

Examination of IT risk-taking with modified DOSPERT questionnaire among university students

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Abstract: All our decisions based on personal perception and personal risk taking, the extent of the risk and the personal judgment of the possibility of the risk event. According to Weber, Blais and Betz, this can be different from subject to subject. To measure this, they have developed Domain-Specific Risk-Taking (DOSPERT) Scale questioner. For my research I have modified this questionnaire to examine risk-taking behaviour on ICT security and used this questionnaire on university students to examine their risk-taking differences between domains. In this paper I show my results.

Keywords: DOSPERT, Risk-taking, IT Risk, BYOD

1 Risk and Risk-Taking

1.1 Definition of Risk

One can find a wide variety of definitions of Risk. In this paper I use Renn's definition [3] which states that there are two prevailing definitions which are: risk is a situation or event where something of human value (including humans themselves) is at stake and where the outcome is uncertain; risk is an uncertain consequence of an event or an activity with respect to something that humans value.

In risk analysis a traditional way of classifying uncertainty as aleatory – when randomness is inherent, and epistemic – when uncertainty can be sourced from secondary or tertiary effects, not considered during the modelling. [4][5]

We can examine risks in different viewpoint one of them during when while we make decisions. According to Albert Camus "life is the sum of all your choices". In our lives we have to and must make decisions. According to Herbert Simon decision making is a three-stage flow. [6]

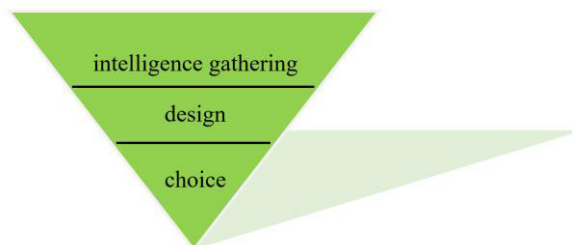


Figure 1
Herbert Simon's decision-making flow

The stage of intelligence gathering contains the searching environment, searching for condition and the calling for decision.

When we take this stage into our non-determined non-rational real life, we must deal with limited knowledge of the environment. limited information about the conditions, and the limits of the human mind at the event of call for decision.

1.2 Risk-taking

In real-life situations rarely can have whole information. We can only deal with the model of reality in our head. We cannot gather and deal with all the conditions affecting our situation. Also, we might find the call of decision to late or too early from the optimum.

The main question about our decisions is about the information we use in our decision, that we use for making our choice.

Even if we would be able to gather all the information that could have an effect on our decision which can be a state in very limited number of cases, the human mind can only deal with a limited number of information pieces at a time. We even have problems with classifying, ordering, and scoring these when we need to consider and judge.

In these circumstances when making our decisions we need to deal with uncertainty and take the risk of non-intentional negative or positive outcomes.

Risk-taking is a personal quality of one, which differs from person to person. Numerous studies were done researching risk-taking in different cultures and different backgrounds. [7][8] [9][10][11]

According to Hofstede the people of Hungary could be considered as risk- and uncertainty-avoiding. [12]

In this paper I have analysed the risk-taking qualities of university students with a modified version of the DOSPERT questionnaire.

2 Modification of DOSPERT questionnaire

2.1 DOSPERT questionnaire

Weber, Blais and Betz in 2002 have published a paper which present a psychometric scale on the topic of risk-taking in different parts of life.

The domains are:

- Financial,
- Health / Safety,
- Recreational,
- Ethical,
- Social decisions

The answerers are asked to rate on a 7 step Likert scale the likelihood the perceived risk and benefits of the stated situations.

In 2006 they have revised their work and created a renewed, shortened version of the questionnaire with the same domains.

2.2 The modified questionnaire

For my research I have modified the 2006 version of the questionnaire. I have added a new domain Security of Information and Communications Technology (SICT) which contains five new questions. These are simple situate yes-no questions where the answerer are asked to answer would he or she do as it situated or not and tests the ICT security consciousness of the answerer.

These questions are the following:

- Would you send corporate data to your private email
- Would you connecting to public open Wi-Fi
- Would you let somebody to use your mobile without your previous consent
- Would you use your pin (password) - unlock pattern in front of others
- Would you copy corporate data to private smartphones

I have removed one question from each original domain. For selecting the questions to be dropped I have tested the new domain and the original questions on a test sample. After the first test I have revised and modified the questionnaire according to the feedbacks from students and my research leader, and used on a larger sample.

3 Results of the research

3.1 Sample

For my research I have handed out the modified DOSPERT questionnaire to different bachelor courses at Obuda University. From the received answers I have built a sample from three bachelor's courses Business Informatics Engineer, Electronical Engineering and Mechanical Engineering.

		Course			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Business Informatics Engineer BSc	107	34,7	34,7	34,7
	Electronical Engineering BSc	108	35,1	35,1	69,8
	Mechanical Engineering BSc	93	30,2	30,2	100,0
	Total	308	100,0	100,0	

Figure 2
Courses of the students in the sample

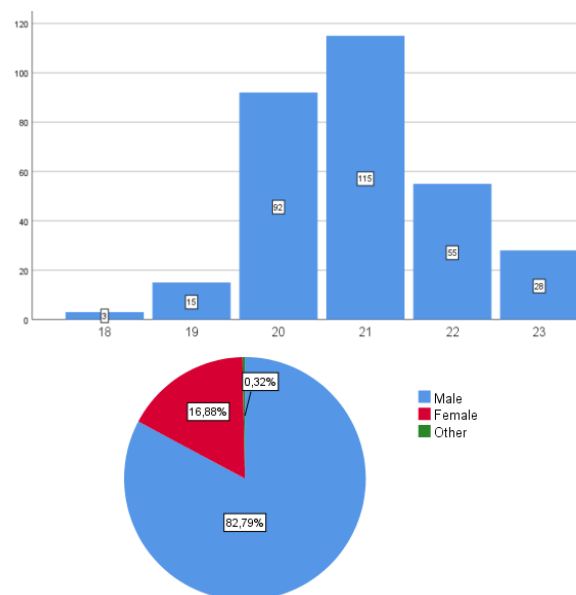


Figure 3
The Distribution of Students by Age and Sex in the Sample

As we can see on the figure in the sample there is a male dominancy. Because of this non-biased state, I could not study the effect of gender on the answers.

In the domain of Security of Information and Communications Technology we could see that the perceived risk of the statements is between 3,56 and 5,51 (minimum 1, maximum 7). If we study the order of the statements it is interesting that the highest perceived risk is connected to the usage of pin (password) – unlock pattern in front of others, which is a positive sign. Although the lowest perceived risk is for the statement about connecting to public open Wi-Fi networks.

	Business Informatics Engineer BSc	Mechanical Engineering BSc	Electronical Engineering BSc
Would you use your pin (password) - unlock pattern in front of others	4,98	5,06	5,51
Would you copy corporate data to private smartphones	4,80	4,62	5,04
Would you let somebody to use your mobile without your previous consent	4,51	4,72	5,26
Would you send corporate data to your private email	4,77	4,86	4,93
Would you connecting to public open WiFi	3,80	3,56	3,97

Figure 4
Perceived Risk of the Situations in the Domain Security of Information and Communications Technology

3.2 Hypotheses

The first hypothesis for this research was that the perceived risk of the ICT security domain will be the highest. (H1)

My second hypothesis was, that the ICT security is significantly more important for those in the field of IT than other students (H2)

3.3 Testing the hypotheses

Field of study		Social	Financial	Health and Safety	Ethical	Recreational	Security of ICT
Business Informatics Engineer	Mean	3,8626	4,6112	4,8355	5,2336	4,6579	4,5738
	N	107	107	107	107	107	107
	Std. Deviation	,78878	1,00970	1,05502	1,03868	1,20502	1,10883
Electronical Engineering	Mean	4,0630	4,7815	5,1389	5,4500	4,5704	4,9407
	N	108	108	108	108	108	108
	Std. Deviation	,75400	,82418	,84608	,92610	,90184	1,03554
Mechanical Engineering	Mean	3,9892	4,5183	4,9806	5,2387	4,5183	4,5656
	N	93	93	93	93	93	93
	Std. Deviation	,60675	,90132	,91131	,84404	,83366	,96532
Total	Mean	3,9711	4,6429	4,9857	5,3110	4,5851	4,7000
	N	308	308	308	308	308	308
	Std. Deviation	,72833	,91871	,94806	,94625	,99819	1,05306

Figure 5
Perceived Risk of Domains

As we can see in the table the Security of ICT domain is in the middle. For the Business Informatics Engineering students this domain is second to last. Thus, my first hypothesis has fallen.

I have tested the differences between the students of the different courses. Only in two domains could we have seen significant differences. These were between the students of Business Informatics Engineer and the Electronical Engineering courses and the Electronical Engineering students and Mechanical Engineering students.

The significant differences were in the Health and Safety domain and The Security of ICT domain.

In the Health and Safety domain the Business Informatics Engineer students' perceived average risk (Mean: 4,9806; Std. Deviation: 0,91131) and the Electronical Engineering students' were (Mean: 5,1389; Std. Deviation: 0,84608).

While in the domain of Security of ICT surprisingly, the direction of the difference is the opposite than what we could have suspected. The group of Electronical Engineering students answered with a higher average perceived risk

(Mean: 4,9407; Std. Deviation: 1,03554) than the Business Informatics Engineer students (Mean: 4,5738; Std. Deviation: 1,10883).

Independent Samples Test									
	Levene's Test for Equality of Variances				t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Health and Safety	2,139	,145	-2,327	213	,021	-,30337	,13037	-,56035	-,04639
			-2,325	202,623	,021	-,30337	,13050	-,56069	-,04606
Security of ICT	,114	,736	-2,508	213	,013	-,36691	,14631	-,65531	-,07851
			-2,507	211,725	,013	-,36691	,14635	-,65541	-,07841

Figure 6

Results of T-test between the groups of students from Business Informatics Engineer and Electronical Engineering students

There was no significant difference between the group of Business Informatics Engineer students and the group of Mechanical Engineering students in the risk-taking domains in the questions of perceived risk.

Conclusions

According to the answers for the questionnaire the perceived risk of the ICT security is in the middle or below than the middle in the sample comparing the other five domains. This means that the students of the sample do not perceive a high risk for the studied situations. Especially they do not think that connecting to open Wi-Fi networks could have high security risk.

If we continue the comparison in between of the domains we can see that the perceived risk of the Ethical and Health /Safety domains has high levels, while the Social domain and the Security of ICT domain is lower. This could lead us to the conclusion that our students should have a higher level of ICT security education.

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References

- [1] Weber, E. U., Blais, A.-R., & Betz, N. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making*, 15, 263-290.
- [2] Blais, A.-R., & Weber, E. U. (2006) A Domain-Specific Risk-Taking (DOSPERT) scale for adult populations. *Judgment and Decision Making*, 1, 33-47.
- [3] Renn, „Concept of Risk: A Classification,” in *Social Theories of Risk*, G. Krinsky, Szerk., Westport, Praeger, 1992, pp. 53-82.
- [4] I. Krómer, „Természeti katasztrófák: Kockázatok és Bizonytalanságok,” *ELEKTROTECHNIKA*, %1. kötet104: (11), pp. 19-24, 2011 .
- [5] M. Power, *Organized Uncertainty: Designing a World of Risk Management*, Oxford: Oxford University Press, 2008.
- [6] SIMON, Herbert A. (1957) *Models of Man, Social and Rational: Mathematical Essays on Rational Human Behavior in a Social Setting*, New York: John Wiley and Sons.
- [7] Chrysovalantis Gaganis, Iftekhar Hasan, Panagiota Papadimitri, Menelaos Tasiou, 2019 National culture and risk-taking: Evidence from the insurance industry, *Journal of Business Research*, Volume 97, 2019, Pages 104-116, ISSN 0148-2963, <https://doi.org/10.1016/j.jbusres.2018.12.037>. (<http://www.sciencedirect.com/science/article/pii/S0148296318306477>)
- [8] Li et al., 2013 Li K., Griffin D., Yue H., Zhao L. How does culture influence corporate risk-taking? *Journal of Corporate Finance*, 23 (2013), pp. 1-22
<https://www.sciencedirect.com/science/article/pii/S0020025512007463/pdf?md5=734f315aa1baaff673174f5b04f65120&pid=1-s2.0-S0020025512007463-main.pdf>
- [9] Hofstede, 1995 Hofstede G. Insurance as a product of national values *The Geneva Papers on Risk and Insurance Issues and Practice*, 20 (4) (1995), pp. 423-429

- [10] Hofstede, 2001 Hofstede G. Culture's consequences: International differences in work-related values (2nd ed.), SAGE Publications, Beverly Hills, CA (2001)
- [11] Hofstede et al., 2010 Hofstede G., Hofstede G.J., Minkov M. Cultures and organizations: Software of the mind (Third Ed.), McGraw-Hill Education (2010)
- [12] Hofstede Insights – Hungary
<https://www.hofstede-insights.com/country/hungary/>