40]. Motivation, the environment and political factors have a significant influence on the attitude of consumers to e-commerce [41]. The evolving environment and advancing technological and information development create new opportunities and solutions. The influence of external factors can have both positive and negative effects, and it is not always possible to control them. Consumers most often adapt to the changing environment, as exemplified by the outbreak of the COVID-19 pandemic. According to the latest research, the COVID-19 pandemic contributed to a change in consumer purchasing behavior, which was visible in all e-commerce subsectors. The interest in e-shopping increased in relation to sports equipment, retail services, cosmetic products, and financial services by 23.6%, 7.0%, 3.7% and 1.8%, respectively [41]. The change in consumer behavior resulted not only from the COVID-19 pandemic itself but also from the government restrictions. Consumers, regardless of their age group, now buy online more often [43].

According to the OECD report "E-commerce in the times of COVID-19", e-commerce is the fastest-growing segment of commerce in recent years. 5 years ago, the global market was worth about $ 1 trillion, but currently, it is over $ 3 trillion. The annual growth of the e-commerce market is around 20%.[44].

According to the report "E-commerce i fintechy. System naczyń połączonych "(data: Retailx), the value of the Polish e-commerce market was EUR 12 billion in 2019. In Europe, the UK has the largest online shopping market - EUR 200 billion in 2019, followed by Germany (EUR 105 billion), and France (EUR 94 billion). The Polish e-commerce market is growing dynamically, both in terms of the value of products sold and the number of online stores. At the same time, the contribution of online purchases in total retail sales is growing in each segment. [45].

Summing up, it should be noted that the world is currently dominated by ICT. Based on the literature review, it was remarked that the outbreak of the COVID-19 pandemic significantly contributed to the development of the e-commerce market in Poland and around the world. This segment of the economy has left a significant mark on the functioning of society as a whole. The pandemic also affected the behavior of consumers, who are buying more and more frequently and willingly via the Internet.

3 Research Methodology

According to the data collected by the Central Statistical Office [46] over the years the percentage of people using the web for activities such as ordering or buying has been systematically increasing. In 2020 in Poland about 61% of the population, which is about 17.6 million people, will make purchases on the e-commerce market. Undoubtedly, the factor that significantly affected the functioning of the entire economy was the outbreak of the COVID-19 pandemic. The lockdown introduced in March 2020 and the fear of contagion significantly contributed to the shift of activity to the web. This was reflected both in terms of various leisure activities to daily life activities such as shopping, visiting the office, bank or e-healthcare. According to the CBOS report of July 2019, the main determinant of online activity is age [47]. In the group of older people i.e. over 55 years of age, education is also important. According to the above mentioned publication, 3 out of 4 oldest respondents did not use the Internet. Therefore, the aim of this study was to determine the behavior of consumers in the 45+ group in the e-commerce market. The age of the respondents was selected due to the risk group (older people - more vulnerable to infection) and due to low online activity before the pandemic. The research design was as follows, as shown in Fig. 3.
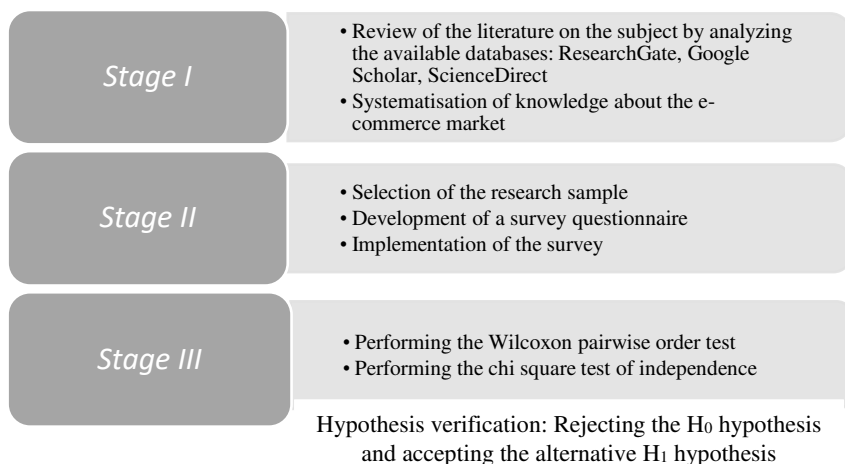

Stage I	• Review of the literature on the subject by analyzing the available databases: ResearchGate, Google Scholar, ScienceDirect • Systematisation of knowledge about the e-commerce market
Stage II	• Selection of the research sample • Development of a survey questionnaire • Implementation of the survey
Stage III	• Performing the Wilcoxon pairwise order test • Performing the chi square test of independence

Hypothesis verification: Rejecting the H_0 hypothesis and accepting the alternative H_1 hypothesis

Figure 3

Research process stages

Source: own research

The SARS-COV 2 pandemic is characterized by many changes of a socio-economic nature. In addition to the real threat to life and health, the COVID-19 pandemic also entails different social and consumer behavior. These changes are particularly evident in the area of commercial activities.

Therefore, it is considered reasonable to verify the chosen research question whether COVID-19 pandemic affects consumer behavior in e-commerce market. For this purpose, the following hypotheses were adopted:

H₀: $F_1=F_2$ COVID-19 pandemic did not affect the statistically significant differences in the distributions of variables in the area of consumer behavior in the group of respondents over 45 years old in the e-commerce market.

H₁: $F_1 \neq F_2$ the COVID-19 pandemic affected statistically significant differences in the distributions of variables in the area of consumer behavior among respondents over 45 years old in the e-commerce marketplace.

The questionnaire included questions to assess consumer behavior and motivations before and during the pandemic. The questionnaire consisted of both qualitative and quantitative questions and a metric. The survey was implemented with a non-random sample. Responses were obtained by posting the survey on https://swpanel.pl/. The survey was completed by 437 people, of which people over the age of 45 accounted for approximately 34%. More than half of the people in the 45+ sample were women. The majority of the surveyed sample consisted of people living in cities between 20-100 thousand, which is 33%, and respondents living in cities with more than 100 thousand inhabitants. The majority of the research group consisted of economically active respondents with secondary and higher education.

A five-point Likert scale, bounded by phrases ranging from strongly agree (5) to strongly disagree (1), was used to determine differences between the pre-pandemic and during-pandemic states. In order to determine whether there were significant differences in respondents' opinions about the e-commerce market before and during the pandemic, a Wilcoxon pairwise rank order test was performed due to the fact that two dependent groups could be paired before and after the experiment. Calculations were performed using Statistica software. In order to verify whether the respondents' opinions about payment and data security during online shopping, online shopping as a better alternative to stationary shopping, and the need for further development of new information and communication technologies are statistically significantly dependent on gender, place of residence, age, education, or average monthly net income, a chi square test of independence was performed. Calculations were performed using Microsoft Excel.

4 Results and Discussion

4.1 Wilcoxon Pair Order Test

To verify the hypotheses, the Wilcoxon pairwise rank order test was performed. Test probability level values of $p \leqslant 0.05$ were obtained, so there are grounds to reject the null hypothesis H_0 and accept the alternative hypothesis H_1. Thus, it should be concluded that the opinions of the respondents before and during the pandemic are statistically significantly different from each other.

Table 1
Wilcoxon pair order test

Variables	N	T	Z	P
respondents' views on payment and data security during online shopping before & during pandemic	60	238.5000	4.980124	0.000001
survey respondents' opinions on: "online shopping is a better alternative to stationary shopping" before pandemic & during pandemic	55	322.5000	3.749400	0.000177
survey respondents' opinions on: "further development of new information and communication technologies is necessary" before & during the pandemic	44	289.0000	2.404060	0.016215

Source: Own research

survey respondents' opinions on payment and data security when shopping online
respondents' opinions on: " online shopping is a better alternative to stationary shopping
survey respondents' opinions on: "further development of new information and communication technologies is necessary
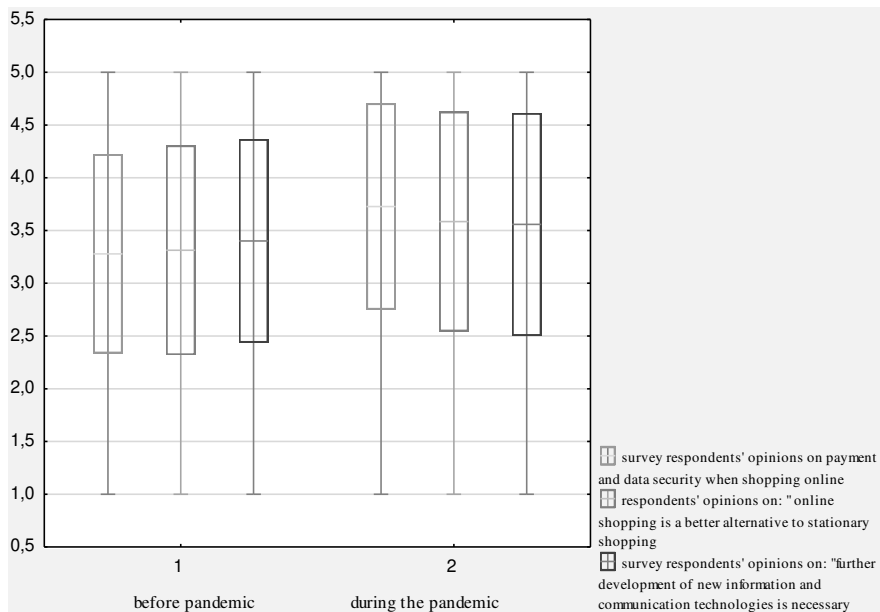
Figure 4
Wilcoxon pair order test

Source: Own research

The results show that the pandemic had a significant impact on the respondents' opinions on online safety, unlimited availability of offered products and the need for further improvement of current technologies. The results of the Wilcoxon rank order test are presented in Fig. 4.

4.2   Chi Squared Independence Test (χ^2)

The results of the chi square (χ^2) independence test conducted are shown in Tab. 2.

The computational process involved several steps. The first step was the calculation of theoretical counts assuming that the variables are independent. The next step was the calculation based on the following formula:

$$x^2 = \sum_{i=1}^{k} \sum_{j=1}^{s} \frac{(n_{ij} - n'_{ij})^2}{n'_{ij}} \tag{1}$$

Where:

   n_{ij} - observed counts
   n'_{ij} - theoretical values

The critical value tables of the chi-squared distribution were then read from the magnitude for a significance level of $p = 0.05$ and calculated from the formula: $(k-1) \times (s-1)$ degrees of freedom. For gender, the number of degrees of freedom is 4, for place of residence, age and education 12, while for average monthly net income 16. From the tables, the values of (2) were read, which, assuming a significance level of $p = 0.05$ and the degrees of freedom mentioned above, are respectively: 9.4877; 21.0261 and 26.2962. When the calculated values are greater than the critical values of the chi-squared distribution read from the tables, it is considered that there are grounds to reject H_0 and accept the alternative hypothesis H_1, which is marked in red.

Table 2
Chi squared independence test (χ^2)

	before the pandemic	χ^2	during the pandemic	χ^2
GENDER	the relationship between the gender of the respondents and their opinion on payment and data security when shopping online	2.3509	the relationship between the gender of the respondents and their opinion on payment and data security when shopping online	2.7869
	the relationship of respondents' gender to their opinion on: "online shopping is a better alternative to stationary shopping"	6.7414	the relationship of respondents' gender to their opinion on: "online shopping is a better alternative to stationary shopping"	9.7052
	the relationship of respondents' gender to their opinion on: "further development of new information and	5.3325	the relationship of respondents' gender to their opinion on: "further development of new information and	10.6858

	communication technologies is necessary"		communication technologies is necessary"	
PLACE OF RESIDENCE	the relationship between the respondents' place of residence and their opinion on payment and data security when shopping online	17.9215	the relationship between the respondents' place of residence and their opinion on payment and data security when shopping online	20.9524
	the relationship of respondents' place of residence to their opinion on: "online shopping is a better alternative to stationary shopping"	9.6896	the relationship of respondents' place of residence to their opinion on: "online shopping is a better alternative to stationary shopping"	12.7989
	the relationship of respondents' place of residence to their opinion on: "further development of new information and communication technologies is necessary".	11.3313	the relationship of respondents' place of residence to their opinion on: "further development of new information and communication technologies is necessary".	11.7771
AGE	the relationship between the respondents' age and their opinion on payment and data security when shopping online and data security	12.8438	the relationship between the respondents' age and their opinion on payment and data security when shopping online and data security	8.8060
	the relationship of respondents' age to their opinion on: "online shopping is a better alternative to stationary shopping"	17.3023	the relationship of respondents' age to their opinion on: "online shopping is a better alternative to stationary shopping"	10.9527
	the relationship between the age of the respondents and their opinion on: "further development of new information and communication technologies is necessary".	23.2904	the relationship between the age of the respondents and their opinion on: "further development of new information and communication technologies is necessary".	15.5086
EDUCATION	relationship between respondents' education and their opinion on payment and data security during online shopping	46.6269	relationship between respondents' education and their opinion on payment and data security during online shopping	33.3440
	relationship of respondents' education to their opinion on: "online shopping is a better alternative to stationary shopping"	54.8109	relationship of respondents' education to their opinion on: "online shopping is a better alternative to stationary shopping"	57.0211
	relationship of respondents' education to their opinion on: "further development of new information and communication technologies is necessary".	34.2802	relationship of respondents' education to their opinion on: "further development of new information and communication technologies is necessary".	35.6190

AVERAGE MONTHLY NET INCOME	the relationship between the respondents' average monthly net income and their opinion on payment and data security while shopping online	16.5753	the relationship between the respondents' average monthly net income and their opinion on payment and data security while shopping online	11.2201
	the relationship of respondents' average monthly net income to their opinion on: "online shopping is a better alternative to stationary shopping"	17.6212	the relationship of respondents' average monthly net income to their opinion on: "online shopping is a better alternative to stationary shopping"	17.0949
	the relationship of respondents' average monthly net income to their opinion on: "further development of new information and communication technologies is necessary"	15.2550	the relationship of respondents' average monthly net income to their opinion on: "further development of new information and communication technologies is necessary"	18.8656

Source: own research

It is therefore evident that in nine cases there are grounds to reject H_0 and accept the hypothesis H_1, which means that the analyzed variables show stochastic relationships. Respondents' opinions on: payment and data security during online shopping, online shopping as a better alternative to stationary shopping, and the need for further development of new information and communication technologies, are statistically significantly dependent on their level of education. This relationship is evident both before and during the pandemic. Better educated people saw, regardless of the pandemic, a greater need and necessity for the development of new information and communication technologies, tend to agree or strongly agree, with the statement that online shopping is a better alternative to stationary shopping, and consider online payments and data to be secure.

A statistical relationship was also noted between the age of the respondents and their opinions on the need for further development of new information and communication technologies before the pandemic. Before the outbreak of the pandemic, the largest number of respondents, 63.64% of the total group over 55 years of age tended to agree with the above statement. During the pandemic this relationship is not observed due to the fact that the majority of respondents, as many as 50.34% of all respondents strongly agree or rather agree with the need for further development of new technologies. Before the pandemic, the number of people agreeing with this statement reached only 42.86% of the total research sample.

The test conducted showed that there was a statistically significant relationship between the gender of the respondents and their opinions on: "online shopping is a better alternative to stationary shopping" and between the gender of the respondents and their opinions on: "further development of new information and communication technologies is necessary" during the pandemic. Before the pandemic, the responses of respondents, regardless of gender, showed significant discrepancies, while

during the pandemic, the majority of women, 63.86% of all female respondents strongly agree or tend to agree that online shopping is a better alternative to stationary shopping, as well as 59.04% strongly agree or tend to agree with the need for further development of new information and communication technologies.

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Conclusions

Management of economic activity within the conditions of an epidemiological crisis, in many countries, determined the change of attitude of customers for the way of purchasing goods and services.

Despite the negative impact of the COVID-19 pandemic on most sectors of the economy and the social sphere, there was a positive impact on the e-commerce market, whose revenues in Poland in 2020 amounted to about 100 billion PLN. In the coming years, further expansion of this market can be expected compared to traditional stationary shopping [48].

The pandemic helped to reduce the percentage of people who were technologically excluded, in terms of Internet access. During the pandemic, about 10% of respondents did not have permanent access to the Internet. The pandemic also had a positive effect on access to personal electronic equipment, which was declared by 80% of respondents in the discussed group. The Wilcoxon rank-sum test and the chi-squared test of independence confirm that the COVID-19 pandemic influenced statistically significant differences in the distribution of variables in the area of consumer behavior in the group of respondents over 45 years old in the e-commerce market.

The aim of the study was to assess consumer behavior and motivation before and during the pandemic. The conducted literature review highlighted the fact that the pandemic had an impact on the behavior of consumers, who more frequently and willingly buy via the Internet. On the basis of the Wilcoxon signed-rank test, it was determined that COVID-19 had a statistically significant impact on the opinions of respondents on cybersecurity, unlimited availability of the products offered and the need for further improvement of current technologies. The chi-square independence test showed a correlation during the pandemic, between the gender of the respondents and their opinions on online shopping, as a better alternative to brick-

and-mortar shopping and that between the gender and the opinions of respondents, that further development of new information and communication technologies is necessary.

The conducted research was of a pilot nature. Further research should take into account larger sample sizes.

Conflicts of Interest

The authors declare no conflict of interest.

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