
The Eurasia Proceedings of Educational & Social Sciences (EPESS), 2014

Volume 1, Pages 28-36

ICEMST 2014: International Conference on Education in Mathematics, Science & Technology

USEFULNESS OF SPSS SUPPORT FOR STUDENTS OF ECONOMICS AND BUSINESS

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ABSTRACT: Faculty of Economics and Business (University of Maribor) offers complex and useful knowledge in the field of statistics, so among other things the SPSS (Statistical Package for the Social Sciences) is part of students' courses. SPSS is the most widely used statistical package that is applied by professionals as well as by higher education institutions, and it represents the important IT support. For that reason in this paper we present conceptual model of the usability of IT SPSS support, which was tested on a sample of 300 undergraduate and postgraduate students of economics and business. The basis for conceptual model developed in this paper represents the expanded TAM model (Technology Acceptance Model). The conceptual model was verified using structural equation modeling (SEM). Based on the set of basic models, we examined connections between formed constructs of the TAM model and in this way we presented the results of the conceptual models. The study reveals that there is a positive relationship between perceived usefulness of statistics and perceived usefulness of SPSS, perceived ease of use of SPSS, and attitude towards using the SPSS. Research model was analyzed by using the SmartPLS and WarpPLS approaches. The examination of the usefulness of statistical information support for educational institutions represents a starting point for further pedagogical and software development, and it also provides an opportunity to increase the value of SPSS in planning of IT support.

Key words: TAM model, usefulness of SPSS, statistics, student, structural equation modeling (SEM)

INTRODUCTION

Students of economics and business sciences acquire differentiated knowledge of statistical methods and analyses in educational programs that the Faculty of Economics and Business (FEB) offers, which graduates can use in further education or at the workplace. Research shows that students perceive statistics as a field of study that is tedious and difficult and usually they study it against their will (Morton & Booth 1997, Gordon 2004). But the acquisition of knowledge of statistics is the basis for understanding the complex quantitative analyzes, which are used in the context of differentiated statistical software support. The teachers of statistics want the students to acquire understanding of statistical methods as well as to be able to apply statistical methods in solving the real-life business problems or scientific research questions. Garfield (2005) emphasizes that students have to learn about statistical approaches in the most practical manner, with the help of computer and application of the statistical software support. Students learn statistics better if they have experience in the implementation of the ideas in new situations. With the help of statistical software support students can change various assumptions and parameters of the models, analyze data and thus improve understanding and application of statistical software support.

Statistical software packages are designed for the explicit purpose of performing statistical analyzes. Different statistical packages such as SPSS, SAS, S-plus, Minitab, STATA, R, and others are available on the market over a long period of time. While development of these packages has focused on industry users' needs, they have also evolved into more menu-driven packages that are more user friendly for students and as a result students of economics and business studies in the educational process often discover the usefulness of SPSS statistical software support, which allows them to use a number of quantitative methods and statistical approaches for data

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- Selection and peer-review under responsibility of the Organizing Committee of the conference

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analysis. To this end, we wanted to know how the usefulness of statistics is perceived by students and how it affects the use of the SPSS statistical software support.

The field of SPSS use in the educational process has not been studied extensively. Researchers tend to study the use of software tools and rather choose to focus on different software solutions and technologies which students acquire during the educational process. In particular, they focus on the study of computer use of information and communication technologies, e-learning, m-learning, accounting software, e-portfolio system and similar (Park 2009, Zafar - Kumah & Achampong 2010; Shroff et al. 2011, Edmunds et al. 2012, Sriwidharmanely & Syafrudin 2012, Mahat et al. 2013). Some researchers study the attitudes of students towards statistical software adoption, within the context of study process, especially in an online version (Yang et al. 2007, Hsu et al. 2009). Also the students' conceptual understanding of statistics has been recently researched by analyzing the perception of statistics, characteristics of students and their attitudes towards statistics (Bond et al. 2012, Lalayants 2012, Dempster et al. 2009). Since the researches that focus on the usefulness of statistical software support for students is in deficit, and since a greater emphasis is laid on teaching and learning of statistics (Adams et al. 1999), we have decided to study the usefulness of SPSS software support that is perceived by students of economics and business sciences.

The designing of the conceptual model was based on the Technology acceptance Model (TAM). The TAM is an adaptation of the TRA (Theory of Reasoned Action) which is conceived as a general structure designed to explain almost all human behavior and is based on the importance of an individual's beliefs for the prediction of his / her behavior (Fishbein & Ajzen 1975, Ajzen & Fishbein 1980). TAM model comprises external variables, perceived usefulness, perceived ease of use, attitude toward using, behavioral intention to use and actual system use (Devis et al. 1989). The TAM is extremely widespread and used to determine the usefulness of IT solutions, software support, and technologies in various fields of science. The TAM attempts to explain why individuals choose to adopt or not a particular technology when performing a task. The purpose of our paper is to verify the applicability of the TAM model to explore the applicability of SPSS software support in the field of education and at the same time expand it with some new factors, in our case, with the usefulness of statistics.

LITERATURE REVIEW

Conceptual Research Model

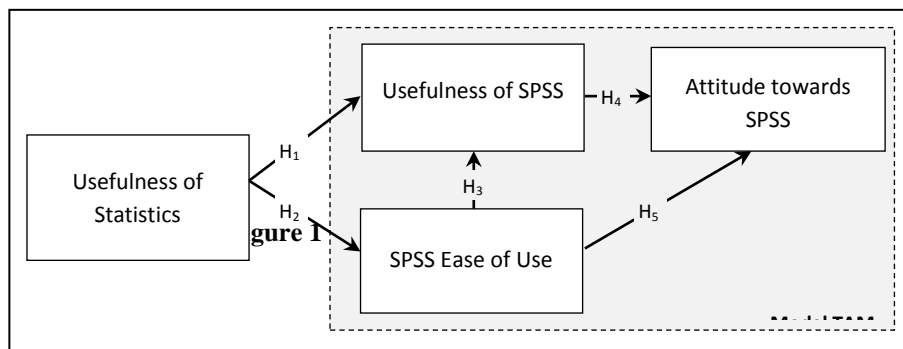
Development of the conceptual model was based on the usefulness of statistics as a basis for understanding the use of any statistical software, especially the obtained results. "Statistics is the science of the planning studies and experiments, obtaining data and the organizing, summarizing, presenting, analyzing, interpreting, and drawing conclusions based on the data" (Triolet 2011). Despite the fact that statistics grant us many benefits which derive from basic definitions of it, several researches analyze attitudes to statistics by the students (Roberts & Bilderback 1980), and only few are analyzing the perceived use of statistics. Some studies also found out, that there is only a small proportion of students who believe that statistic will be useful and important in their chosen career, even after the implementation of additional organized trainings (Hagen et al. 2013). Chiesi and Grab (2009) have studied the perceived importance of statistics among students and their findings were exactly the opposite from the expected – namely they expected the positive opinion of students regarding worth of statistics; but after additional training the decrease in perceived importance of statistics in students' personal and professional life was detected, and also students' feelings concerning statistics were less positive. Lo and Stevenson (1991) found that there was a positive correlation between the perceived importance of statistics and computer experiences among students. It was also found that the learning of statistics would be enhanced by more exposure to computer printouts to assist and to interpret of results. In addition to the computing experience, scientists stress that the students' attitude to statistics is mainly the consequence of their experiences in statistical or mathematical classes in the past course of education (Zhang et al. 2012). "Students learn statistics only if they actually practice statistics through a whole range of statistical activity supported by an appropriate computer package and discussion" (Petocz & Reid 2001). It was also suggested that using statistical software programs in the introductory statistics course would be one of the important ways to improve student knowledge of statistics and to positive attitudes of students towards statistics (Baştürk 2005).

The area of statistics also influences the extent and the nature of the needed computing expertise (Gentle 2004). In literature review we found that there was only few researches done on the usefulness of the SPSS statistical software support for students based on the concept of the TAM. For example Yang et al. (2007) have studied the usage of statistical software support by using the TAM model and they found that learning experience had some effect on the attitudes towards using statistical software. Based on the regression model, they showed that usefulness and ease of use had significant impacts on attitudes towards the statistical software support by students. Their research results revealed that the relationship between the usefulness, ease of use, and attitude was significant.

Hsu et al. (2009) examined the SPSS software support by using the TAM model, which involves external variables such as: computer attitude, statistical software self-efficacy, and statistics anxiety. The study found that there was a positive relationship between perceived ease of use and perceived usefulness of SPSS, but the research was limited to behavioral intentions regarding the use of the SPSS (Hsu et al. 2009). Some researchers have also focused on the study of the SPSS and other support software (e.g. Excel) for better comprehension of statistics (Proctor 2002).

The development of the conceptual model in this paper was based on the TAM model, which in the early stages of development included two constructs, namely perceived usefulness and perceived ease of use of technology. Perceived usefulness is defined as “the degree to which a person believes that using particular system would enhance his or her job performance.” Perceived ease of use, in contrast, refers to “the degree to which a person believes that using particular system would be free of effort” (Davis 1989). Both constructs represent cognitive response, which is reflected in the attitude toward using representing affective response (Davis 1993). The TAM model is a good indicator of the success or failure of a system implementation (Turban & Volonino 2010). The key purpose of the TAM is to provide a basis for discovering the impact of external variables on internal beliefs, attitudes, and intentions (Lu et al. 2003). The researchers did extend the TAM with several external variables, which could be classified as technology factors, social factors, economic factors, individual factors, and behavior factors (Lu et al. 2003, Alshare & Alkhateeb 2008). Based on the theoretical platform of TAM model and its’ expansion with the multidimensional variable “usefulness of statistics”, we have designed the following hypotheses, which are presented in the conceptual model in Figure 1:

- H1: The higher the perceived usefulness of statistics, the higher on average is the student’s perceived usefulness of SPSS.
- H2: The higher the perceived usefulness of statistics, the higher on average is the student’s perceived ease of SPSS use.
- H3: The higher the perceived ease of SPSS use, the higher on average is the student’s perceived usefulness of SPSS.
- H4: The higher the perceived usefulness of SPSS, the higher on average is the student’s perceived positive attitude towards SPSS.
- H5: The higher the perceived ease of SPSS use, the higher on average is the student’s perceived positive attitude towards SPSS.



METHODS

Survey instrument

The questionnaire was designed in three phases; in the first phase we reviewed the literature, which has enabled us to develop a research model multidimensional variables - constructs. An important stage in the development process of the measuring scale represents the preparation of the statements (items) with which we explain several components of constructs of the research model. The research design consisted of three constructs arising from the TAM model (Usefulness of SPSS, SPSS Ease of Use and Attitude to SPSS) and one external construct (Usefulness of Statistics), that we formed and included into the expanded TAM model.

The construct “Usefulness of SPSS” was explained with five items (Davis 1989, Venkatesh & Davis 1996, Saad & Bahl 2005, Letchumanan & Muniandy 2013), the “SPSS Ease of Use” with five items (Davis 1989, Venkatesh & Davis 1996, Letchumanan & Muniandy 2013), the “Attitude toward the SPSS” with four items (Nah et al. 2004, Yi et al. 2006, Letchumanan & Muniandy 2013) and “Usefulness of Statistics” with six items (Davis 1989, Venkatesh & Davis 1996, Letchumanan & Muniandy 2013). In the second phase, we designed an online questionnaire, which was pre-tested on a sample of 10 students. This phase resulted in a total of 21 items in the

questionnaire. In the final third stage an online questionnaire was sent to students. All items were assessed using a five-point Likert scale from 1 = "Strongly disagree" to 7 = "Strongly agree". The questionnaire included two questions gathering basic demographics, i.e., gender and field of study.

Data collection

The data was collected with an online questionnaire from 26th November 2013 to 17th December 2013. The study included a total of $n = 300$ undergraduate and postgraduate students who were acquainted with the SPSS statistical software support during their studies. Online questionnaire was sent to the students of various courses of economics and business sciences. All online questionnaires were duly completed. In the total sample, 33.9% were females, and 66.1% were males; 62.6% were students of undergraduate studies and 37.4% of postgraduate studies.

Data analysis

Statistical Package for the Social Sciences (SPSS), SmartPLS and WarpPLS software were used to analyze the reliability and validity of the data and to conduct structural equation modeling (SEM). The analysis of the data set was based on exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). In the first phase we performed EFA, in which the principal component analysis and Varimax method were used. The Bartlett's Test of Sphericity (BTS), the Kaiser-Meyer-Olkin statistics ($KMO > 0.5$) and the statistically significant ($p < 0.05$) were calculated. In the context of EFA, we have examined factor loadings ($\eta \geq 0.5$), communality of variables ($h > 0.4$) and eigenvalues of factors ($\lambda \geq 1.0$).

In the second phase we conducted the CFA which was used to ascertain the efficiency of the measurement models, and SEM was used to test the conceptual framework and assumptions. To test the model the following rules were applied: average path coefficient (APC), average R-squared (ARS), average adjusted R-squared (AARS), average block VIF (AVIF < 5.0), average full collinearity VIF (AFVIF < 5.0), Sympson's paradox ratio (SPR ≥ 0.7), the R-squared contribution ratio (RSCR ≥ 0.9), statistical suppression ratio (SSR ≥ 0.7), nonlinear substantiated by an association causality direction ratio (NLBCD ≥ 0.7) and goodness-of-fit (GoF ≥ 0.5) (Schepers et al. 2005, Kock 2013). The quality of the measurement model was measured by the index of communality ($C > 0.5$) and index of redundancy (R). Based on the indices of cross-validated communality ($Q^2 > 0$), cross-validated redundancy ($H^2 > 0.5$) and variance explained by the model for a particular endogenous variable (R^2), we examined the predictability value of the structural model (Cohen 1988, Stone 1974).

In the next phase, we examined the reliability and validity of the measurement instrument, keeping in mind the Cronbach's alpha ($\alpha > 0.7$), index of communality and redundancy. Scale validity was analyzed by focusing on convergent validity, discriminant validity and nomological validity. As part of the convergent validity, we examined average variance extracted (ρc^{AVE}) and composite reliability coefficients ρc^{CR} , keeping in mind the criterion (Hair et al. 2010, Fornell & Larcker 1981, Bagozzi & Yi 1988): $\rho c^{AVE} > 0.5$ and $\rho c^{CR} > 0.7$ and the criterion by Byrne (2001) $\rho c^{CR} > \rho c^{AVE}$. To verify the validity of discriminants we considered maximum shared variance (MSV) and average shared variance (ASV). In discriminant force, we took into account two criteria (Hair et al. 2010): $MSV < \rho c^{AVE}$ and $ASV < \rho c^{AVE}$. Nomological validity is established when the correlations between the construct and question and theoretically related constructs are significantly greater than zero (Campbell 1960). In order to check multicollinearity, we used the variance inflation factors $VIF < 3.3$ (Cenfetelli & Bassellier 2009). For hypothesis testing, we used the path coefficient associated with a causal link in the model (β or γ), t -value, statistically significant ($p < 0.05$) and indicator of Cohen's effect (f^2) with size as 0.02, 0.15 and 0.35 for small, medium and large effect sizes (Cohen 1988).

RESULTS and FINDINGS

Validity and reliability analysis

The results of the factor analysis for each construct indicate that it is meaningful to use EFA: Usefulness of Statistics ($KMO = 0.914$; $BTS = 1420.622$; $p < 0.001$), Usefulness of SPSS ($KMO=0.908$; $BTS = 1301.402$; $p < 0.001$), SPSS Ease of Use ($KMO = 0.866$; $BTS = 961.837$; $p < 0.001$) and Attitude to SPSS ($KMO = 0.858$; $BTS = 829.737$; $p < 0.001$). The EFA showed that all four constructs were one-dimensional whose own values were greater than 1.0. All the factors weights of the variables we used to measure individual constructs were higher than the value of 0.5. Therefore we excluded no items out of the individual constructs. 80.1 % of total variance was explained by the "Usefulness of Statistics" factor; 77.4 % by "Usefulness of SPSS"; "SPSS Ease of Use" explained 78.0 %; and "Attitude toward SPSS" explained 84.4 % of the total variance.

Next, we employed confirmatory factor analysis (CFA). Four factors were created and used as latent variables. Item factor loadings were high, ranging from 0.790 to 0.942; and all were significant at the 0.001 level. To

estimate the reliability of observed items, the R^2 values were used. The value of reliability of observed items were high, ranging from 0.624 to 0.887. As revealed in an examination of their values, all items did meet the 0.5 criterion.

Table 1. Convergent and discriminant validity of measurement models

Construct	Cronbach's α	ρ_c^{CRa}	ρ_c^{AVEb}	MSV ^c	ASV ^d	VIF ^e	Results of convergent validity	Results of discriminant validity
							$\rho_c^{CR} > \rho_c^{AVE}$ $\rho_c^{AVE} > 0.5$	$\rho_c^{AVE} > MSV$ $\rho_c^{AVE} > ASV$
US	0.950	0.960	0.801	0.652	0.460	3.007	yes	yes
U	0.941	0.959	0.812	0.516	0.544	3.946	yes	yes
EU	0.929	0.946	0.779	0.516	0.379	2.096	yes	yes
AT	0.938	0.956	0.844	0.602	0.534	3.405	yes	yes
Average	0.940	0.955	0.809	0.572	0.479	3.114	yes	yes

Notes: ^a ρ_c^{CR} refers to the composite reliability ($\rho_c = (\sum \lambda_i)^2 \text{var}(\xi) / [(\sum \lambda_i)^2 \text{var}(\xi) + \sum \theta_{ii}]$; (Bagozzi & Yi 1998)), ^b ρ_c^{AVE} refers to the average variance extracted ($\rho_c = (\sum \lambda_i^2 \text{var}(\xi)) / [\sum \lambda_i^2 \text{var}(\xi) + \sum \theta_{ii}]$; (Fornell & Larcker, 1981)), ^c MSV refers to the maximum shared variance, ^d ASV refers to the average shared variance; ^e VIF is the full indicator variance inflation factor; US is Usefulness of Statistics; U stands for Usefulness of SPSS; EU is SPSS Ease of Use; AT is the Attitude to SPSS.

To check the reliability of the constructs we tested convergent, discriminant and nomological validity. The ρ_c^{AVE} values for this model exceeded 0.5 for the reflective constructs (Hair et al. 2010), thus indicating convergent validity for all constructs. Composite reliabilities ρ_c^{CR} for the four reflectively measured constructs ranged from 0.946 to 0.960, exceeding the minimum requirement of 0.7. Table 1 shows the construct reliability for all four constructs: Usefulness of Statistics ($\rho_c^{CR} = 0.960$, $\rho_c^{AVE} = 0.801$); Usefulness of SPSS ($\rho_c^{CR} = 0.959$, $\rho_c^{AVE} = 0.812$); SPSS Ease of Use ($\rho_c^{CR} = 0.946$, $\rho_c^{AVE} = 0.779$); and Attitude to SPSS ($\rho_c^{CR} = 0.956$, $\rho_c^{AVE} = 0.844$). Since all the values ρ_c^{CR} values were higher than ρ_c^{AVE} values, we confirmed the convergent validity for all studied constructs. The internal consistency of the items in relation to the single trait within the instrumental was tested using Cronbach's α , ranging from 0.929 to 0.950. The discriminant validity of the measurement model was totally confirmed, where we kept in mind the suggested criteria ($AVE > ASV$ and $AVE > MSV$). All values ρ_c^{AVE} of individual constructs were higher than the maximum value of shared variance (MSV) and average shared variance (ASV). The results of the discriminant validity are shown in Table 1. The interconstruct correlations are all positive and significant. The results in Table 2 indicate that the model has complete nomological validity.

Table 2. Construct correlations and indicators of quality of research model

	M ^a	SD ^a	US	U	EU	AT	C	R	R ²	Q ²	H ²
US	4.456	1.417	0.895*				0.801	-	-	-	0.801
U	4.547	1.389	0.807	0.901*			0.812	0.219	0.714	0.580	0.812
EU	4.421	1.354	0.493	0.612	0.883*		0.779	0.190	0.244	0.189	0.779
AT	4.729	1.381	0.696	0.775	0.713	0.919*	0.844	0.342	0.696	0.562	-

Notes: ^aThe means and standard deviations are based on simple composites of the constructs, ^{*}Indicates square root of AVE; C-index of communality; R-index of redundancy; R²-variance explained by the model for a particular endogenous variable; H²-cross validated communality; Q²-cross validated redundancy; US-Usefulness of Statistics; U-Usefulness of SPSS; EU-SPSS Ease of Use; AT-Attitude to SPSS.

Structural model assessment

After the construct measures had been confirmed as reliable and valid, the next step was to assess the structural model results. Before interpreting the path coefficients, we examined the structural model for collinearity. The VIF values of these analyses ranged between 2.096 and 3.946, providing confidence that the structural model results were not negatively affected by collinearity. Explained variation R^2 for the endogenous latent variables is provided by Cohen (1988), where the value of 0.26, 0.13 and 0.02 represent strong, medium or low impact. The examination of the endogenous constructs' predictive power (Figure 2) shows that "Attitude toward SPSS", which is the primary outcome measure of the model, has a substantial R^2 value 0.696. Prediction of "Usefulness of SPSS" is higher with an R^2 value of 0.714, whereas the prediction of "SPSS Ease of Use" is comparably weak ($R^2 = 0.244$). The average value of R^2 is 0.551, which explains a large part of the variance of the endogenous variables. The quality of the measurement model was tested with the guarantee of communality (C) and the index of redundancy (R). The values of communality are all positive, ranging between 0.779 and 0.844. the average of its value is 0.809 and is higher than the threshold 0.5 (Henseler & Ringle 2009). Its value tells us that the quality of the measurement model for each block is at a satisfactory level. Values of redundancy are ranging between 0.190 and 0.342. Its average value is 0.250. The index of redundancy explained to us that the quality of the structural model for each endogenous block was at a satisfactory level. As for structural model, we have

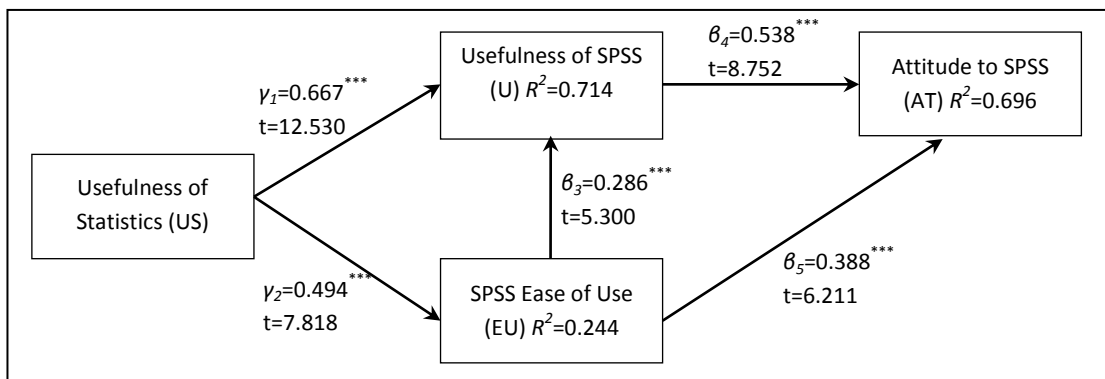
evaluated the guarantee of cross-validated communality (Q^2) and the index of cross validated redundancy (H^2). The values of Q^2 are ranging between 0.189 and 0.580. The average value of Q^2 is 0.443. The values of H^2 are ranging between 0.779 and 0.812 and are higher than the prescribed value of 0.5. The average value of H^2 is 0.797. All values of Q^2 and H^2 are positive, confirming the good predictability value of our measurement model.

Here we examined how the data fit the research model. One of the criteria that WarpPLS offers us is the coefficient of goodness-of-fit (GoF). A criterion of goodness of fit (GoF) for PLS was proposed as geometric mean of the average communality and the average R^2 by Tenenhaus et al. (2005). GOF is defined as small (0.35), medium (0.50) and large (0.61) (Zlatan & Ghozali 2012). The model in this study had a GoF value of 0.668; this indicates that the model fit was good. WarpPLS provided us with additional criteria for verifying data consistency within the research model. This assesses the model fit with the data, it is recommended that the p -values for both the average path coefficient (APC = 0.475) and the average R-squared (ARS = 0.552) both be lower than 0.05. Both coefficients are at the level of statistical significance of $p < 0.05$. Average values of the variance inflation factor (AVIF = 1.470) and average full colinearity VIF (AFVIF = 3.114) were lower than 5.0. The values of Sympson's paradox ration (SPR = 1.000) and R-squared contribution ration (RSCR = 1.000) achieve the ideal value, which was proposed 1,000. For additional research model fit the data values contribute statistical suppression ration (SSR = 1.000) and nonlinear causality bivariate direction ration (NLBCDR = 1.000), as both indicators exceed the suggested value 0.7 (Kock 2009).

Hypothesis testing

After verifying the adequacy of based conceptual model, we examined all hypotheses. All of our hypothesized relationships have been found significant at $p < 0.001$. In Figure 2 we present the relationships between individual constructs. Structural path coefficients of the proposed model, that are presented in Table 3, support the hypotheses formed.

Research results suggest that perceived “Usefulness of Statistics” by students has a positive and significant effect on perceived “Usefulness of SPSS”. The findings also provide support for H_2 , showing that the “Usefulness of Statistics” has a positive effect on the “SPSS Ease of Use”. We found that students perceived the important role of statistics in the use of the SPSS, as it provides a basis for understanding the SPSS. The SPSS gives us analytical approaches that require knowledge of statistics, which is a prerequisite for the efficient use of the SPSS. In addition, “Usefulness of Statistics” effect on “Usefulness of SPSS” is higher than its effect on “SPSS Ease of Use”.



Note: *** $p < 0.001$; Based on $t(499)$; $t(0.05; 499) = 1.967$; $t(0.01; 499) = 2.594$; $t(0.001; 499) = 3.320$.

Figure 2. Results of structural model analysis

Results revealed that, as expected, the “SPSS Ease of Use” had a positive effect on “Usefulness of SPSS”, supporting H_3 . Hypothesis H_4 and H_5 indicate the effects of “Usefulness of SPSS” and “SPSS Ease of Use” on “Attitude to SPSS” exist: the “Usefulness of SPSS” had a positive effect on the “Attitude to SPSS, supporting H_4 . Besides that similarly also “SPSS Ease of Use” showed a significant positive impact on “Attitude toward SPSS”, supporting H_5 . Hypothesis H_1 - H_5 were therefore all supported in this study.

Impact assessment f^2 (effect size) was used to assess the impact of latent variables in structural level model. The average f^2 0.331, represents a strong effect of latent variables. The strongest effect is perceived regarding the independent variable “Usefulness of Statistics”, which affects the dependent variable “Usefulness of SPSS”. Low-impact is perceived regarding the impact of independent variables “SPSS Ease of Use” on the dependent variable “Attitude toward SPSS” (see Table 3). From the results of the research, we can conclude that statistics has an important role in the use of the SPSS statistical software support. Students who perceive sufficient

usefulness of statistics may understand more successfully the usage of the statistical software and perceive it as easy to use. From this we can further assume that students with higher perceived ease of use of statistical software SPSS on general perceive also a more positive attitude toward statistical software SPSS.

Table 3. Structural path coefficients for proposed model

Connection	γ/β	f^2	S.E.	t-value	p-value
γ_1 (US \rightarrow U)	0.667	0.539	0.053	12.530	0.000
γ_2 (US \rightarrow EU)	0.494	0.252	0.060	7.818	0.000
β_3 (EU \rightarrow U)	0.286	0.173	0.055	5.300	0.000
β_4 (U \rightarrow AT)	0.419	0.419	0.062	8.752	0.000
β_5 (EU \rightarrow AT)	0.388	0.273	0.065	6.211	0.000

Notes: γ/β standardized regression coefficient; f^2 effect size; APC=0.475, $p<0.001$; ARS=0.552, $p<0.001$; AARS=0.549, $p<0.001$; AVIF=1.470; AFWIF=3.114; GoF=0.668; SPR=1.000; RSCR=1.000; SSR=1.000; NLBCDR=1.000

CONCLUSION

In this paper, we addressed the usefulness of SPSS for students of economics and business. We have developed a conceptual model which we derived from the TAM model. The TAM model was expanded with multidimensional variable “Usefulness of Statistics”. Although there were numerous studies about the use of IT solutions and technologies found in the literature, we detected a lack of research about the use of statistical software support for students, especially about the perceived usefulness of the SPSS. Therefore this represented a shortfall in this area of study that certainly called for further research.

In this study we have found that the perceived usefulness of statistics is important and definitely is a key factor for high perceived usefulness of SPSS and perceived ease of its use. It is not enough that students acquire knowledge of statistics they also have to learn statistics and perceive it as useful so as to efficiently use the SPSS. This certainly requires changes in the teaching process, in particular the use of real business cases. We have found relationship between the perceived ease of use of the SPSS and the perceived usefulness of SPSS, which is consistent to the conceptual model of Hsu et al. (2009). In this way, we found that among students who perceived the ease of use of the SPSS also perceived usefulness of the SPSS tends to increase. Next, we found that students who perceived the usefulness of the SPSS, had a more positive attitude toward the SPSS. At the same time, we found that students who increasingly perceived the ease of use of the SPSS also had a more positive attitude toward the SPSS. However, the connection between usefulness and attitude towards SPSS is significantly stronger, compared to the correlation between the ease of use and the attitude towards the SPSS. From the findings we can conclude that students placed greater emphasis on the usability of the SPSS and its practical application, both in the study, as later in business practice. Our findings are thus consistent with the findings of Garfield (2005), who stresses the need for the students to learn about statistical approaches in the most practical manner. The TAM model is therefore also useful for determining the applicability of statistical software such as the SPSS.

As already described the constructs “Usefulness of SPSS”, “SPSS Ease of Use” and” Attitude toward SPSS” were included based on the TAM model; besides them additional external variable, i.e., “Usefulness of Statistics” was included and expanded TAM model for the use of the SPSS statistical software support was formed. We performed our research on a sample of 300 Slovenian undergraduate and postgraduate students of economics and business sciences, and therefore we cannot generalize the findings to the entire population. Since the usefulness of statistical software support represents a deficient area of research, we perceive there are more opportunities for future research. The conceptual model could include additional constructs such as “satisfaction of use of SPSS” and “future intention of the use of the SPSS”. The TAM model could be expanded to the other external variables such as educational support, compliance use of statistical software support with their studies in general or to the course of study, and also observed significant differences between undergraduate and postgraduate students, or between foreign and domestic students of economics and business studies regarding the perceived use of statistical software support. The scope of applicability of statistical programming support has a lot of potential for the use of experimental studies, in particular the verification of the effects of different pedagogical approaches.

RECOMMENDATIONS

Based on the findings of the research recommendations are formed for both the designers of statistical software support as well as for faculties and teaching staff that teach and use statistical software support. For the effective use of the SPSS students need an appropriate level of understanding of statistics, which is almost a precondition for the effective use of the SPSS. For the students to perceive the usefulness of statistics teachers should focus more on the preparation of study aids, which contain statistical simulation and real business cases that are actually prepared based on real-life business situations. Therefore the future research should also be oriented

towards the study of pedagogical support for the use of the SPSS, as it is seen that the use of statistics and SPSS both require an adequate level of motivation in order to reduce statistics anxiety. For the students it is necessary to gain the insight about where and how to effectively use statistics and the SPSS in business practice. Organizations that are engaged in the development of statistical software support should consider developing friendly and simple, but innovative and useful enough SPSS software. It would certainly be appropriate to prepare the SPSS with appropriate additional explanations of statistical parameters and additional useful applications that are frequently used in business. This will definitely increase the perceived usefulness of SPSS for students of different study fields and create a more positive attitude towards SPSS.

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