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EVALUATION OF FACTORS THAT INFLUENCE THE MOTIVATION OF IT SPECIALISTS IN LATVIA

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Abstract. *The present paper in dedicated to the research of factors that influence the motivation of Information Technology (further in the text IT) specialists in Latvia and the significance of these factors in overall motivation. The research contains a theoretical evaluation of approaches to measurement of motivation and presentation of the model of motivation metering.*

Being an internal individual condition, employees' motivation is hard to be measured. However, attempts of measuring employees are regularly taken by research groups and individual scholars. As many factors such as gender, generation, profession and origin influence the motivation of the employee, we believe that there is no universal approach. The goal of the research is to evaluate the weight and significance of motivation factors and calculate the overall motivation of IT specialists in contemporary Latvia. The methodology used in the present research includes an evaluation of the theoretical models of measuring an employee's motivation, suggestion of a mathematical model that is applicable to motivation measurement, conducting a survey of 78 IT specialists in Latvia and the approbation of the model.

As the result, the factors that influenced IT specialists in Latvia were estimated, their influence on overall motivation was weighted, the motivation of IT specialists was measured and an analysis of the motivation of IT specialists that belonged to different genders and generations was performed.

Keywords: *IT specialists, motivation, motivation system.*

Introduction

Evaluation of motivation is one of the difficult problems of contemporary management. It was practically proven for multiple times that, the motivation of an employee influences his or her productivity, overall performance, loyalty to the company. Motivated employees create a positive work environment; bring the company competitiveness and economic success. However, there is no clear model yet how the employee's motivation can be measured. On one hand, it is not

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quite proper to judge employees' motivation based on their overall performance, as the performance depends on many factors besides the motivation. On the other hand, an examination of internal motives of an employee faces difficulties associated with his or her background, personal interpretation of motivation and psychological issues.

Disputes in the scientific community over the problem of estimating motivation show that there is no one and only correct approach. Moreover, the approbation of certain approaches in different conditions brings contradictory results. The main problem is that the factors of motivation that are important for one target group of employees may be unimportant for another target group that differs in the nationality, gender, age etc.

The topicality of such type of research in Latvia can be explained by the fact that so far there were no attempts to measure the motivation of Information Technology (further in the text IT) specialists in contemporary Latvia. The topicality is strengthened by the importance of the role of the IT sphere in Latvia's competitiveness and understanding that IT specialists form a large part of the creative class – the most innovative, educated and successful individuals that push the economy, culture and technological progress forward.

Materials and Methodology

The research question set in this paper is an estimation of the overall motivation of IT specialists in contemporary Latvia. The goal of the research is to evaluate the weight and significance of motivation factors and calculate the overall motivation of IT specialists in contemporary Latvia.

Specific research objectives of the paper are:

- estimation of approaches to measuring motivation in theoretical and practical research studies;
- suggestion of a mathematical model for measuring motivation;
- analysis of the results of the research;
- study of the difference in motivation of specific generations of IT specialists in Latvia.

The research presupposes a critical review of bibliographical sources, an analysis of statistical data and conducting a survey. A theoretical evaluation of approaches to motivation measurement provided by researchers in the fields of economics and management is implemented in order to explain the basis for building one's own mathematical model. The model includes two types of variables: the value and weight of motivation factors. In order to determine the variables, a survey of 78 IT specialists in Latvia was conducted. The employees were contacted through social media and using snowballing method. They were asked to estimate the significance of a motivation factor in general to estimate its

weight and the personal perception of the motivation factor to estimate its value. The survey results are to be analysed, and the overall motivation is to be calculated. While the research may show the difference in the perception of importance of motivation factors between different generations and genders of employees, a cross-gender and cross-generational analysis is to be performed.

Theoretical approaches to measuring motivation

In its general interpretation, motivation is defined as anything that causes an action (Simon, 1964). However, most authors researching motivation bring in their own definition in the light of their field of study and the subject of their research. To decrease the confusion, Russell highlighted three characteristics of motivation that are mentioned in most definitions: 1) motivation is an internal force; 2) motivation causes certain actions; 3) motivation sets the direction of the action (Russell, 1971).

However, the action caused by motivation is usually hard to be measured. A survey conducted by Miegel in 1988 showed that 44% of the employees would not work harder even if they appeared in a working environment that was perfect for them just because that already used all their labour potential. Another 16% said that they would not work harder, as the work was not their main priority (Miegel, 1988). This means that there is no direct connection between motivation and action. The variety of other factors such as personal interpretation, situation, employees' background matter.

As there is no direct dependence between the stimulus, motivation and action, the motivation is extremely hard to be measured. However, considerable attempts to measure motivation regularly appear in scientific research studies.

The model of motivation introduced by Vroom is based on expectation as a subjective estimation of probability of events by an individual. Vroom believed that an employee acts when he or she expects that the reward for the action will follow. In his model, Vroom applied three types of expectations (Vroom & Deci, 1970): expectations concerning labour inputs demanded for the result (LR); expectations concerning rewards for the result (RW); expectations concerning satisfaction from the reward – valence (V).

Overall motivation, according to Vroom, is a function of these three variables (Vroom & Deci, 1970):

$$M=LRxRWxV, \quad (1)$$

The motivation model suggested by Vroom allowed analysing motivation from employees' personal perceptions and expectations. However, it is not clear how the variables of the model should be measured. Moreover, the model

characterizes the probability of employee action more than motivation itself. It also does not give any information concerning the importance of motivating factors. All the above make the Vroom model rather theoretical then practical.

Expectations were later applied in advanced economic models, including the moral hazard and principal-agent models. The moral hazard economic model designed for measuring motivation assumes that an employee is less motivated to perform better when the chances to be caught doing nothing are lower. This problem can be solved with the contract theory where the model hazard model maximizes the utility of counteragents of the contract. According to Nobel laureate Mirrlees, employee utility gained from rewards with regard to efforts taken can be described as a following model (Mirrlees, 1999):

$$Eu(x, y, z) = \int_0^1 u(x, y, z)dw, \quad (2)$$

where x = reward gained by an employee,
y = losses of the employer in the case an employee fails,
z = expenditures on fail probability reduction, such as employee training, additional efforts,
w = environment [0,1]

In this model, the reward of an employee depends of employer losses. Then it is possible to set these two variables into the contract.

The moral hazard gives an explanation of principal-agent behaviour towards the moral hazard; however, it does not explain how motivation can be measured.

Moral hazard theory was also developed in the research by Grossman and Hart by adding the assumptions of a principal's risk neutrality and independency of agents' preferences (Grossman & Hart, 1983). However, the assumptions could not overcome the same difficulties in measuring motivation, according to the moral hazard theory of Mirrlees.

According to the approach to measuring motivation presented by Kotljarov, the motivation could be estimated by the formula (Kotljarov, 2001):

$$M = \sqrt{\sum_{i=1}^{N} \alpha_i m_i^2}, \quad (3)$$

where M – overall motivation,
α_i – adjustment coefficient that reflects the importance of the group of motivation factors to the employee;
m_i – value of a motivational factor (scalar value).

In the model presented by Kotljarov, it is not clear why the value of a motivational factor should correspond to the adjustment coefficient for a group of

motivation factors, not a motivation itself. However, this approach seems the most reasonable from the point of researching the influence of motivation factors on overall motivation.

Zámečník uses the Ward method to cluster motivation factors of employees (Zámečník, 2014). The value of motivation factors are obtained through a survey. However, this approach does not take in account the importance of a certain factor in overall motivation.

Research design

Estimation of IT specialists' motivation, on one hand, is based on understanding the factors that motivate employees. On the other hand, these factors are not equally important. This is why the weight of each factor of motivation should be introduced.

In general, motivation could be estimated by the following formula:

$$M = \sum \sqrt{In * Vn}\ , \tag{4}$$

where M – overall motivation of an IT specialist,
In –value of a motivation factor,
Vn – weight coefficient of the motivation factor.

In order to estimate both the value and weight of motivation factors, two questions should be asked – one for each variable.

Question one of the survey is set as follows: "Mark on a scale of zero to ten the extent to which the motivation factor influences your motivation to work: 0 = it has no influence on my motivation to work; 10 = it has a hundred percent positive influence on my motivation to work" and it is aimed to estimate the weight coefficients of the factors of motivation.

Question two aims to find out the value of motivation factors, and it is stated as follows: "Mark on a scale of zero to ten the extent by which you are satisfied with certain aspects of your work: 0 = I am absolutely dissatisfied with this aspect of work; 10 = I am hundred percent satisfied with this aspect of work".

The weight coefficient of a motivation factor shows how important is this factor for an IT specialist whose motivation is to be measured. In order to estimate weight coefficients, the basic question should be suggested to the respondents. Question one contains impersonal questions. Answering this question, an IT specialist shows how important this or that factor of motivation is in general. During the survey, respondents are supposed to assign a number from zero to ten to each factor.

$$0 \leq V_n \leq 10, \tag{5}$$

The list of sub-questions within question one includes the most obvious factors of motivation that reflect all standard human needs.

The value of a motivation factor is associated with the extent to which a certain need of an employee is satisfied. In order to estimate how an employee is motivated in general, the level of satisfaction by each factor of motivation should be measured. To accomplish this task, the question concerning the personal satisfaction of employees by different factors should be asked. Answering question two assumes assigning a number from zero to ten to each factor.

$$0 \leq I_n \leq 10, \tag{6}$$

The respondents were offered a list of motivation factors, and they had to put the score for every factor significant for them

The factors of motivation in Question 1 and Question 2 are identical. It is designed this way in order to: 1) reach similarity in the factors' value and weight; 2) decrease the chance of an employee's misunderstanding of a part of a question.

The present survey was offered to 78 IT specialists in Latvia. Their gender and age structure is presented in Figure 1.

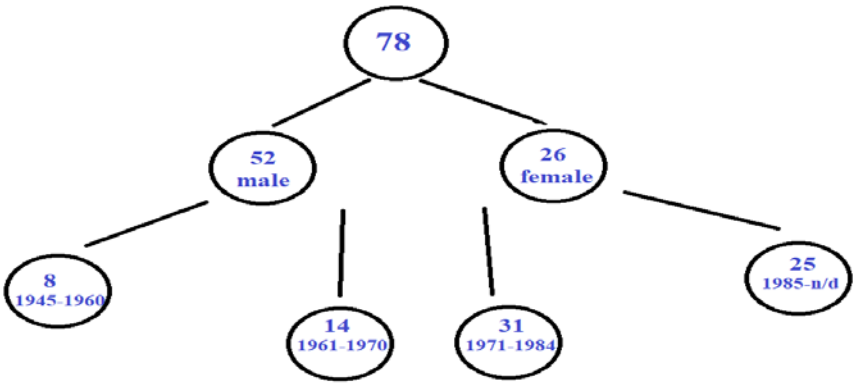


Figure 1 ***Gender and age structure of the respondents***

For the purpose of simplification, the results of the research are adduced as average for each motivation factor.

Research results

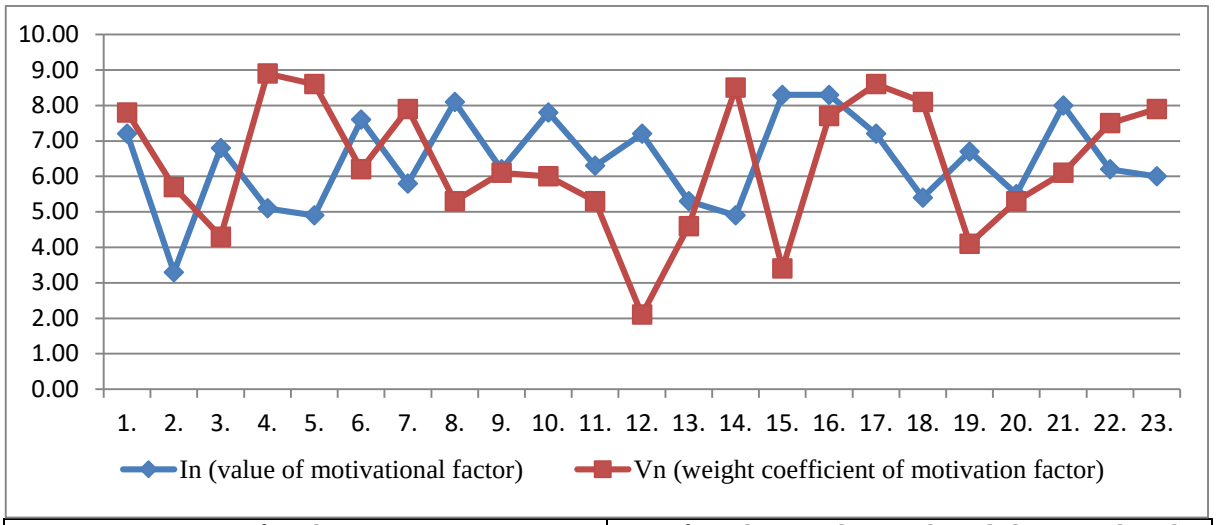
The results of the survey enabled us to obtain the value and weight of motivation factors and are summarised in the Table 1.

Table 1 ***Value and weight of motivation factors***

Motivation factor	Post-War Generation		Early Generation X		Transition Generation		Millennials		Total	
	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight
Interesting scope of work	7	7.5	7.1	7.5	7.3	7.8	7.3	8	7.2	7.8
Opportunity to be creative	2.2	5.4	2.2	5.8	3.1	5.9	4.6	5.6	3.3	5.7
Responsibility for one's decisions	7	4.5	7.2	4.6	6.8	4.5	6.5	3.7	6.8	4.3
Opportunity for professional development	3.1	8.3	3.3	8.5	5.6	9	6	9.2	5.1	8.9
Opportunity for career growth	3.9	8.7	4.2	8.7	5.2	8.5	5.3	8.5	4.9	8.6
Work environment	8.1	6.5	8.1	6	7.3	5.8	7.6	6.8	7.6	6.2
Flexible work arrangements (e.g. home-office, flexible working hours)	6.2	7.1	5.9	7.5	5.7	8	5.6	8.4	5.8	7.9
Atmosphere at the workplace	8.6	6	8.1	5.4	8	5.1	8.2	5.4	8.1	5.3
Good and fair supervision	6.4	6.1	6.3	6	6.3	6.1	6	6.2	6.2	6.1
Autonomy of work	7.5	6.3	7.7	5.9	7.7	6	8.1	6.1	7.8	6.0
Work in which the result can immediately be seen	6.4	4.7	6.3	5.1	6.5	5.5	6.1	5.5	6.3	5.3
Long-term work where results are not immediately tangible	7.6	2	7.1	2.1	7.5	2.1	6.9	2	7.2	2.1
Informal immediate acknowledgement by the manager	5.6	4.6	5.4	4.3	5.3	4.4	5.1	5.1	5.3	4.6
Clear responsibilities	5	8.6	4.9	8.5	4.7	8.5	5	8.6	4.9	8.5
Working with colleagues from different cultures	8.3	3.2	8.1	3.2	8.3	3.5	8.3	3.6	8.3	3.4
Opportunity to use modern technologies at work	8.4	7.7	8.5	7.6	8.1	7.6	8.3	7.9	8.3	7.7
Extraordinary financial reward for getting the job done	7.2	8.8	7.2	9.1	7.1	8.8	7.3	7.9	7.2	8.6

System of material nonfinancial benefits	4.9	8.5	5.2	8.3	5.2	8.1	6	7.8	5.4	8.1
Working in teams	6.4	4	6.6	4	6.8	4.3	6.6	4.2	6.7	4.1
Working on unique, difficult tasks	5.2	5	5.1	5.1	5.7	5.4	5.5	5.5	5.5	5.3
Working with professionals in the field	8	6.1	8	6.1	8.1	6.1	7.8	6.2	8.0	6.1
Earnings depend on the results performed	6	7.4	6.3	7.5	6.3	7.6	6	7.5	6.2	7.5
Stability and confidence in employment	5.6	8.3	5.5	8.3	6.1	7.9	6.1	7.5	6.0	7.9

The survey showed that there was concordance between the perceived importance of a motivation factor and employees' satisfaction by this factor in some cases and a noticeable mismatch in others, which is reflected on the Figure below.



1. Interesting scope of work	13. Informal immediate acknowledgement by the manager
2. Opportunity to be creative	14. Clear responsibilities
3. Responsibility for one's decisions	15. Working with colleagues from different cultures
4. Opportunity for professional development	16. Opportunity to use modern technologies at work
5. Opportunity for career growth	17. Extraordinary financial reward for getting the job done
6. Work environment	18. System of material nonfinancial benefits
7. Flexible work arrangements	19. Working in teams
8. Atmosphere at the workplace	20. Working on unique, difficult tasks
9. Good and fair supervision	21. Working with professionals in the field
10. Autonomy of work	22. Earnings depend on the results performed
11. Work in which the result can immediately be seen	23. Stability and confidence in employment
12. Long-term work where results are not immediately tangible	

Figure 2 ***Concordance between the value and weight of motivation factor***

The confines of overall motivation are from 0 to 23*$\sqrt{100}$=230.

$$0 \leq M \leq 230, \quad (7)$$

For the conducted research, overall motivation will equal:

M= $\sum\sqrt{In * Vn}$ = 143.8

This result allows concluding that the motivation of IT specialists in contemporary Latvia is above the average.

However, the research showed that there was a difference between the factors that influenced the motivation of employees of different genders. Two thirds of the respondents involved in the survey were males, while only one third were females. This reflects the real situation with employment in the IT sphere, where women occupy only around 30% of ICT jobs in the European Union (Women in ICT, 2012). The perception of women and men concerning the factors of motivation that are important, as well as satisfaction with different factors of motivation vary as demonstrated in the Figure 3.

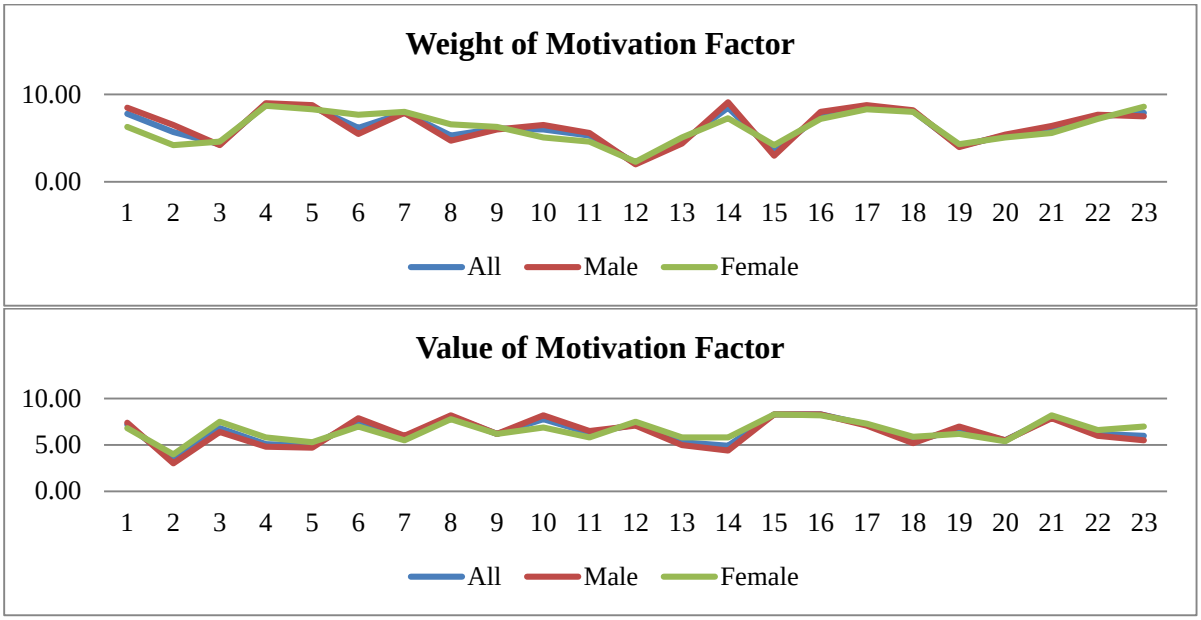


Figure 3 ***Weight and value of a motivation factor***

It is noteworthy that the largest variance between estimations of weight of motivation factors between males and females appears in all the clusters, so it cannot be concluded that some needs are explicitly more important for men then for women.

Motivation factors that are much more important for males then for females are as follows: autonomy of work; work in which the result can immediately be seen; interesting scope of work; opportunity to be creative and clear

responsibilities.

Motivation factors that are much more important for female then for male are as follows: work environment; atmosphere at the workplace; informal immediate acknowledgement by the manager; working with colleagues from different cultures; stability and confidence in employment.

The value of a motivation factor or the extent to which the need is satisfied also varies between men and women.

Men are significantly more satisfied by the following motivation factors then women: work environment; autonomy of work; working in teams.

Women are significantly more satisfied by the following motivation factors then men: opportunity to be creative; responsibility for one's decisions; opportunity for professional development; clear responsibilities; stability and confidence in employment.

In general, the motivation of female IT specialists is higher than the motivation of male IT specialists: 144.9 against 143.1.

Along with gender differences, affiliation to a certain generation also impacts motivation. Latvia, because of its complicated multidirectional history, has an especially unique generation formation. The fact that part of the Latvian society, including IT specialists, were brought up in the Soviet Union and the other part were born in an independent Western-oriented country sets a necessity to build an approach to the classification of generations. According to the research by Apsalone et al. devoted to distinguishing generations in Latvia, the current Latvian labour force can be divided into the following generations: the Post-War Generation, Early Generation X, the Transition Generation and Millennials (Apsalone et al., 2016). The duration of these generations correspond to the factors that caused their occurrence.

Table 2 ***Generations in Latvia*** *(Apsalone et al., 2016)*

Generation	**Period of time of birth**	**Main events and processes that influenced the appearance of the generation**
Post-War Generation	1945-1960	World War II, communist ideology, hardship and privation, fast technological development
Early Generation X	1961-1970	Khrushchev Thaw, economic stagnation and economic inefficiency, deficit, influence of Western culture
Transition Generation	1971-1984	Declaration of the independence of Latvia after the collapse of the Soviet Union, open borders, transition from a command to a market economy, joining NATO and the EU
Millennials	1985-now days	Globalization, a market economy, informational technologies, total adaptation to the Western society, joining the EU

The number of representatives of each generation in the present research is uneven. However, the distribution reflects the real situation in Latvia where most of the current working IT specialists are younger than 47.

The results showed that the young generation is less motivated by financial stimulus and cares less about stability, while the older generation is more concerned about atmosphere at the workplace and stability.

In general, the most motivated generation was Millennials. However, the research showed that there was a clear distinction in motivation between the Post-War Generation and Early Generation X with a motivation score of 140.6 and 140.5, respectively, and the Transition Generation and Millennials whose motivation coefficient was about 5 points higher – 144.3 and 145.9 points, respectively.

Conclusion

The research results showed that IT specialists in contemporary Latvia do not always receive enough motivation from the factors that are important for them and the other way around. For example, IT specialists value the importance of professional development and career growth; however, they are not satisfied by the career and professional development opportunities. Conversely, they are satisfied by the opportunity to work with the colleges from different cultures, but it is not highly important for them.

The motivation of IT specialists differs in the context of gender and age. Women demand a better work environment and confidence in comparison with men. They are more satisfied by responsibility, creativity and stability factors than male employees. The motivation of female employees is slightly higher then that of their male colleges; 144.9 against 143.1.

An analysis of motivation of each generation separately and its comparison with other generations showed that the Post-War and Early Generation X were significantly less motivated then the Transition Generation and Millennials.

Millennials were more interested in the interesting scope of work, opportunity for professional development, the work environment, informal immediate acknowledgement by the manager than an average respondent.

The Transition Generation appreciated the work environment less than the other generations but cared more about the work in which the result could be immediately seen. They were more satisfied by the opportunity for professional development and less by the work environment.

Early Generation X emphasized the significance of such motivation factors as responsibility for one’s decisions, stability and confidence in employment and extraordinary financial rewards.

The Post-War Generation cared more about atmosphere at the workplace, a system of material nonfinancial benefits and stability and confidence in employment and less about work in which the result could be immediately seen, the interesting scope of work, the opportunity to be creative, the opportunity for professional development and flexible work arrangements.

Limitations

The research is conjugated with certain limitations. The main one is subjectivity. Each respondent has his/her personal attitude to as his/her response values equally with all the other responses his/her subjective overreaction may influence the final result. Another limitation that is also concerned with subjectivity is the misunderstanding of questions that may take place. This limitation follows from the interview design where the question cannot be rephrased or explained.

Another limitation is associated with perceptual biases. As Bruner and Goodman showed, children from less wealthy families estimated coin sizes to be larger than children from more wealthy families (Bruner & Goodman, 1947); IT specialists in the present research might overestimate the importance of the factors they lacked the most.

Despite the possibility of slightly influencing the result, limitations are too tenuous to change the overall picture. However, in future research, ways to overcome the limitations should be suggested.

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