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Examining young people's awareness of electricity consumption during the energy crisis from the perspective of economics students in Hungary

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ABSTRACT

Objective: The objective of our article is to analyse students' knowledge, awareness, feelings and attitudes to the energy crisis, in particular, the rising price of electricity in Hungary to test whether students are aware of their electricity consumption and influenced by the opinion of their close relatives. We also examined how consumption awareness is influenced by the variables of the number of tenants and the person who pays the electricity bill.

Research Design & Methods: In the research, self-administered questionnaires as qualitative research tools tested the previous assumptions. In total, 272 responses from students of economics at a Hungarian university were analysed by using an ANOVA test. The structural equation modelling (SEM) method for modelling latent variables was used for analysis, including the variance-based method (PLS over-analysis).

Findings: Our study showed that the number of occupants does not affect consumption patterns as most changes in savings are explained by either awareness or by a clear understanding of consumption patterns, and only 10.2% by the war and its consequences.

Implications & Recommendations: Savings on energy and awareness are interdependent. It was also pointed out that there are a lot of factors as a source of information such as (social) media in addition to family, friends, and acquaintances, who do not take the lead in terms of credibility.

Contribution & Value Added: Previous research analysed many context- and area-specific determinants of responsible consumption. Our article explores consumption awareness and analyses savings to obtain information about the feelings and attitudes, as well as reactions of Hungarian students of economics to the energy crisis.

Article type: research article

Keywords: energy crisis; savings; awareness; consumption; electricity; SEM model

JEL codes: D9, Q2

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INTRODUCTION

As soon as the European Union's economy slowly began to recover from the pandemic, it had to face the challenges of energy security. The EU is now aware of the current energy price crisis, which is mostly caused by market gas instability. Stable and smooth collaboration between governments and institutions is required to support households and enterprises affected by price hikes. The shift to clean energy and energy independence from fossil fuels is a priority due to the current geopolitical and energy market conditions (Khatiwada *et al.*, 2022). The interconnection of gas markets resulted in an overdependence. Independence from fossil fuels should be the EU's long-term objective (Calanter & Zisu, 2022). The extent of our dependence on fossil fuels is incompatible with the EU's decarbonization objectives so low-carbon alternatives are supported by present laws and regulations (Barnes, 2020).

Europe needs to step up its efforts to attain energy independence. The invasion of Ukraine served to highlight Europe's reliance on Russian gas and the necessity of a diverse energy source for energy security.

Previous research analysed many context- and area-specific determinants of responsible consumption (Carrete *et al*., 2012; Bakó *et al*., 2021; Győri *et al*., 2021). However, only the most recent studies examined responsible energy consumption in response to the crisis in 2022. The article aims to fill a gap by exploring consumption awareness and analysing savings to obtain information about the feelings and attitudes, as well as reactions of Hungarian students of economics to the upcoming energy crisis. To this end, research questions were framed on the factors that led to the current situation, the reliable sources of information, changes in consumption patterns, and worries about livelihood.

Our primary research was conducted to examine students' knowledge, awareness, feelings, and attitudes to the energy crisis and the rising price of electricity in Hungary.

In the course of the research, we formulated the following research questions.

RQ1: Are young people aware of their electricity consumption and its financial implications?

RQ2: What factors do respondents think are responsible for their energy situation and how do they save electricity?

RQ3: What do they consider to be a reliable source of information on this issue?

The article is structured as follows. After the introduction, we will discuss the theoretical background of the energy crisis of 2022-2023. Next, we will describe electricity consumption and price in the current situation, along with changes in consumption patterns. Next, we will provide the main analysis of electricity consumption patterns and trends together with the research questions and hypotheses. The final section will present the hypothesis test, conclusions, practical implications, limitations, and the possible future threads of the research.

LITERATURE REVIEW

The Energy Crisis of 2022-2023

As a result of the Ukrainian-Russian war, energy shortages and high prices, Europe's economy was predicted to suffer in the winter of 2022-2023 as energy costs were ten times greater than the five-year average (Jayanti, 2022). According to Eurostat (2023), millions of Europeans now spend a record percentage of their income on energy due to growing wholesale prices for gas and electricity.

Germany suffered significantly as a result of its dependency on Russian gas (Ruhnau, 2022). The British spent twice as much in 2021 (Sharafedin, 2023). In July, Turkey's gas prices more than doubled compared to the previous year, while the country's electricity prices increased by 67% (Sharafedin, 2023). The average price of electricity on the Spanish wholesale market in August 2022 increased by 19.3% from July (EurActiv, 2022). Late in August 2022, energy costs in France also reached all-time highs as they were increased by 25% (France24, 2022).

Consumer Behaviour Towards Electricity

The exploration of consumer needs and the price elasticity of demand in consumer choice theory is well suited for electricity markets, where consumers' reactions to price changes can be explored using mathematical methods (Sharifi *et al.*, 2018). In the case of energy consumption, the problem of climate change requires a transition to carbon-neutral energy. The use of renewable energy sources, including the development of renewable electricity systems, is a complex task (Timmons *et al*., 2020).

Behavioural economics sought to provide adequate answers to behaviours that were previously unexplainable. The findings show that taking biases into account might have an impact when there is a strong demand for an energy end-service (Good, 2019). Demand response can also be used to improve the reliability of energy systems. Since the tasks related to the model are very complex, artificial intelligence can be used to map consumer preferences, and dynamic pricing, and determine the optimal decision for energy consumption (Antonopoulos *et al*., 2020). Blasch *et al*. (2017) confirm that investment literacy also plays a role in reducing electricity consumption.

The Current Situation and Hungary's Reaction to the Crisis

The reaction of electricity consumption to changes in price can vary in the European Union, depending on factors such as the overall economic situation, the level of energy efficiency, the availability of alternative energy sources, and the specific regulations and policies in place. Citizens in the EU are adopting voluntary steps to minimize their use of natural gas, fuel, and electricity (Favero & Gross, 2023). Electricity prices in EU countries are connected to energy prices in other EU countries and tied to the green transition from a fossil fuel-based energy production system to one in which renewable energy plays a larger role. Regulatory power market reforms safeguard the transition from a fossil fuel-based energy production system to one in which renewable energy plays a larger role. However, similar patterns of energy market growth may be observed in other nations where liberalization of electricity markets resulted in changes for industry, homes, and other end customers (Bojnec, 2023).

There are not many fossil fuel deposits in Hungary. Therefore, its share of global oil reserves is 0.001%, and that of global natural gas is 0.002%, respectively. Coal makes up a larger portion, *i.e.* 0.28% (Advanced Energy Technologies, 2023). Hungary depends on energy import, and gas is the most prevalent energy source, yet approximately 10% of Hungarian villages lacked access to a gas network, leaving only solid fuel (wood and coal) or electricity as possibilities for heating. Due to the sharp increase in gas prices, many houses shifted to wood heating (Győri *et al*., 2021). This change in energy pricing will have a detrimental effect on the standard of living of many Hungarians (Moldicz, 2022). According to Eurostat, Hungary has the greatest rate of monetary deflation in Europe, with inflation at 21.7% in November (2022). As global energy costs are increasing, food and gasoline prices are continuing to rise. Regarding electricity, the one-year forward price on 1 May 2021 was 60.4 EUR per megawatt-hour, while the price on 6 July 2022 was 515.4% higher, and forward prices for energy commodities have been rising since then (Kovalszky *et al.*, 2022).

The government declared an energy emergency in August 2022, fearing a widespread energy crisis across Europe with an aim to increase energy security and prepare the citizens for the crisis. The previous pricing scheme for both gas and electricity was modified by setting monthly band limits and annual consumption limitations to pay the subsidised, lower price (Magyar Közlöny, 2022). However, individuals who exceed the imposed limits should compensate for the excess at market rates.

These prior empirical results allowed us to assume the following research hypotheses:

H1: The young people surveyed are aware of their electricity consumption, which is influenced by who pays for electricity and by the number of people living in the household.

H2: The young people interviewed are saving electricity because of the current situation.

H3: The young people selected in the survey consider their close relatives as the most credible source of information about the situation and this influences their perception of the reasons for the situation in the electricity market.

RESEARCH METHODOLOGY

Our primary research was conducted with the objective of examining students' knowledge, awareness, feelings, and attitudes to the energy crisis and the rising price of electricity in Hungary.

A study at the Budapest Business School was conducted last year to investigate how students at a business school perceive the current economic situation, including the development of the electricity market, the price of electricity and its related consumption. The institution is the 'number one business university in Hungary' (bge.hu, 2023). The authors chose this institution as a research site because students at the 160-year-old university receive a high level of business education. It was assumed that students of economics follow and recognize the issues of electricity as an important area of business.

The survey was conducted in a form of a questionnaire (Si *et al.*, 2022) with self-administered questionnaires, which were completed anonymously, voluntarily, and exclusively for research purposes. The authors paid attention to the university's ethical rules and those of GDPR while completing the questionnaires, which had not been pre-validated so reliability was checked by re-sampling 15 people with results

similar to the original questionnaire. The questionnaire consisted of 18 closed and two open questions. Before starting the tests, a pilot study was conducted to check if all questions were understandable and not misleading. The respondents did not experience any problems with interpretability, so the originally drafted questionnaire was sent out without any modifications. Social media platforms and classrooms were used for sharing, so willingness to respond could not be measured by the researchers. In total, 272 students completed the questionnaire. All questionnaires were evaluable. The questions were divided into three major groups, the structures of which are presented in Table 1.

Table 1. The structure of the questionnaire

The first group of questions Students' specifications	The second group of questions Electricity consumption habits	The third group of questions Electricity situation
Gender Age How many people live together on the property? Residence? Cost of living? Are you aware of their electricity consumption in kWh and in HUF?	What does conscious electricity use mean for the student? How did the situation change the electricity use of the respondents?	How are you informed about the current electricity situation? What is the cause of the power situation in the world? Are you worried about your livelihood because of the situation?

Source: own study.

The data were analysed using SPSS version 28 with univariate and multivariate analysis and the authors used SMART PLS4 version to build the model.

RESULTS AND DISCUSSION

There are few insights into how particular sociodemographic, behavioural, and attitudinal variables affect home power usage (Wallis *et al*., 2016).

The findings of the research of Wen *et al*. (2022) conducted in China indicated that the intention to energy conservation, personal norms, green trust, and awareness are the key contributors to energy conservation. Consumers are compelled to learn about household energy management and shape their ideas and knowledge about it as a result of social and ecological attitudes, economic conditions, and other factors (Żywiołek *et al.*, 2022).

Consumers' actions, motivations, and attitudes can result in efficient and effective energy management (Slupik *et al*., 2021). While examining behavioural patterns of energy consumption in Bangladesh, Islam *et al.* (2022) highlighted the role of increasing awareness through training and improving responsibility in developing responsible consumption behaviour.

Based on the concepts above, Hypothesis 1 was developed.

H1: The young people surveyed are aware of their electricity consumption, which is influenced by who pays for electricity and by the number of people living in the household.

Young people are viewed by parents as large energy consumers, who are less likely to advocate for energy conservation because they view electronic devices as integral parts of their existence (Schmidt *et al*., 2014).

The main objective of Si *et al.*'s study (2022) was to look into young people's influencing variables and energy-saving activities, which adds to the knowledge about the variables that affect energy-saving practices. Since carbon emissions made energy consumption a significant factor in climate change, academics and policymakers focused on home energy-saving practices and expenditures. It is difficult to turn a household into a carbon-neutral one simply cutting energy costs at the household level (Pio & Managi, 2023). The results of Li *et al.* (2021) also underpin the role of awareness in household energy consumption. By analysing a university campus, Setyowati *et al*. (2019)

concluded that energy saving is only possible if the management of campus energy facilities is properly integrated with the behaviour patterns of the citizens to save energy.

Based on the concepts above, Hypothesis 2 was drafted.

H2: The young people interviewed are saving electricity because of the current situation.

The study by Lusinga and de Groot (2019) examined how primary school students in a low-income neighbourhood use energy. The research offers insights into how geographical and contextual elements, such as the socioeconomic circumstances of the family and social practices, influence children's energy behaviours. Parental nagging and inconsistent behaviour were ineffective in encouraging children to conserve power (Aguirre-Bielschowsky *et al*., 2018). The two groups that have the largest influence on how children develop their energy conservation knowledge are parents and teachers (Pearce *et al*., 2020).

The research of Bjønness *et al*. (2022) also concluded that parents are a valuable resource in assisting their adolescent's decision-making processes. Wang *et al*. (2022) confirmed the efficiency of family connections in encouraging energy conservation between parents and children.

Based on these concepts, Hypotheses 3 was formulated.

H3: Young people selected in the survey consider their close relatives as the most credible source of information about the situation and this influences their perception of the reasons for the situation in the electricity market.

In what follows, the authors present their findings on their hypotheses along the lines of their research.

The first results that the authors present are the sample specification results. In total, 272 respondents participated in the survey. The average age of the respondents was 20.58 years with a standard deviation of 3.3 years.

The sample specification is summarised in Table 2.

Table 2. Sample specification (%)

Features	Frequency (%)
Gender	43.4% male 56.6% female
Respondents' place of residence	47.4% Budapest 5.1% city (with more than 100 000 inhabitants) 41.5% town (with inhabitants between 1000 and 100 000) 5.9% village (with less than 1000 inhabitants)
Type of property where they currently live	4.9% student hostel 22.3% rented apartment 5.3% rented room 64.0% with the family on their own property 3.4% with the family in a rented property
Number of persons living on the property	4% 1 26.1% 2 28.3% 3 24.3% 4 17.3% 5 or more
Who pays the electricity bill?	5.9% on their own 16.2% with flatmates 69.1% parents 8.8% they and the parents together 0% other

Note: n = 272.

Source: own study.

In the sample, 70.4% of men lived with their families, compared to 59.1% of women. 20.0% of men and 33.6% of women lived in rented property. There was a correlation between gender and property type in the sample (Chi-square test: Chi-square: 12.867 df: 4 sig.:0.012 p<0.05). The majority (46.7%) of those who paid the bill themselves lived in rented property. Where parents paid the bills, 81.6% of respondents lived with a close relative.

Depending on who pays the electricity bill for the property, the sample was very divided. For those paying with parents, the majority were either renting a property (33.3%) or were still staying at home (58.3%).

In the survey, students were asked to decide to what extent they agreed with statements related to electricity consumption in the context of the current situation. On a Likert scale of one to five, one meant absolutely no and five meant absolutely yes.

In Table 3, we show the extent to which respondents agreed or disagreed with each set of questions.

The authors created several constructs, so-called latent variables, which included understanding consumption patterns, consumption awareness, consumption saving, reasons for the situation and sources of information.

The data show that the respondents are less aware of their electricity consumption although the variances show that there is still a large deviation in this respect. The authors examined how awareness of consumption is influenced by the variables of how many people live in a property and who pays the electricity bill. The number of occupants did not have any impact while both the knowledge of kWh hours (F: 6.352 df: 3 sig.: 0.01 p<0.05) and the knowledge of the amount of the monthly electricity bill (F: 7.954 df: 3 sig.: 0.01 p<0.05) were influenced by the person who pays the electricity bill.

According to the ANOVA test, students' energy awareness was not affected by factors such as who pays the bills and how many people live in a property. Energy conservation is more prevalent among students than their perception of energy awareness. Here, in addition to lighting, the focus is now on the optimal use of electrical appliances. Surprisingly, conservation is not influenced either by the number of occupants in a property or by the person who pays the electricity bill. The high mean scores indicate that it is an important issue, especially saving money on lighting: the standard deviation (SD: 0.726) was very low, indicating that respondents were unanimous on this question.

Not only war but also environmental factors play an important role. Close relatives are regarded as the most credible source of information while the average score is much lower for media, which are seen as no less reliable.

The results also showed that students with different costs of living differ significantly in terms of thrift (I use a light where I am: F: 9.31 df: 4 sig: 0.00, I use energy efficient devices: F: 3.541 df:4 sig.:.0.008). Thus, for example, students living on HUF 200 000 or less per month are significantly more likely to save electricity than those who spend HUF 40 000 or more per month. In total, 42% of students are worried about their financial livelihood because of the energy situation they face, and only 11% were not worried at all. Paying the electricity bill is a problem for 18%, while for 20% it is not.

In the subsequent part of the study, the authors created a model to identify the relationship between knowledge of consumption, energy awareness, saving, reasons for the energy situation, and their sources. The variables in Table 3 and others were not included as they would have degraded the values of the latent variables.

For the analysis, we used the structural equation modelling (SEM) method (Hair *et al*., 2011; 2013; 2014; 2016) for modelling latent variables, including the variance-based method (PLS over-analysis). In the SEM model, the latent variables generated from the indicators and the relationships between them can be modelled.

The SEM method consists of two parts: the measurement model and the structural model. In the former one, the relationships between the latent variables and the indicators can be analysed while in the latter one, the relationships between the latent variables can be examined.

The latent variables can be endogenous or exogenous. Exogenous variables are the explanatory variables, endogenous variables are the explained variables. For PLS-SEM, items (the manifest variables), the metric measurement-level variables, are not required to be normally distributed (Hair *et al*., 2016; Kazár, 2014). The indicators were not normally distributed, which the authors tested using the

Kolmogorov-Smirnov and Shapiro-Wilk tests. For all variables, the p-value was less than 0.01, *i.e.* normality could not be confirmed. Table 3 presents latent variables and items.

Table 3. Respondents' views on the current situation, consumption, and sources of information (N, M, SD)

Constructs	Variables	N	Missing	Mean	Std. Deviation
		Valid			
Consumption aware	Aware 1 I am aware of how much (how many kWh hours) of electricity we consume each month in the current dwelling.	272	0	2.95	1.353
	Aware 2 I am aware of the monthly electricity consumption (in HUF) of the current residential property.	272	0	3.41	1.320
	Aware 3 I am aware of how much electricity we use.	272	0	4.07	1.011
Awareness	Conscious 1 I only use electricity for appliances that I am using or that need electricity to run constantly (fridge, freezer).	272	0	3.72	1.298
	Conscious 2 I only use lights in the room where I am.	272	0	4.59	0.763
	Conscious 3 I use energy-efficient electrical appliances and replace those that are not.	272	0	3.17	1.219
Thrift	Thrifty 1 I only power appliances that I am using or that need electricity to run constantly (fridge, freezer).	272	0	4.01	1.165
	Thrifty 2 I only use lights in the room where I am.	272	0	4.66	0.726
	Thrifty 3 I use energy-efficient electrical appliances and replace those that are not.	272	0	3.63	1.236
Reasons 1	Environmental 1 Scarce energy sources.	272	0	3.42	1.107
	Environmental 2 Excessive past consumption.	272	0	3.29	1.193
	Environmental 3 Inefficient use of energy.	272	0	3.44	1.099
Reasons 2	Energy 1 Unreliable information on energy and electricity market developments.	272	0	3.20	1.126
	Energy 2 Buildings not up to date in terms of energy efficiency.	272	0	3.56	1.071
	Energy 3 Lack of public promotion of energy saving.	272	0	3.32	1.163
	Energy 4 Use of electrical equipment that is not up to date.	272	0	3.32	1.085
	Energy 5 High cost of energy upgrades.	272	0	3.45	1.004
Reasons 3	War 1 The Russian-Ukrainian war.	272	0	3.85	0.975
	War 2 EU sanctions.	272	0	3.17	1.164
Source 1	Close relatives 1 Family members	272	0	3.48	0.913
	Close relatives 2 Friends, acquaintances	272	0	3.28	0.821
Source 2	Media 1 TV	272	0	2.65	1.042
	Media 2 Radio	272	0	2.86	1.012
Other	Conscious Other 1 I unplug chargers after charging the device.	272	0	3.53	1.478
Other	Conscious Other 2 I use energy-saving light bulbs.	272	0	4.05	1.071
Other	Thrifty Other 1 I unplug chargers after charging the device.	272	0	4.10	1.294
Other	Conservative Other 2 I use energy-saving light bulbs.	272	0	4.25	0.997

Source: own elaboration, n= 272.

The standardised factor weights, when all items were examined, were above 0.5. The multicollinearity of the indicators, the VIF, is good if it is below 5 (Hair *et al.,* 2016). This was met for all variables.

There are several ways to test the reliability of latent variables. One of them is the CR (composite reliability) value, which should be above 0.7 (Werts *et al*., 1974). The CR values of the latent variables met this requirement. To measure the convergence validity, the AVE (average variance extracted) values were all higher than 0.5, which could be appropriate (Fornell-Larcker, 1981). The results of the above analysis are presented in Table 4.

The test of discriminant validity was conducted according to the Fornell-Larcker (1981) test, where the square root of the mean variance extracted by a construct should be greater than the correlation between the construct and any other construct. For the model, this criterion was fulfilled, except for awareness and thrift (where the variance was very small). The other possibility is cross loading, *i.e.* items can express content more strongly in their own construct than in another latent

variable. This condition was also fulfilled by the model. Due to space constraints, only the Fornell-Larcker criterion and cross-loading results are presented in Tables 5 and 6. The items and constructs were indicated by the authors' labels in Table 3.

Table 4. Standardised factor weights, VIF, validity, and reliability results

Constructs	Variables	Stand. fact. w.	VIF	CR	AVE
Consumption aware	Aware 1 I am aware of how much (how many kWh hours) of electricity we consume each month in the current property.	0.778	2.034	0.820	0.603
	Aware 2 I am aware of the monthly electricity consumption (in HUF) of the current residential property.	0.789	2.087		
	Aware 3 I am aware of how much electricity we use.	0.763	1.104		
Awareness	Conscious 1 I only use electricity for appliances that I am using or that need electricity to run constantly (fridge, freezer).	0.753	1.129	0.766	0.522
	Conscious 2 I only use lights in the room where I am.	0.709	1.131		
	Conscious 3 I use energy-efficient electrical appliances and replace those that are not.	0.706	1.205		
Thrift	Thrifty 1 I only power appliances that I am using or that need electricity to run constantly (fridge, freezer).	0.799	1.345	0.804	0.578
	Thrifty 2 I only use lights in the room where I am.	0.757	1.269		
	Thrifty 3 I use energy-efficient electrical appliances and replace those that are not.	0.723	1.185		
Reasons 1	Environmental 1 Scarce energy sources.	0.858	1.486	0.826	0.619
	Environmental 2 Excessive past consumption.	0.603	1.228		
	Environmental 3 Inefficient use of energy.	0.869	1.594		
Reasons 2	Energy 1 Unreliable information on energy and electricity market developments.	0.676	1.346	0.850	0.534
	Energy 2 Buildings not up to date in terms of energy efficiency.	0.796	2.460		
	Energy 3 Lack of public promotion of energy saving.	0.745	1.438		
	Energy 4 Use of electrical equipment that is not up to date.	0.801	2.429		
	Energy 5 High cost of energy upgrades.	0.620	1.324		
Reasons 3	War 1 The Russian-Ukrainian war.	0.799	1.181	0.819	0.694
	War 2 EU sanctions.	0.866	1.181		
Source 1	Close relatives 1 Family members	0.914	1.865	0.913	0.841
	Close relatives 2 Friends, acquaintances	0.920	1.865		
Source 2	Media 1 TV	0.948	2.683	0.945	0.896
	Media 2 Radio	0.945	2.683		

Note: n = 272.
Source: own study.

The measurement model was adopted by the authors based on the results. To test the significance of the path coefficients in the structured model analysis, the authors used bootstrap sampling with a sub-sample size of 5000 and a p-value of 0.05 significance level. Among other things, the authors analysed whether the independent variables had a significant effect on the dependent variables. Where the significance level was below 0.05, the relationship was confirmed as significant. Beta coefficient values were also analysed, which shows how much one variable influences the other. If this value was above 0.2, then a significant effect was assumed, The R-squared values were also examined, which shows the magnitude of the change in the endogenous variable that is explained by the exogenous variables. Based on these results, the authors developed the following model (Figure 1).

Only the endogenous variables have numbers in the rings. These are R-squared values, which indicate how much of the change in a given endogenous variable is explained by the exogenous variable or variables. One number in the arrows is the significance level p (in parentheses) and the other is the β value. In the model, not all latent variables have a significant effect on each other. If the value of p does not exceed 0.05, there is a significant relationship. There are mediator variables in the model that

mediate between two latent variables. Through the mediating variables, there is an indirect effect between the latent variables, and if there is no mediating variable, there is a direct effect. The direct and indirect effects together constitute the total effect. The relationship between each variable is shown in Tables 7 and 8. The Table shows the beta values, the T-statistic, which if above 1.96 indicates a plausible relationship, and there is a significance level, which if below 0.05 indicates a significant relationship. For indirect relationships, we present only the significant ones.

Table 5. Fornell-Larcker criterion

Variables	Consumption aware	Source 1	Source 2	Reasons 1	Reasons 2	Reasons 3	Savings	Awareness
Consumption aware	**0.777**							
Source 1	0.131	**0.917**						
Source 2	-0.007	0.177	**0.947**					
Reasons 1	0.232	0.067	0.041	**0.787**				
Reasons 2	0.177	0.052	-0.118	0.507	**0.731**			
Reasons 3	0.028	0.176	0.294	0.033	-0.101	**0.833**		
Savings	0.357	0.068	-0.016	0.287	0.269	0.076	**0.760**	
Awareness	0.375	0.053	-0.090	0.235	0.241	0.011	0.767	**0.723**

Note: n = 272; the highlighted values are the square root of the AVE values.
Source: own elaboration.

Table 6. Cross loading

Variables	Consumption aware	Source1	Source 2	Reasons 1	Reasons 2	Reasons 3	Savings	Awareness
Energy 2	0.151	0.064	-0.100	0.419	0.796	-0.125	0.163	0.153
Energy 3	0.167	0.046	-0.115	0.381	0.745	-0.102	0.202	0.207
Energy 4	0.168	0.112	-0.052	0.449	0.801	-0.097	0.183	0.196
Energy 5	0.027	-0.001	-0.060	0.366	0.620	0.040	0.229	0.127
Energy 1	0.106	-0.046	-0.097	0.234	0.676	-0.059	0.214	0.181
War 1	0.027	0.148	0.205	0.055	-0.035	0.799	0.088	-0.006
War 2	0.020	0.146	0.280	0.005	-0.125	0.866	0.044	0.021
Environment 1	0.191	0.019	0.070	0.858	0.398	0.060	0.282	0.225
Environmental 2	0.055	0.083	0.073	0.603	0.318	0.097	0.146	0.089
Environmental 3	0.251	0.079	-0.022	0.869	0.472	-0.040	0.225	0.205
Close relatives 1	0.140	0.914	0.212	0.046	-0.001	0.178	0.047	0.036
Close relatives 2	0.100	0.920	0.115	0.077	0.095	0.145	0.078	0.060
Media1	0.013	0.157	0.948	0.031	-0.120	0.281	0.006	-0.066
Media2	-0.027	0.179	0.945	0.048	-0.102	0.275	-0.037	-0.105
Thrifty 2	0.340	0.074	-0.012	0.239	0.174	0.090	0.757	0.569
Thrifty 3	0.257	-0.010	-0.029	0.197	0.268	-0.019	0.723	0.580
Thrifty1	0.218	0.090	0.003	0.218	0.173	0.101	0.799	0.600
Aware1	0.778	0.073	-0.010	0.104	0.075	0.040	0.250	0.271
Aware2	0.789	0.014	-0.035	0.123	0.079	-0.030	0.215	0.237
Aware3	0.763	0.175	0.017	0.267	0.215	0.040	0.332	0.337
Conscious 2	0.298	-0.029	-0.076	0.253	0.134	0.016	0.550	0.709
Conscious 3	0.269	-0.012	-0.096	0.138	0.268	-0.013	0.543	0.706
Conscious1	0.246	0.158	-0.021	0.116	0.119	0.020	0.570	0.753

Note: n = 272; we indicated which item belongs to which latent variable.
Source: own study.

The results show that the media affects who and what students blame for the situation, such as war (β: 0.271, t: 4.650 p: 0.00) or energetics (although negative β was confirmed: β: -0.131, t: 2.18 p: 0.029). The absence of environmental factors affects students' awareness of their consumption (β: 0.188, t: 2.752 p: 0.006), while clarity has a strong effect on awareness (β: 0.330, t: 6.025 p: 0.000). On the other hand, awareness has a strong effect on students' saving (β: 0.713, t: 13.520 p: 0.000).

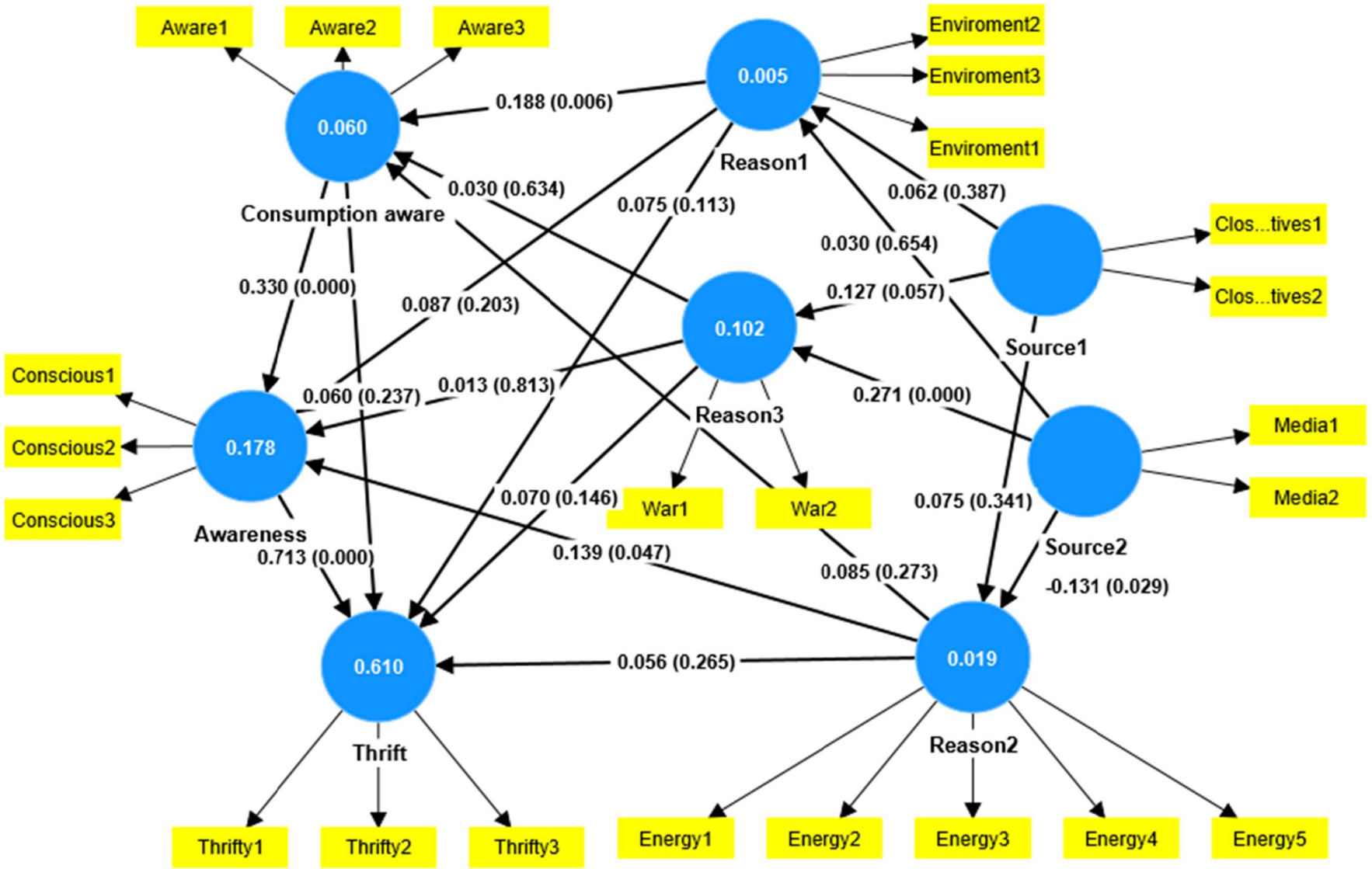

Figure 1. The model with SMART PLS4

Source: own elaboration.

Table 7. Direct relationships (p=0.05)

Paths	β	T statistics	P values
Consumption aware -> Savings	0.060	1.183	0.237
Consumption aware -> Awareness	0.330	6.025	0.000
Source 1 -> Reasons 1	0.062	0.865	0.387
Source 1 -> Reasons 2	0.075	0.953	0.341
Source 1 -> Reasons 3	0.127	1.907	0.057
Source 2 -> Reasons 1	0.030	0.448	0.654
Source 2 -> Reasons 2	-0.131	2.180	0.029
Source 2 -> Reasons 3	0.271	4.650	0.000
Reasons 1 -> Consumption aware	0.188	2.752	0.006
Reasons 1 -> Savings	0.075	1.583	0.113
Reasons 1 -> Awareness	0.087	1.273	0.203
Reasons 2 -> Consumption aware	0.085	1.096	0.273
Reasons 2 -> Savings	0.056	1.114	0.265
Reasons 2 -> Awareness	0.139	1.985	0.047
Reasons 3 -> Consumption aware	0.030	0.476	0.634
Reasons 3 -> Savings	0.070	1.455	0.146
Reasons 3 -> Awareness	0.013	0.237	0.813
Awareness -> Savings	0.713	13.520	0.000

Note: n= 272; we marked significant relationships in grey.
Source: own study.

Table 8. Indirect relationships (p=0.05)

Paths	β	T statistics	P values
Reasons 1 -> Consumption aware -> Awareness	0.062	2.594	0.010
Reasons 1 -> Consumption aware-> Awareness -> Savings	0.044	2.538	0.011
Reasons 2 -> Awareness -> Savings	0.099	1.974	0.048
Consumption aware -> Awareness -> Savings	0.235	5.294	0.000

Note: n= 272.
Source: own study.

Table 9. Research hypotheses

Hypothesis	Accepted/ rejected	Reason
The young people surveyed are currently aware of their electricity consumption, which is influenced by who pays for electricity and the number of people in the household.	Rejected	The young people surveyed were not really aware of their consumption data in kWh hours or in HUF, and this fact was only influenced by who pays the bills.
Young people interviewed are saving electricity because of the current situation.	Accepted	The students in the study were attentive to saving. Their energy awareness was the main determinant of their saving, which, in turn, was determined by how aware they were of their consumption.
The young people selected in the survey consider their close relatives as the most credible source of information about the situation and this influences their perception of the reasons for the situation in the electricity market.	Rejected	The young people in the sample tended to listen to their close relatives on this issue, but while there was a significant effect for the media on war and energy reasons, this effect was not confirmed for family members.

Source: own study.

Moreover, we analysed indirect relationships, showing only significant relationships in Table 8, which were no longer directly significant (Table 7 values).

We were able to conclude the following about the R squares. About 61% of the change in thrift is explained by awareness, while 17.8% of the differences in awareness can be explained by understanding consumption patterns, and 10.2% of the changes in war and its consequences as a reason can be attributed to the media for students.

Overall, our hypotheses can be evaluated as follows in Table 9.

CONCLUSIONS

Our research examined consumption awareness to obtain information about the feelings and attitudes of students of economics at a Hungarian university, which has some common points with the 2022 study by Wei and Du on university students' energy-saving behaviour.

The research is in parallel with the findings of Zanocco *et al*. (2022) while examining how well-prepared customers are to make the best decisions in a more dynamic energy system while Hahnel (2022) also offered important insights into consumers' awareness of their electricity use patterns.

The research indicated that young people's awareness of their electricity consumption should be improved as they generally do not know how much they consume as they entrust this information to the person in charge of paying the bill. It is thought-provoking to note that the majority of students surveyed (33.5%) believe that the rise in energy prices could increase their monthly living costs by up to 20-40%, while one in six think this figure will be between 40-80%.

It was one of the most important practical implications of the research to conclude that savings on energy and awareness are interdependent. As for policy and managerial implications, a steady and efficient collaboration between governments, institutions, and other stakeholders is essential to assist households and businesses affected by price increases.

Finally, there are a lot of factors as a source of information such as (social) media in addition to family, friends, and acquaintances, who do not take the lead in terms of credibility.

As a future continuation of the research, we would like to conduct studies in other EU countries to see how young people perceive their own consumption and what factors influence this. The authors will also carry out longitudinal research on how students' perceptions of their consumption change after the winter period.

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