HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES

Theses of Doctoral Dissertation (PhD)

Tibor Pál SZEMERE

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INVESTIGATION OF INVESTMENT PROJECT MANAGEMENT RISKS IN THE CONSTRUCTION INDUSTRY

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Approval of the Head of the School   **Approval of the Supervisor**

1. BACKGROUND OF THE WORK, OBJECTIVES

The focus of this study is to examine the investment project process. Since investments can also be considered as economic interactions, certain risks are associated with their implementation. Risk factors were given a particular priority during the secondary and primary researches while determining the most relevant risk factors of investment project processes in relation to B2B market. The risk map for investment project processes was created in line with the relevant secondary sources, qualitative and quantitative primary results.

This study is topical because the importance of investments is unquestionable in a market economy. Therefore, a comprehensive risk assessment might provide results, which are useful for both supply and demand side actors in B2B market relations. Based on the results of the primary study, the perceived risks of the project process were defined and they were structured into a risk hierarchy system.

Based on the qualitative results, we performed a quantitative study; based on the responses of the sample subjects, we determined the perceived risk factors and based on them we segmented the service provider (contractor) market. The main sociodemographic characteristics of each segment were also explored in the framework of the research then I formulated risk mitigation solution proposals for the actors on both sides.

1.1 Relevance of the Subject

Because of the pandemic, the question - in the most developed economic sections - is how it is possible to minimalize the damages, to provide an operational framework in a way that is also acceptable to the society. The experts agree that the measures taken in the epidemic context (mainly restrictions) destroyed the interaction of supply and demand. On the demand side, healthcare products and services and some IT devices connected to the defence were in the centre of interest while the demand for products which were hard to get and might be postponed decreased significantly. The customers' willingness to buy stopped abruptly. Those customers who have changes in their incomes reduce or postpone their purchases.

On demand side, the fear of the infection and the introduced restrictions cut services down. The operators in these sectors (tourism, catering, and culture) experienced changes in their work conditions and depending on the possibilities, they were directed to online interfaces. Some services, e.g. in case of logistic services, have incurred additional costs.

The precise survival recipe is not yet known but one of the pillars of macroeconomic equilibrium is the consumption, which has been undergoing a rearrangement[1]. The other important factor is the investment, which is the basis of the economic stability. Therefore, the postponed and cancelled investments would seriously hit the economy. The funding of governmental purchases are questionable in the medium term because the tax burden cannot be increased and the decline in tax revenues is predictable in absolute terms. The export outlook can only be ensured if the currency inflation is a tendency in the given country because in this case export products are cheaper compared to the competitors on the international market. In this context, investments have an important role, as it is generally the case in post-crisis recovery. John Maynard Keynes also noticed the volatility concerning the level of investments. However, the consumption also varies; he thought that the reason for this in case of investments was that the capital holders' (investors) expectations for the future (psychological factor) strongly influence the amount of investments. In many cases, it depends on the risk-taking willingness of decision makers (potential investors) to what extent they withdraw the investment plans, and to what extent the investment intensity will be modified. These modifications might be more important than it can be justified. Several factors influence the level of investments, for example the income of economic operators, the rate of interest, the amortization of capital, or a change in the price level of means of production. In case of a change in interest rates, the ratio of investments varies inversely because if the bank has a higher expectation for interest rate and at the same time the investment risk is lower then it is preferred by investment decision makers. This article is topical since it deals with the examination of investment risks, including the detection of perceived construction project risks. If we know the risks and we can manage them in time, then we can help the economy to recover and prevent the development of major problems.

1.2 Objectives

The main objectives of the research:

1. Characterization of investments as projects.
2. I explore the steps of the architectural investment process, I analyse the stages of the investment decision process.
3. I define the groups of risk factors that arise, which I group on the basis of the literature.
4. I explore and compare the risks perceived by the customer and contractor side on both sides of the investment process and make proposals to reduce them.

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[1] In case of an open economy, it means that the total output (Y) is equal to the amount of the household consumption (C), the company investment (I), government purchases (G) and the net exports (NE) Y=C+I+G+NE, the net export is the difference between export and import (EX-I).

1.3 Background of the Research

My preliminary research conducted within the framework of my Scientific Student Circle Dissertation (TDK) in 2011 aimed to analyse the investment process in the construction industry from customer decision-making to implementation from the point of view of an architectural firm. I consider my empirical results as an initial starting point for my research.

I wrote my dissertation (2012) with the same title as my TDK dissertation, but the focus and approach of the research analyzed the issue in a different dimension. I examined the investment project process as theoretical aspects of service, my work was entitled as *"Investment process analysis from customer decision-making to implementation from the point of view of an architectural firm"*. The aim of my dissertation was to examine the marketing aspect of a project work through the example of a specific architectural firm.

I also consider as the background of my dissertation the study I carried out under the scholarship UNKP-2017 entitled as *"A comprehensive analysis of the factors affecting the employment intensity of investments"*, the partial results of which can be related to the research area of my doctoral dissertation. I examined what role investments play in employment. In addition, under the scholarship programme UNKP-2018 I also examined a research entitled as "A comprehensive analysis of the generation-specific characteristics of investments in order to increase employment". These are also partial results and the background of my research

1.4 Research hypotheses

In accordance with my objectives and the formulated tasks, I formulated the following hypotheses during my research:

Hypothesis 0 (H0) – According to my basic hypothesis, the risks occurring during the investment project process and their perception and assessment can be used as a segmentation criterion, therefore it offers an opportunity to characterize new target groups of consumers and service providers.
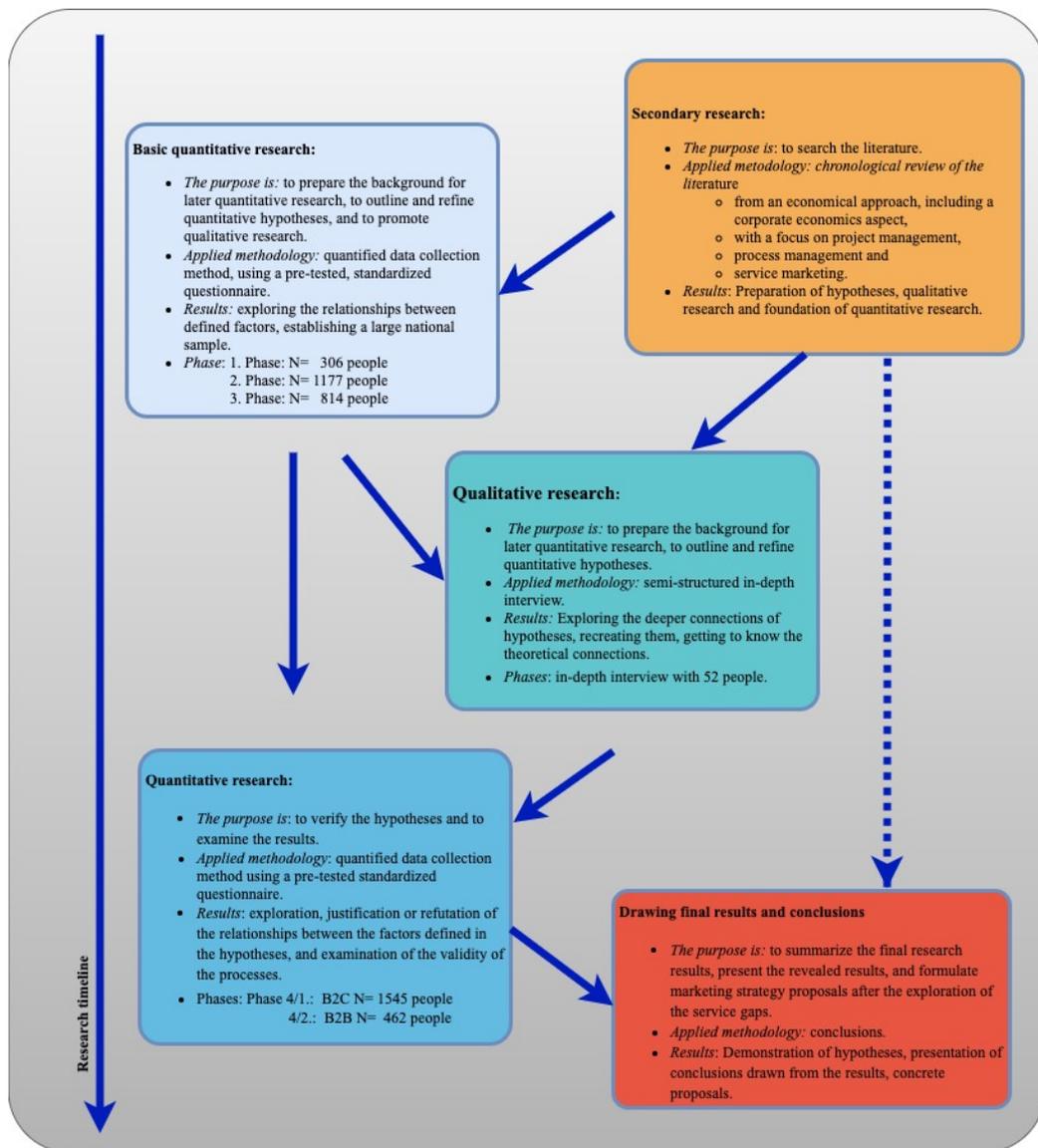
Hypothesis 1 (H1) – During the investment process, risk factors can be defined and grouped, and the criteria determining profitability can be arranged in order.

Hypothesis 2 (H2) – Based on the perceived risk factors, investor-consumer groups with characteristic differences can be created in the construction investor-consumer market.

Hypothesis 3 (H3) – Based on the perceived risk factors, well-distinguishable groups of characterizable contractors can be defined in the construction service provider-contractor market.

Hypothesis 4 (H4) – The success of the construction investor project depends on the relationship between the customer and the designer.

The steps of preparing the dissertation and the system of the relationship between the individual phases are illustrated in Figure 1.

Secondary research:
- *The purpose is*: to search the literature.
- *Applied metodology: chronological review of the literature*
  - from an economical approach, including a corporate economics aspect,
  - with a focus on project management,
  - process management and
  - service marketing.
- *Results*: Preparation of hypotheses, qualitative research and foundation of quantitative research.

Basic quantitative research:
- *The purpose is*: to prepare the background for later quantitative research, to outline and refine quantitative hypotheses, and to promote qualitative research.
- *Applied methodology*: quantified data collection method, using a pre-tested, standardized questionnaire.
- *Results*: exploring the relationships between defined factors, establishing a large national sample.
- *Phase*: 1. Phase: N= 306 people
            2. Phase: N= 1177 people
            3. Phase: N= 814 people

Qualitative research:
- *The purpose is:* to prepare the background for later quantitative research, to outline and refine quantitative hypotheses.
- *Applied methodology:* semi-structured in-depth interview.
- *Results:* Exploring the deeper connections of hypotheses, recreating them, getting to know the theoretical connections.
- *Phases*: in-depth interview with 52 people.

Quantitative research:
- *The purpose is*: to verify the hypotheses and to examine the results.
- *Applied methodology*: quantified data collection method using a pre-tested standardized questionnaire.
- *Results*: exploration, justification or refutation of the relationships between the factors defined in the hypotheses, and examination of the validity of the processes.
- Phases: Phase 4/1.: B2C N= 1545 people
            4/2.: B2B N= 462 people

Drawing final results and conclusions
- *The purpose is:* to summarize the final research results, present the revealed results, and formulate marketing strategy proposals after the exploration of the service gaps.
- *Applied methodology:* conclusions.
- *Results*: Demonstration of hypotheses, presentation of conclusions drawn from the results, concrete proposals.

Research timeline

Figure 1: ***Flow chart of dissertation preparation***

Source: I compiled the individual process stages in the figure according to the known methodologies, and the my own research.

2. MATERIAL AND METHODOLOGY

My research is the result of a multi-step research process, which consists of secondary research and a primary research phase. I managed to identify and group the risks of an investment project process as the result of the systematic multi-aspect analysis of the relevant literature.

Subsequently, in the framework of a primary study, I implemented qualitative and quantitative data collection, one of the aims and tasks of which was to outline and refine the later quantitative hypotheses. I conducted in-depth interviews with a total of 52 people. Subjects of the interviews were filtered and they were people who had dealt with projects and/or project coordination. Thus, the respondents included project specialists, project managers, and project coordinators. During the recruitment, I preferred that the specialist also (had) participated in the project process as an investor, constructor or designer, therefore, the sample was able to provide the most information possible to examine the risk aspects formulated as the goal of the research. As a methodological tool for qualitative research, I used a semi-structured interview outline to gather information in depth. I examined the perceived risks of each project phase in a separate issue.

In the course of my qualitative research, I defined the differences and correlations between the factors, which provided a solid basis for the last research phase, the B2C 1545-person and B2B 462-person national quantitative survey.

The quantitative research consisted of four phases. The first three phases were my so-called basic research, and in the fourth phase I examined the relationship and differences between the two sides of service users (B2C) and service providers (B2B) in the framework of a national survey. The input and statistical processing of the data was carried out with the help of SPSS 17.0 - 22.0 program in the case of the basic and national researches. To process the results of my quantitative research, I performed descriptive statistics, bivariate and multivariate correlation studies, using Chi-square test, factor analysis, cluster analysis, and analysis of variance. In the case of segmentation, I used the K-means clustering procedure every time. During each analysis, I performed several tests, I detailed the segmentation result that can be best explained professionally and statistically appropriate from the obtained results in the light of my research results. Significance and F-values were taken into account in the correlations analyzed by analysis of variance. In the case of Chi-square tests, the internal correlation analysis of each relationship was performed in each case on the basis of the values of the corrected standardized residues (Adj. R).

3. RESULTS

3.1 Results of secondary research

The grouping of risks encompasses a wide range of literature, there is a content overlap between the groups formed by each author, but many factors emerge as a result of the specifics of the enterprise. In the following, I grouped the explored factors in summary with my own empirical experience and synthesized the results of the processed secondary sources in the table below.

*Table 1: **Grouping of identified risk factors***

Risk categories	Risk factors	Architectural investments (business aspect)	Projects (aspects of the project within the company)
Financial and financial structure	Debt management capacity, pay gaps, liquidity, bad investments, receivables management	Whether the given enterprise has the necessary resources, the scheduling availability corresponds to the pace of the investment.	Whether the financial framework for the project is provided at the right pace and distribution.
Market prices – market demand	Market price fluctuations, cost structure, contract terms, market exit and entry	Adaptation of the enterprise to price fluctuations according to the original budget, e.g. exchange rate risk.	Flexibility of the project budget in relation to the bid price and the price differences caused by the price change.
Stakeholders and their relationships	Dependencies, conflicts arising from cultural differences, contractual risks	The effect of dependencies arising from the interests of the company on the investment process.	Company priorities and disparities to be taken into account during the implementation of the project

Competitive environment, competitors	Market power segmentation, market espionage, antitrust measures, measuring and controlling market power	Competitive activities observed during the architectural investment and changes in the investment environment, e.g. regulatory preferences.	Uncertainty of project implementation due to changes in external factors and changes in company preferences.
Distribution system and channels	Supplier flexibility, availability, raw material dependence, raw material substitutability	The dependencies of the company during the investment process, e.g. supplier attitudes, resp. availability of raw materials.	Material needs arising during the project and their availability through the company's networking
Consumers and consumer preferences	Flexibility of product-service choice, credibility, weak consumer core.	The relationship of the business with the consumers, reaching and serving the target group core.	To what extent the given project fits into the consumer preferences, how much it is supported and how relevant it is.
Human Resources	Employees, subcontractors, personal competencies, qualities, personnel changes based on political reasons, personal competencies.	Competencies and incompetencies of the corporate workforce.	Competences of the project owner and the project team and their limitations.

Political environment	Social support, political involvement in the company's activities, the threat of terrorism, personal changes based on political reasons.	he political influence of the company and independence from political power. Brand social support, CSR, PR activities.	Project vulnerability based on political considerations.
Legislation	Permits to operate, legal supervision and justice, office cooperation competence.	Compliance with and control of the legal framework of the enterprise.	The official and corporate legitimacy of the project.
Corporate identity, fame, image	Credibility of corporate image, product reliability, popularity of reference persons.	The credibility of the business and its communication.	The communication and image of the project towards the whole business.
Strategic factors	Correct company goal selection, acquisitions, mergers, resource allocation.	The place of the company's strategic goals and the fit of the investment into it.	Integration of the project into the corporate strategy.
Technical-technological factors	Technology complexity, amortization, labour demand.	The technological development of the enterprise and its development.	Adapting the project to the company's technology aspirations.
Financial market factors	Exchange rates, reliability of investments, liquidity of investments, actual liquidity, rate of interest rates.	The financial stability of a business is a guarantee of investment.	One of the pillars of the project's success is the company's financial stability.
Tangible assets, business operation framework	Equipment, manufacturer-service units, force majeure cases,	Adaptation of the company's investments to the technical level.	Alignment of the project with the corporate

	international influences, trends.		technology direction.
Cognitive Risk or Psychological Risk	The risk of the difference between the image in the mind of the investor and the way it is realized.	How the corporate investment is realised depending on relationship between the vision of decision-makers and the actual investment.	How much the project fits to the company's ideas.
Communication	Side-by-side "narratives", conceptual and content misunderstandings between the participants in the process.	The quality and quality of corporate communication during the investment process.	Feasibility of the project and how it fits to the corporate investments.
Health risk	It includes risk elements related to the adverse health effects of the investment.	Healthy implementation of the company's construction investment in all segments.	Health-conscious implementation of the project in the investment segment.

Source: (BOEHLJE - LINS 1998), supplemented by secondary sources
and with empirical experience

The examined risk categories in the literature and their causes were also grouped according to the authors, which is detailed in the table below.

3.2   Results of primary research
3.2.1   Qualitative results

As a qualitative result of my primary research, I was able to identify the following perceived risk factors based on secondary research and expert interviews:

Table 3: ***Project risk factors perceived by participants in the architectural investment project process***

Perceived risks
the quality of the work done (poor quality materials, improper work)
the reliability of those collaborating on the project (how many tasks and what responsibilities they take on, and whether promises are met by the deadline)
investment coverage (whether the money is enough to complete the work)
availability of project collaborators
the price of services (how expensive the service is)
the flexibility of the contractors cooperating in the project in relation to each problem
the experience of the participants in the project
credit risk (interest on the loan rises)
cooperation with project participants, information exchange (if the partner shares all the info at the end of each work phase, the partner gives information about the next step, etc.)
legal risk (contract is not appropriate)
duration of construction
health risk (the built-in materials are harmful to health)
changes in legislation (new taxes, contributions)
investment risk (market factors change, so it does not hold the value of the property)
accident risk (someone is injured during the investment process)
expected return on investment (when the investment pays off)
the investment segment (construction for residential or commercial purposes)
the reputation of the architect/constructor and the client
health risk (the contractor gets sick during the process)
implementation phase (when the work can be done: spring, summer, autumn or winter)
taste risk: the client does not like the finished property in the end
the social perception of the realized real estate is not what the client wanted (the opinion of friends and colleagues will be negative)
flexibility of project participants

Source: own research, 2018. N = 52 people

Overall, we can state that the result of the qualitative research is that the service provider is aware of the customer's expectations during the investment project process. Based on the perceived risks, he/she tries to prepare the investment process so that implementation can take place as smoothly as possible. To do this end, they focus on the following areas:

- continuity,
- communication,
- costs,
- deadlines,
- quality,
- functionality,
- style,
- value for money,
- effectiveness,
- experience,
- reputation,
- availability,
- the whole project process and its stages,
- psychological risk,
- and the duration of the free decision, adherence to its framework.

Of course, participants in qualitative research (B2B) do not only perceive risk factors, but they also mention risk mitigation considerations for these identified risk factors.

Table 4: ***Service project considerations determining the reduction of perceived risks in construction project investments***

Aspects determining the reduction of perceived investor risks
continuous information of the customer
giving the customer the opportunity to make a free decisions
involving the customer in professional issues as well
explanation of the steps in the construction project to see what happens next
meeting the deadlines
respecting the budget
introducing cheaper solution to the customer
presenting other contractor prices and results to allow the customers to compare

Source: own research, 2018. N = 52 people

3.2.2 Quantitative results

3.2.2.1 B2C kvantitatív kutatás

My B2C quantitative research is based on the grouping of risk factors perceived by participants in architectural investment projects and the examination of the relationships between different-based segmentations. The number of B2C items in my samples is (N = 1545 people), so many evaluable questionnaires were filled in by the respondents. 59% of respondents have their own property, 39% do not currently have their own property. Respondents who own property owned an average of 1.25 properties, with most of the 10 properties owned by one of the subjects in the sample only. 20% of the respondents (69% of the sample) plan to renovate their most recently purchased property or their own property. 35% do not plan such an investment, and another 4% are still hesitant about whether their property needs renovation. Among those who do not plan to renovate their property, the main reason for this is that the property has recently been renovated and is still in good condition. In any case, it is a positive result in terms of the attitude towards investors that only 1.5% stated that they have a negative experience with renovation work. This will be an important result because I examine the willingness of continuity in the case of the respondents. On a separate issue, I analysed the extent to which respondents considered it necessary to consult with a professional during the construction or renovation.

Most people (54.7%) consider the joint review of ideas to be important in detail, and almost one-fifth of the respondents (17.9%) are in favour of planning. Only 0.9% of the sample believed that they would completely hand over the renovation work. Quite few respondents (2.7%) would implement such a project without the involvement of a specialist.

During the examination of the risk approach, I grouped the project risk factors perceived by the buyer-customer (consumer side) and I segmented the investors (consumers) of the architectural investment. Thus, for the first time, I identified the risks associated with the project and their perceived importance to investors. I ranked the perceived risk factors in my questionnaire based on the average importance of the mentions. According to the result, the following aspects were rated as the most important on the side of investors: **quality** (such as the use of poor quality materials or inadequate work), **reliability** (how many tasks, how much responsibility the professional takes on and whether the promises are met on time) and **financial risk** (investment coverage, enough do you have the money to finish the work). But other factors have also emerged, such as **trust in the professional**, the **availability** of the professional, and the **price of the services** it provides, as well as the **flexibility of the service** provider-contractor among the primary perceived risks of the sample respondents.

It also turned out (see table) that the sample is characterized by a kind of overestimation since none of the items had an average value less than two. It is also clear from the relative standard deviations that the sample is very cohesive for the above perceived risks, in contrast, the respondents judged differently the other perceived risk factors. It

is likely that in the lives of some investors, these are risks that occur in different ways, which may be based on gaining previous experience.

*Table 5: **Ranking of project risk factors detected by the buyer-customer (B2C, consumer) side of the architectural investment** (mentions are in percentages)*

Perceived risks	average (where 1 = I do not feel risky at all, 4 = I feel completely risky)	relative standard deviation
The quality of the work done (poor quality materials, inadequate work)	**3,33**	**0,95**
Reliability of the professional (how many tasks, what responsibilities he/she takes on and if he/she keeps his6her promises on time)	**3,32**	**0,89**
Investment coverage (if the money is enough to complete the work)	**3,11**	**0,97**
Trust in the professional	**3,09**	**0,98**
Availability of the architect / constructor	**3,06**	**0,98**
Price of the services (how expensive the service is)	**3,03**	**0,93**
Flexibility of the architect / constructor with arising problems	**3,00**	**0,92**
Problem solving capacity of the professional	2,98	0,94
Experience of the professional, number of years spent in the profession	2,93	0,93
Credit risk (credit interest rate rises)	2,90	1,03
Cooperation with the contractor, exchange of information (Sharing all information, information about the next step at the end of each work phase, etc.)	2,87	0,96
Legal risk (contract inadequate)	2,84	1,03
Duration of construction	2,80	0,89
Health risk (built-in substances are harmful to health)	2,80	1,09
Changes in legislation (new taxes, contributions)	2,75	0,99
Investment risk (market factors change, so do not keep the value of the property)	2,71	0,98
Accident risk (someone gets injured during the investment process)	2,67	1,05
A selection of specialist services	2,65	0,91
Expected return on investment (when will the investment bring back the price?)	2,60	0,95
Investment segment (construction for residential or commercial purposes)	2,51	0,94
az építész/kivitelező hírneve	2,51	0,95

Reputation of the architect / constructor	2,50	0,97
Period of the investment (work would take place in spring, summer, autumn or winter)	2,48	1,01
Taste risk: I don't like the finished property in the end	2,40	1,01
Social perception of the realized real estate is not what he wanted (the opinion of friends and colleagues will be negative)	2,01	1,02

Source: own research, 2018. N=1545 people (Scale 1-4, where 1 = least important, 5 = most important);
Important factors: average> = 3; Key factors: average> = 2; Less important factors: mean <2;
(variance=0,89-1,09)

In order to be able to separate groups of contractors based on risk factors, we performed, for the first time, a factor analysis for risk factors. With the help of this, we were able to find out which risk factors are related in the opinion of the contractors.

In the factor analysis, the Varimax rotation method was used in all cases. Based on the total variance and KMO values, the results of the four-, five- and six-factor tests were statistically evaluated, of which the five-factor result showed the most professional structure.

During each trial, there were factors that moved together throughout, regardless of the number of factors, these elements are very closely related in the value judgment of the contractors.

Examples of such factors were:

- risk group concerning the **duration of the project** (construction) and the time generated for the period of the investment (work would take place in spring, summer, autumn or winter) risk group
- and some range of **competencies related to the professional**s (problem solving, flexibility, availability).

In addition, there were so-called migrating elements, which were grouped into different groups of factors in terms of factor numbers, such as:

- "**Investment segment** (residential or commercial - expenditure on construction)", or
- "**health risk** (for example, the investor becomes ill or the contractor becomes ill during the process)".

As a result of the five-factor test, the following factor structure was obtained (see Table 15)**:**

- **Factor 1:** "**human and quality factor**" in which the competencies associated with the professional, the quality of the project, and communication were included;
- **Factor 2:** "**financial and legal risk group**", where the financial risks related to the return on investment and the risks generated by changes in the legal environment were included;
- **Factor 3: "social, psychological risk group"** including the psychological and social risk factors associated with the investor. The social perception of the project and its acceptance by the investor, the risk of identification with the result are the ones that were included in this factor;
- **Factor 4: "health risk group"** including elements related to the adverse health effects of an investment;
- **Factor 5: "time risk"**, a group of risk factors generated by the duration and period of the project.

After the factor analysis, we performed a cluster analysis on the original factor list using the K-means clustering procedure in order to segment the sample based on the risk factors.

Characteristics of segments by risk factors

Depending on risk factors, consumer groups with characteristic differences can be created among those involved in the construction investment project process. According to the analysis of variance, I was able to determine the difference between at least two clusters based on each risk factor.

The characterization of the created segments was first performed on the basis of the risk factors involved in the factor analysis, which helped to determine what basic perceived risks can be defined in my sample. The analysis of the formed five segments was carried out by comparing the averages per cluster obtained for each factor and the sample average. The evaluation carried out resulted in clusters (consumer target groups) that showed many similarities with the segments defined in my basic research.

Based on the results, I was able to characterize five groups of investors:

- **Cluster 1:** "**under-estimators**", i.e. the segment of those "who underestimate all risks" for whom none of the risk factors was more important than the sample average;
- **Cluster 2:** "**over-estimators**", i.e. the group of over-estimators of all risks who considered each risk factor to be more important than the overall sample average;
- **Cluster 3:** "**collaborators, overestimating financial, legal and health risks**" who focus on collaboration for whom the financial, legal and health

risks of the investment project were most important compared to the sample average;

- **Cluster 4:** A "cluster of **professional-minded consciousnesses**" who assessed the importance of human-related competencies as authoritative above the sample average, in addition to price and quality risk elements;
- **Cluster 5:** "**Social, psychological risk over-estimators**" for whom the social and psychological risk dimensions of the investor project were above average important.

Socio-demographic characters

I found it interesting to examine whether there is a correlation between the perceived risk appetite of investors and their education and net monthly income per capita, therefore, I examined in detail the socio-demographic characteristics of the sample (so I was able to characterize each cluster on the basis of socio-demographic criteria).
based on the Pearson's Chi-square test results, I examined where there was a significant relationship between socio-demographic criterion and cluster membership. Therefore, the segments formed on the basis of the perceived risks were also examined according to the basic variables. Belonging to the cluster is significantly (sig = 0.000-0001) determined by school graduation and monthly net income per capita. The demographic characters examined for each segment are summarized below. I also analyzed the sample for the other variables, but the significance value of the Chi-square test results was higher than expected (0.005), so I excluded them from the study.

*Table 6: **Socio-demographic characteristics of the construction segments according to the perceived risk factors***

Criteria	Under-estimators N=152	Over-estimators N=466	Collaborators, overestimating financial, legal and health risks N=306	Collaborators counting on a professional N=421	Over-estimators of social, psychological riskN=200
	primary education (0,04%) Adj.R=1,25	vocational education (0,13%) Adj.R=1,60	vocational education (0,14%) Adj.R=1,88 (0,35%)	higher education (0,50%) Adj.R= 5,13	primary education (0,05%) Adj.R=2,48

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Educational attainment **sig = 0,000**		higher education (0,35%) Adj.R.= -2,37 underrepresented	Adj.R.= -1,75 overrepresented	vocational education (0,06%) Adj.R.= -3,92 underrepresented primary education (0,01%) Adj.R.= -2,71 underrepresented	higher education (0,34%) Adj.R.= -1,76 underrepresented
net income/person **sig =** **0,001**	Income between 51-100 thousand HUF (0,09%) Adj.R= -1,74 slightly underrepresented	Income between 51-100 thousand HUF (0,15%) Adj.R= 1,66 Over 251 thousand HUF (0,19%) Adj.R.= -1,72 slightly underrepresented	Income between 51-100 thousand HUF (0,16%) Adj.R=1,70 Over 251 thousand HUF (0,16%) Adj.R.= -2,50 underrepresented	**251ezer felett (0,29%)** **Adj.R=4,44** Income between 151-200 thousand HUF (0,20%) Adj.R.= -2,83 underrepresented	**Income between 0-50 thousand HUF (0,05%)** **Adj.R=2,48** **overrepresented**

Source: own research, 2018. Measurement levels: nominal, attributes = clusters Chi-square test, Adj=corrected standardized residences, %= column percentage the variable rate of the exam in the cluster

There is thus a correlation based on two socio-demographic aspects, because there was a detectable relationship between school graduation and net monthly income per capita. In terms of education and cluster affiliation, the sample showed that the proportion of those with tertiary education was highly over-represented (0.50%) in the "professional-conscious" cluster (which has 421 out of 1545 people in the sample, the second largest

number of items). in the segment compared to the expected value (Adj.R. = 5.13). In terms of education and cluster affiliation, the sample showed that the proportion of those with tertiary education was highly over-represented (0.50%) in the "Collaborators counting on a professional" cluster (which has 421 out of 1545 people in the sample, the second largest number of items) in the segment compared to the expected value (Adj.R. = 5.13). At the same time, this cluster is also characterized by the fact that those with vocational training or vocational education (0.06%) are over-represented compared to the expected value (Adj.R. = -3.92), as well as those with primary education (8-class primary school, or less) (0.01%) compared to the expected value (Adj.R. = -2.71).

In the case of those belonging to the cluster "overestimating social and psychological risks", the subjects of the sample showed (N = 200) that the proportion of those with primary education (0.05%) was almost twice the expected value (Adj.R = 2.48) belong, while in the same cluster, those with tertiary education (0.34%) were under-represented compared to the expected value (Adj.R. = -1.76).

The net monthly income per capita, as a socio-demographic aspect, in the "professional-conscious" segment showed that the proportion of subjects in the income category of over 251 thousand (0.29%) compared to the expected value (Adj.R = 4.44) is markedly overrepresented. In the same segment, however, the proportion of subjects living in the income category between 151-200 thousand HUF (0.20%) was under-represented compared to the expected value (Adj.R. = -2.83).

The segment of "over-estimtors of social psychological risks" among the examined subjects showed that the proportion of subjects belonging to the income category between 0-50 thousand (0.05%) was overrepresented compared to the expected value (Adj.R = 2.48).
Among the examined subjects, those with higher education and those in the highest income category were over-represented in the "professional-conscious" segment compared to the expected value. Among the subjects examined, those with higher education and those in the highest income category were over-represented in the "professional-conscious" segment compared to the expected value. Respectively, the inverse of "those who overestimate social and psychological risk" is that those with primary school education and subjects belonging to the lowest income category are over-represented in the sample compared to the expected values. Respectively, the inverse of those who "overestimate social and psychological risk" is that primary school graduates and subjects belonging to the lowest income category are over-represented in the sample compared to the expected values.

3.2.2.2 B2B quantitative research

My empirical primary research sought to determine the ranking of risk factors perceived by participants in architectural investment projects; therefore, within the framework of B2B 462 quantitative research, I obtained the following results:

66.6% of respondents stated in the sample that he is the decision-maker, which means 308 people. Regarding the composition of the sample, 31.6%, ie. 146 people who were not, a total of 8 people did not want to comment on the question, which means that two thirds of our respondents actively influence decision-making during the investments of the surveyed companies. The distribution of the affected companies within the sample showed the following picture: the proportion of Limited Liability Company (LLC) was over-represented, as the sample accounted for 60.8%. Among respondents, the proportion of Individual Entrepreneurs (EVs) was still dominant, accounting for 24.45% of the total sample, ie almost a quarter. The number of Deposit Guarantee Companies (BTs) appeared in the sample with a small number of items, which was 7.57%, ie a total of 35 items. This may be due to the fact that in the case of Limited Liability Companies, the executives, who are also internal members, are responsible for the activities of the company with their entire assets, which is a perceptibly high risk factor on the contractor's side in the case of a larger investment. The presence of joint stock companies was low, 14 respondents filled in the declaration, this makes up 3% of the sample. In the other answers, the enterprise indicated the other category, here, for example, the respondents indicated a cooperative, a municipality and a general partnership.

There was no uniformly segmentable period among the respondents, how long they have been engaged in investment activities, they were located in the range of approximately 1-40 years without extreme values.

An interesting result was obtained on the question of whether the company is operating in the construction industry as its main activity. As many percent of respondents said yes as they said no. This represents a value of 46.69% and 28 respondents gave a neutral answer, ie almost 6% of the sample, so almost half of the sample is committed to the construction industry based on their main activity.

Respondents have managed an average of 6.28 construction / architecture / investment projects in the last year and participated in 7.45 projects (eg as subcontractors). This shows that those who answered the question in the sample were mainly project leaders and in very few cases were involved in a project in which they were not the decision makers.

During the examination of the project risk factors observed by the contractor (supply) side of the architectural investment, I identified the risks related to the project for the first time, and then ranked the perceived risk factors in our questionnaire according to the average importance of the mentions.

Based on the results, **financial risk** (coverage of the investment, whether the money is enough to complete the work), the **reliability risk** (reliability of the contractors cooperating in the project) and **quality risk** (quality of the work performed e.g. quality materials, inadequate work) were the most important aspects for the contractors, but

there also appeared the **flexibility** of the collaborators, the **availability** of the contractor and the **legal risks** (whether the contract was inadequate).

It also turned out (see table) that the sample was characterized by a kind of overestimation approach, as none of the elements had a mean value less than two. It is also clear from the relative standard deviations that the sample is very cohesive in the case of the above perceived risks, in contrast, the other perceived risk factors were judged differently by the respondents. It is also clear that the experience of the contractors also put legal risks at the top of the perceived risk ranking, suggesting that they had a consequent problem in previous years.

Table 5: *Ranking of project risk factors detected by the contractor of the architectural investment (B2B, supply) side (mentions are in percentages)*

Perceived risks	average (where 1 = I do not feel risky at all, 4 = I feel completely risky)	relative standard deviation
Investment coverage (if the money is enough to complete the work)	3,33	0,95
Reliability of the contractors cooperating in the project	3,32	0,89
The quality of the work done (poor quality materials, inadequate work)	3,27	0,93
Flexibility of the contractors cooperating in the project in case of problems	3,17	0,87
Contact details of the contractors cooperating in the project	3,12	0,94
Legal risk (contract is inadequate)	3,09	0,90
Expected return on investment (when the investment will pay off)	2,95	0,92
Investment risk (market factors change, so the property do not keep its value)	2,94	0,93
Availability of the customer	2,94	0,95
Changes in legislation (new taxes, contributions)	2,93	0,97
Accident risk (someone gets injured during the investment process)	2,92	1,05
Customer flexibility	2,91	0,88
The price of the services (how expensive the service is)	2,89	0,88
Credit risk (credit interest rate rises)	2,88	0,96

Cooperation with the contractor, exchange of information (share all information, inform about the next step at the end of each work phase, etc.)	2,87	1,06
Duration of construction	2,85	0,86
Health risk (built-in substances are harmful to health)	2,81	1,02
Health risk (I get sick or the contractor gets sick during the process)	2,60	0,86
Investment segment (construction for residential or commercial purposes)	2,53	0,89
The reputation of the architect / constructor	2,51	0,98
Reputation of the customer	2,50	0,97
Taste risk: the customer does not like the finished property in the end	2,48	0,99
Period of the investment (work would take place in spring, summer, autumn or winter)	2,44	1,05
The customer's expertise, knowledge and information	2,35	1,03
The social perception of the realized real estate is not as expected (the opinion of friends and colleagues will be negative)	2,31	0,93

Source: own research, 2018.
N = 462 persons (1-4 scale, where 1 = least important, 5 = most important);
Important factors: *average> = 3; Key factors: average> = 2; Less important factors:*
mean <2; (variance=0,86-1,06)

In order to be able to separate groups of contractors based on risk factors, I performed, for the first time, a **factor analysis** for risk factors. With the help of this, we were able to find out which risk factors are related in the opinion of the contractors.

In the factor analysis, the Varimax rotation method was used in all cases. Based on the total variance and KMO values, the results of the four-, five- and six-factor tests were statistically evaluated, of which the **five-factor result showed** the most professional structure. During each trial, there were **factors that moved together throughout**, regardless of the number of factors, these elements are very closely related in the value judgment of the contractors.

Examples of such factors were:

- the risk group of the time **generated for the duration of the project (construction) and the period of the investment** (if work takes place in spring, summer, autumn or winter),
- and **some of the competencies related to the contractors cooperating in the project** (problem solving, flexibility, availability, information exchange at the end of each work phase, and information about the next step),
- or changes in **legal risks** (non-compliant contract) and legislation as a risk (new taxes, contributions),
- **certain range of return risks** (market factors change, so the project will not be financially successful or the loan interest rate will increase).

In addition, **there were** so-called **migrating elements**, which were grouped into different groups of factors in terms of factor numbers, such as:

- "**Investment segment** (residential or commercial - expenditure on construction)", or
- "**health risk** (for example, the investor becomes ill or the contractor becomes ill during the process)".

As a result of the five-factor test, the following factor structure was obtained:

- **Factor 1**: "**financial and legal risk group**", where the financial risks related to the return on investment and the risks generated by changes in the legal environment were included;
- **Factor 2**: "**human and quality factor**" in which the competencies associated with the professional, the quality of the project, and communication were included;
- **Factor 3**: "**health and psychological risk factor group**", which included elements related to the adverse health effects of the investment, as well as psychological and social risk factors related to the investor, such as social perception and acceptance of the project, risk of identification with the end result;
- **Factor 4**: "**range of risks related to the customer**" means the flexibility of the customer, his background knowledge, the range of risks related to the investment segment;
- **Factor 5**: "**time risk**", a group of risk factors generated by the duration and period of the project.

After the factor analysis, I performed a cluster analysis on the original factor list using the K-means clustering procedure so that I could segment the sample based on the risk factors.

Characteristics of segments by risk factors

Thus, **groups of contractors** can be created from the subjects of the sample taken among the participants in the construction investment project process, which show **characteristic differences** based on the perception of risk factors. According to the analysis of variance, based on each risk factor, we could determine the difference between at least two clusters.

I first characterized the generated segments based on the risk factors involved in the factor analysis, which helped determine what basic perceived risks could be defined in my sample.

The analysis of the formed five segments was carried out by comparing the averages per cluster obtained for each factor and the sample average. The clusters of the evaluation resulted in **target groups of service providers**.

Based on the results, we were able to characterize five contructor groups of service providers:

- Cluster 1: "**over-estimators**", i.e. the group of over-estimators of all risks who considered each risk factor to be more important than the overall sample average;
- Cluster 2: "coll**aborators, overestimating financial, legal and health risks**" who focus on collaboration for whom the financial, legal and health risks of the investment project were most important compared to the sample average;
- Cluster 3: "**customer-based, overestimating health risks and psychological risks**" for whom the financial, health and psychological risks of the investment project were the most important;
- Cluster 4: "**rationals**" who keep in mind cooperation, quality and the financial framework;
- Cluster 5: "**under-estimators**", i.e. the segment of those "who underestimate all risks" for whom none of the risk factors was more important than the sample average.

Socio-demographic characters

It was interesting to examine whether there is a correlation between the contractors' willingness to take risks and their gender and education; therefore, the socio-demographic characteristics of the sample were examined in detail, so the individual clusters were also characterized on the basis of socio-demographic criteria and based on the Pearson's Chi-square test results, we examined where there was a significant relationship between socio-demographic criterion and cluster membership. Therefore, the segments formed on the basis of the perceived risks were also examined according to the basic variables.

Belonging to the cluster is significantly (sig = 0,001- 0,003) determined by gender and education. The demographic characteristics examined for each segment are summarized below (see Table 8). Independently of the above, we also examined the correlations for the other variables, but the significance value of the Chi-square test results showed a value higher than the expected 0.005; thus, they were, of course, excluded from the study.

Table 8: *Socio-demographic characteristics of the construction segments according to the perceived risk factors*

Criteria	over-estimators N=134	collaborators, overestimating financial, legal and health risks N=119	customer-based, overestimating health risks and psychological risks N=105	rationals N=62	under-estimators N=42
gender sig = 0,001		women (36,13 %) Adj.R=2,86		men (91,93%) Adj.R=3,48	
education sig = 0,003	secondary school education. (45,52%) Adj.R=2,10 higher education (36,56%) Adj.R.=-3,39 excessively underrepresented	secondary school education (57,98%) Adj.R=2,29 skilled worker (5,88%) Adj.R.= -2,54 excessively underrepresented	skilled workers (16,19%) Adj.R=1,27	higher education (66,12%) Adj.R=2,91	primary education (2,38%) Adj.R=2,01

Source: own research, 2018. Measurement levels: nominal, attributes = clusters Chi-square test, Adj=corrected standardized residences, %= column percentage the variable rate of the exam in the cluste

In terms of gender and cluster affiliations, the sample showed that most of "collaborators, overestimating financial, legal and health risks" are women; in this group, the proportion of people with higher education was higher than expected (college, university, PhD.); however, the proportion of skilled workers in the same segment is underrepresented compared to the expected value (Adj.R.= -2,54).

The other group, where the gender ratio was higher than expected, is the group of "rationals", the proportion of men in this segment is outstandingly high (91.93%), compared to the expected value (Adj.R.=3,48), a total of 62 people belong here. Also in this segment, the proportion of people with higher education was higher, ahead of the percentage of subjects in the previous segment (by 8.14% points).

The segment of "over-estimators" was the segment with the largest number of items in the sample, representing a total of 134 people, typically a high school education (vocational high school, grammar school, technical school); however, in this segment the proportion of people with higher education (college, university, PhD) (36.56%) was underrepresented compared to the expected value (Adj.R.= -3,39).

The "customer-based, overestimating health risks and psychological risks" segment is the 3rd largest group of the sample with 105 people, and in terms of their education, the proportion of vocational training and vocational school graduates is the highest compared to the expected value (16,19%, Adj.R=1,27).

According to the socio-demographic characteristics of the constructed segments according to the perceived risk factors, the number of items in the "under-estimators" segment is the lowest, a total of 42 people belong here, and the proportion of those with primary education was high related to the expected value.

Based on our study, we concluded that in the B2B sample, primary school graduates underestimate the perceived risks. Most high school students overreact to them, but they tend to listen to the opinions of professionals. We see that people with higher education overestimate the health risks and psychological risks that build on the customer, but rational decision-makers also belong to this segment in terms of school graduation.

Based on the results of the research, I believe that the most important perception risk according to the participants in the investment process is the coverage of the investment. This was followed with almost equal importance by the reliability of the contractor cooperating in the project process. In third place on the podium, according to the subjects of the sample, is the quality of the work performed and the flexibility of the participants in the project at the fourth level of the perceived risk hierarchy.

According to the results, the availability of the parties involved in the process and the minimization of legal risks are indispensable aspects of the project implementation, so the next two places are occupied by the former two aspects. The return on investment and other risks are already lower, but they occupy a prominent place in the ranking of risk factors.

4. NEW SCIENTIFIC RESULTS

1. **Based on the theoretical contexts of the topic, I identified the risk factors of the investment project process and grouped them (T1).**

In my dissertation I summarize the results of the international and Hungarian literature, which are based on the critical processing of the literature on investment, project management, process management and service marketing from the focus of corporate economics, and examine the factors determining the risks. I categorized the risk factors and systematized their causes according to the authors. To the best of my knowledge, such a scientific work cannot be found in the Hungarian literature, so this synthesizing part of my dissertation can be considered novel.

2. **I explored the risk factors of the investment project process and the correlations between the investors (service users) on the B2C side, and the preferences of the actors on the B2B side of the service providers (T2).**

The main objective of my dissertation was to explore the perceived risks and preferences of the participants in the investment process. In order to achieve this goal, I conducted a large number of national qualitative and quantitative researches. With the help of the revealed results, I systematized the preferences of the participants in the process.

3. **I identified the risk factors of the investment process and segmented the sample based on individual preferences, and characterized the created target groups according to basic and descriptive variables on B2C and B2B side (T3).**

Based on the results of my empirical research, I managed to form the target groups of customers (service users) and service providers, which can be considered as well-separable segments in terms of the factors affecting the perceived risks of the investment project process. I explored the orientation directions along which these segments can be well defined according to the perceived factors of investment risks. As a result of the segmentation, I distinguished five target groups. I identified the socio-demographic differences shown by the segments as well as the characteristic features that emerged.

4. **I created a new-novel definition of construction investment (T4).**

Following my secondary research, I created an independent definition based on the known and processed international and Hungarian literature, based on which the a construction investment is an establishment created as a result of an economic activity created temporarily or permanently, which is created during integration with the soil, and if dismantled, it loses its function.

5. **I identified project-independent risk factors (T5).**

As a partial result of my primary research, I defined sector-independent risk factors as one of the results of the expert interviews during the qualitative phase, for which I also make risk reduction solution proposals in my dissertation.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses of the literature, it can be stated that the investments are of decisive importance both at the macroeconomic level and at the level of the given company. That is the reason why I put it at the centre of my research and started researching the topic. The secondary research helped to highlight both the factors behind the investment reasons and the risks faced by those who are involved in the process.

The basic goal of my research was to analyse the Hungarian construction-investment segment, to explore the reasons and goals of the investment, and the motivations and means of the participating partners, the connections between investment motives and the implementation, and the emerging risks. Ultimately, my goal was to identify the development possibilities and available risk aversion options to stabilize the segment's operations.

A systematic analysis of the international and Hungarian literature helped to reveal the investment risks, then I conducted qualitative interviews within the framework of primary research and examined the perceived risks based on the experiences of the participants in the investment project process. As a result of the qualitative research, I set up quantitative hypotheses, the validity of which was confirmed or refuted by the results of my questionnaires used during the quantitative phase. The quantitative phase had four phases, the first three phases synthesized the results of my so-called basic research, while the fourth phase produced results that could be grouped in two more respects, as they measured the opinions of both B2B and B2C actors. For the systematic processing of the questionnaires, I performed descriptive statistics, bivariate and multivariate correlation studies, during which I used the Chi-square test, factor analysis, cluster analysis, and analysis of variance. In the case of segmentation, I used the K-means clustering procedure every time. During each analysis, I performed several tests, I detailed the segmentation result that can be best explained professionally and I also detailed the statistically appropriate segmentation result in the light of my research results. Significance and F-values were taken into account in the correlations analysed by analysis of variance. In the case of Chi-square tests, the internal correlation analysis of each relationship was performed in each case, on the basis of the values of the corrected standardized residues (Adj. R).

The results of my primary research are summarized in Table 40 which helps to illustrate the differences and similarities between the B2C (consumer-investor-investor) page and the B2B (service provider-contractor) page; in addition, I make my own independent suggestions for each attribute / object.

*Table 40: **Summary of the results of the Quantitative 4/1 and 4/2 research and exploration of the observed differences between the actors of the two sides, the opinion of the subjects of the sample based on the subjective value judgment***

Criteria	4/1 B2C N=1545	4/2 B2B N=462	RESULT	PROPOSAL
Reason for refusal to renovate	1. in good condition 2. lack of coverage	it is not a relevant issue, the basic activity of the contractor side is renovation, so it does not shy away	service development can bring the actors of the two sides closer together	Upgrades can always be made and financial resources can be added to help the customer.
Importance of consultation with a specialist / customer	1. very important 2. planned thinker	1. very important, planned thinker 2. free space is important	criteria are the same	This is a common point of connection. At the beginning of the cooperation, the framework should be clarified, what can and cannot be decided by the contractor alone.
Sequence of construction / renovation process	1. procurement of building materials 2. selection of contractors	1. procurement of building materials 2. selection of contractors	None of the respondents is aware of the optimal sequence of the process, and the contractor side presumably covers the known sequence in the sample due to risk reduction.	Training can help reduce the risk of individual investments. For example 1. Designer selection 2. make a plan etc.
Ranking of perceived project risk factors	1. Poor quality work, unreliability of a specialist and lack of investment coverage. 2. Lack of trust in a professional, inability to access a professional, expensive	1. Lack of investment coverage, unreliability of contractors (subcontractors), poor quality work. 2. inflexible cooperating specialist, availability of the specialist,	The aspects are the same, they perceive the risks equally on both sides. Both sides fear the lack of cooperation of the partner, its inflexibility, lack of trust, and	- It would be worth bringing together investors and contractors with a professional organization and to ensure the representation of interests for both parties within a legally

	service, inflexibility of a professional. 3. Lack of the specialist's self-problem solving and experience, credit risk, cooperation risk, legal risk, construction duration risk, health risk, changes in legislation, investment risk, accident risk, etc.	legal risks (contract inadequate) 3. Return on investment, investment risks, customer unavailability, changes in legislation, accident risks, customer inflexibility, price of services, credit risk, cooperation risk, construction duration, health risk, etc.	perceive the resulting legal risks, The customer feels vulnerable to the other party and fears the risk of compromising quality cooperation, as well as the fact that he will not have enough cover. The same goes for the contractor side, who want to legally insure themselves that they will be paid and that they can trust the experts.	regulated framework. - Even within a non-profit organization, the representation of both sides should be brought together to **qualify and mediate** potential disputes. - and to help the two sides in a solution-oriented manner on a professional basis. - clients and contractors would be categorized on the basis of pricing and other professional considerations, as well as e.g. banks in the credit rating of customers.
Sequence of criteria for determining effectiveness	1. customer-contractor relationship 2. readiness for construction 3. customer-architectural designer relationship	1. readiness for construction 2. customer-contractor relationship 3. customer-architectural designer relationship	only the answers differ in part	This is a common point of contact: at the beginning of the cooperation, the order of the processes and the priorities need to be clarified.
The importance of factors that play a role in style choice	1. amount of money to be spent 2. expert advice 3. experience in specialist shops	1. amount of money to be spent 2. expert advice 3. experience in specialist shops	The aspects are the same, they perceive the risks on both sides equally	During the preparation, design and construction professionals are given a crucial role in influencing the choice of style, and investors try to reduce

				this risk with information from friends and specialty stores.
Importance of factors involved in material use	1. amount of money 2. expert advice 3. experience in specialist shops	1. amount of money 2. expert advice 3. experience in specialist shops	the criteria are the same, they perceive the risks equally on both sides	In the case of material use, the actors on both sides have the same opinion in the sample.
Importance of factors influencing psychological risks (feel the product is your own)	1. self-identical style 2. continuous communication (control during the process) 3. adherence to the budget	1. self-identical style 2. continuous communication (control during the process) 3. adherence to the budget	the criteria are the same, they perceive the risks equally on both sides	in the case of psychological risk, the actors on both sides perceive the risks in the same way
The importance of factors influencing continuity	1. compliance with quality requirements 2. adherence to the budget 3. previous cooperation experience	1. compliance with deadlines 2. the nature of communication during construction 3. the nature of the customer relationship	perception of mostly different risks	- While investors prefer quality cost collaboration, the contractor side focuses on deadlines and collaboration. - Contractors need to understand the perspectives of investors in order for collaboration to run smoothly. This should be based on communication.
The biggest risk factor		1. social risk, the influence of friends on the customer 2. health risk	The answers are different, this is because the actors on both sides build on their previous experiences	I see the solution in optimizing the relationship between the two parties and in making preparation play a more important role. (It is difficult to filter out the opinions of friends, but if the investment process is properly prepared, the

				visual designs can also be tested with friends.)
Discrepancies between expected and completed projects perceived by customers		1. style 2. functionality, material quality		Contractors are aware of the preferences of the investor side, so if they pay attention and provide them with consciously documented information at all times, long-term cooperation is guaranteed.
The importance of aspects that determine effectiveness		1. budget adherence 2. winning further orders 3. compliance with deadlines		
Aspects determining the reduction of perceived investor risks		1. meeting deadlines and budgets 2. continuous informing of the customer 3. acquainting the investor with the construction process		

Source: own research, 2018.

The factors that determine the reduction of perceived investor risks seem to depend on which stage of the investment project process is at stake; furthermore, what are the consequences (financial, legal, etc.) and how do they influence the risk management process and its ways, from individual and personal competencies, risk-taking and attitudes. During the investment project process, special care must be taken to avoid and prevent the following problems and thus reduce investment risks.

It is a common mistake in a significant part of Hungarian companies that the preparation of an investment decision is often too and rough. The reason for this can obviously be fuelled by personality, personal competencies, or a willingness to take risks, or even the quasi-limitlessness of available resources.

A common problem is the lack of alternatives, the lack of different design variants. It is typical for companies' decision-making and for the preparation of their decisions that they offer different options of the same design as an alternative, e.g. different equipment levels for the same design, instead of several completely different approaches.

A hidden problem is the different way of the perception and the expectation of the quality factor. This factor means different things to businesses and individuals and varies based on experience and also on the observations during the investment project process. This factor will affect subsequent, new collaborations, such as winning new assignments.

It is also a shortcoming in many cases that the technical and economic plans are of a different standard. Thus, the technical content is of a much higher standard, more elaborate than, for example, the planning of cash flows in the financial plan.

For a significant proportion of corporate investments, the timing of the investment is inappropriate. I see the reason for this in the fact that products and technologies look at life expectancy with different value analyses. So in many cases, businesses produce their products, or even services, with outdated tools. However, this also means that the individual products produced do not run their life under the most favourable production and sales conditions.

Corporate market research and the exploration of market needs take place in an extreme context. Some of the investors are striving for complete security (2018, N = 462Persons), they belong to the segment of "over-estimators". They strive for complete security so they do not want to take any risks. One way to do this is to insist on fully documenting your needs. Thus, in terms of exploring market needs, they are just creeping after market needs. And the other part of investors run a kind of superficial marketing campaign when we look at corporate sales. Thus, they do not have much to do with market needs. Both extreme attitudes on the provider side are worrying.

It is essential to know the market competitiveness, and to monitpr the competitors in international and domestic markets. Reputation, branding, image, and word of mouth are important factors in what is now considered traditional marketing, and they continue to influence customer choice. Thus, they can in no way be ignored.

In many cases, standardization of processes offers a solution to reduce risks. The revealed results of the investment process help the service providers to adequately inform the customers about the individual stages, the expected risks and the ways to reduce them, strengthening the trust among the participants in the process.

6. PUBLICATIONS RELATED TO THE TOPICS OF THE DISSERTATION

Scientific journal articles published in Hungarian

Morauszki, Kinga Szilvia; Lajos, Attila; **Szemere, Tibor Pál**; Almádi, Bernadett (2018): A beszállítók kiválasztásának optimalizálása és értékelése, ACTA CAROLUS ROBERTUS 1: 1 pp. 173-191., 19 p.

Scientific journal articles published in foreign languages:

Tibor Pál Szemere, Mónika Garai-Fodor (2021): Risk Approach – Risk Hierarchy or Construction Investment Risks in the Light of Interim Empiric Primary Research Conclusions, "Vadyba" / Journal of Management ISSN 1648-7974, 2021 Vol 37 No. 1 (*megjelenés alatt*)

Szemere, Tibor Pál; Medve, András; Tóth, Tamás; Almádi, Bernadett (2017): Reviewing the Investment Process - from Decision Making to Realization, from the Customers Viewpoint, ÓBUDA UNIVERSITY E-BULLETIN 7: 2 pp. 15-24., 10 p.

Szilágyi, Tibor Pál; Csiszárik-Kocsir, Ágnes (2016):
The application of investment economical calculation's practice between the hungarian small and medium sized enterprises, INTERNATIONAL JOURNAL OF BUSINESS AND MANAGEMENT STUDIES 5: 1 pp. 359-366., 8 p.

Conference papers published in Hungarian:

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