Article

Risk Approach—Risk Hierarchy or Construction Investment Risks in the Light of Interim Empiric Primary Research Conclusions

Tibor Pál Szemere, Mónika Garai-Fodor and Ágnes Csiszárik-Kocsir *

Keleti Károly Faculty of Business and Management, Óbuda University, 1034 Budapest, Hungary;
szemere.tibor.pal@uni-obuda.hu (T.P.S.); fodor.monika@uni-obuda.hu (M.G.-F.)
* Correspondence: kocsir.agnes@uni-obuda.hu; Tel.: +36-1-666-5222

Abstract: The focus of this study is to examine the investment project process. Since investment 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 research, while determining the most relevant risk factors of investment project processes in relation to the B2B market. The risk map for investment project processes was created in line with the relevant secondary sources, qualitative and quantitative primary results. This is topical because the importance of investments is unquestionable in a market economy. Therefore, a comprehensive risk assessment might provide results that 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 on the basis of them, we segmented the service provider (contractor) market. The main socio-demographic characteristics of each segment were also explored in the framework of the research.

Keywords: investment; risk; risk approach; primary research

1. Introduction

As an impact of the pandemic, a significant global economic downturn can be expected, which proves the relevance of the topic of our study. The open economies of the world have an effect on each other, so the economic downturn has an impact on other economies. The coronavirus outbreak has shaken the member states of the European Union. The initial preventive crisis management of the epidemiological situation (localization, isolation, and lockdown) was followed by a swift and significant economic downturn. The unexpected health and economic crises forced the weaker and export-dependent economies (i.e., Hungary) to stop. The Union's member states tried to stabilize the national economies with different methods and mitigate as well as minimalize the damage. In this turbulent economic environment, part of the companies went bankrupt. The Hungarian small- and medium-sized enterprises (SMEs) did not have any savings, and the loss of customers and the operative (previous) liquidity problems put an end to their activity swiftly (Balcerzak et al. 2017; Kovacova et al. 2019; Kliestik et al. 2018).

In the most developed economic sections, the question is how it is possible to minimalize the damage and 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 defense were the center of interest, while the demand for products that were hard to get and might be postponed decreased significantly. The customers' willingness to buy stopped abruptly. The customers who have changes in their incomes reduce or postpone their purchases.

On the 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 the case of logistic services, have incurred additional costs.

The precise survival recipe is not yet known, but one of the pillars of the macroeconomic equilibrium is consumption, which has been undergoing a rearrangement.[1] The other important factor is 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 is questionable in the medium term because 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, 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 investment intensity will be modified. These modifications might be more important than can be justified. Several factors influence the level of investments, for example, the income of the economic operators, the rate of interest, the amortization of capital, or a change in the price level of means of production. In the 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 timely 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.

2. Literature Review

The meaning of the word 'risk' according to the Encyclopaedia of Hungarian Language is 'danger, damage, trouble, possibility of inconvenience' *ENCYCLOPEDIA OF HUNGARIAN LANGUAGE* (Bárczi and Országh 1962). There is also some kind of negative event related to this definition at first reading. According to Knight (1921), we speak of risk if the occurrence possibility of an event can be explored, learned, or even predicted. Luce and Raffia (1957) further refined this idea, and they state that we can speak of risk if all outputs of an action result in one of the known alternatives and their probability is known. Illés and Megyeri (2005) emphasize the duality of the conceptual meaning of 'risk'. On the one hand, risk is a danger associated with an action or enterprise, possibility of material loss and damage; on the other hand, risk is the tendency for the actual outcomes of an investigated process to differ from the expected outcome.

It is clear that defining a risk is also a difficult task, so is to identify (which does not mean to 'recognize'), explore, assume, manage, or even reduce it. Identifying and recognizing risks carry two different meanings even if we use the two terms as synonyms in everyday life. In our opinion, risk is easy to recognize and difficult to identify. While identifying a risk, it is possible to indicate the outcome resulting from the act. While identifying a risk, it is possible to indicate it and we can try to find a solution or prevent it, etc. Recognizing a risk, in our view, means that we perceive the risk, but we may not be able to determine what the source of the risk is.

The literature on risk taking is also very diverse; Vlahos (2001) describes risk taking in a comprehensible coordinate system where he illustrates the property situation on the x-axis and the utility on the *y*-axis. He depicts the types of risk taking in the following three

groups: 'risk-averse', 'risk-indifferent', and 'risk-seekers'. Vlahos's (2001) work, in our view, concerns the classifiability of individuals, but regarding the subject of our research, we assume that individuals in corporate management can also fall into one of the three categories; thus, the composition of management will determine the risk-taking attitude of the firm. In our opinion, mainly the industry–territorial characteristics of a company determine its risk appetite.

Businesses typically take three approaches to risk management that are significantly influenced by the size of the enterprise and its ownership structure in addition to the sector of activity of the enterprise (Valaskova et al. 2018). Farkas and József (2005) call these factors risk management strategies, which, according to the authors, can be classified into the following groups:

- Risk aversion, which means that a given business does not take a certain economic step that is considered risky or ceases any economic activity;
- Risk reduction, one of the fundamental goals of businesses to make the most of their own assets can be further divided into three subgroups according to the authors:
  ○ Damage prevention means accepting a certain degree of risk but with mineralization of the chance of occurrence;
  ○ Damage mitigation, it seeks to resolve the situation after the damage event, the aim is to reduce the damage;
  ○ Doing nothing, the risks are not addressed by the business strategy due to a presumed unlikely occurrence.
- Risk sharing, in some cases this might mean passing on or relocating risk. This is especially true in cases where the business either cannot or does not want to face a particular risk alone.

The grouping of risks covers a wide range of literature. There is a content overlap between the groups formed by the authors, but several factors appear that are the results of the specificities of a given enterprise. Hereinafter, we categorize the explored factors summed up with our own empirical experience and synthesize the results of the processed secondary sources in the Tables 1 and 2.

Table 1. Grouping of identified risk factors. Source: Boehlje and Lins 1998, supplemented by secondary sources and with empirical experience.

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.

Table 1. *Cont.*

Risk Categories	Risk Factors	Architectural Investments (Business Aspect)	Projects (Aspects of the Project within the Company)
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.	The 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, international influences, trends.	Adaptation of the company's investments to the technical level.	Alignment of the project with the corporate 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.

Table 2. Risk categories and their causes according to the authors. Source: Boehlje and Lins 1998, supplemented by secondary resources and with own empirical experience.

Risk Categories	Causes	Authors
Financial and financial structure	Debt management capacity, pay gaps, liquidity, bad investments, receivables management.	(Boehlje and Lins 1998; Schindelbeck 2002; Hardy 2003; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Market prices–market demand	Market price fluctuations, cost structure, contract terms, out and market entry.	(Boehlje and Lins 1998; Hobbs 2000; Schindelbeck 2002; Coenen 2004; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Stakeholders and their relationships	Dependencies, conflicts arising from cultural differences, contractual risks.	(Boehlje and Lins 1998; Coleman 2011; Chapman 2006)
Competitive environment, competitors	Market power relations, segmentation, market espionage, antitrust measures, measurement and control of market power.	(Boehlje and Lins 1998; Schindelbeck 2002; Coleman 2011; Coleman 2011; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Logistics, distribution system, and distribution channels	Supplier flexibility, availability, raw material dependence, raw material substitutability.	(Boehlje and Lins 1998; Chapman 2006)
Consumers and consumer preferences	Flexibility of product/service choices, credibility, weak consumer core.	(Boehlje and Lins 1998)
HR—Human Resources	Employees, subcontractors, personal competencies, qualities, personnel changes based on political reasons.	(Boehlje and Lins 1998; Hobbs 2000)
Political environment	Social support, political involvement in the company's activities, the threat of terrorism.	(Boehlje and Lins 1998; Coleman 2011; Coenen 2004; Chapman 2006)
Legislation	Permits to operate, legal supervision and justice, office cooperation competence.	(Boehlje and Lins 1998; Coleman 2011; Coenen 2004; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Corporate identity, fame, image	Credibility of corporate image, product reliability, popularity of reference persons.	(Boehlje and Lins 1998)
Strategic factors	Correct company goal selection, acquisitions, mergers, resource allocation.	(Boehlje and Lins 1998; Coleman 2011; Coenen 2004; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Technical–technological factors	Technology complexity, amortization, labour demand.	(Boehlje and Lins 1998; Coleman 2011; Coenen 2004; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Financial market factors	Exchange rates, reliability of investments, liquidity of investments, actual liquidity, interest rates.	(Boehlje and Lins 1998; Coleman 2011; Coenen 2004; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Tangible assets, business operation framework	Equipment, production service units, cases of force majeure, international influences, trends.	(Boehlje and Lins 1998; Coleman 2011; Coenen 2004; Illés et al. 1997; Castle et al. 1987; Chapman 2006)
Communication	Side-by-side "narratives", conceptual and content misunderstandings between the participants in the process.	(Wytrzens 2009)
Cognitive risk or psychological risk	The risk arising from the difference between the image in the mind of the investor and the way the investment is realized.	(Williams et al. 1995; Tversky and Kahneman 1973, 1974; Reissland and Harries 1979; Wildavsky 1979; Fischoff et al. 1978; Hámori 2003)
Macro environmental factors	Changes in market conditions, the emergence of factors hindering and disrupting the company's activities. Changes in interest rates, exchange rate risk, cash flows. Political, social, legal, technological changes. Other risks that the business does not expect.	(Frame 2003; Banks 2004; Williams et al. 1995; Fasse 1995; Illés and Megyeri 2005; Varga 2017)
Micro environmental factors	Direct risks of the company, strategic and operational risks.	(Frame 2003; Banks 2004; Williams et al. 1995; Fasse 1995; Illés and Megyeri 2005)

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

Based on the explored risk dimensions of secondary sources, we conducted primary research, the methodology of which is detailed in the Section 3.

3. Material and Methods

This publication presents one part of the results of a multi-step research process. The main research goal in this part was to examine the perceived risks of those involved in the investment process (B2B) and establish a ranking of project risk factors. Qualitative and quantitative data collection was carried out in the framework of primary research. In the qualitative research phase, we conducted in-depth interviews with a total of 52 people. Subjects of the interviews were selected, 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, we 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, we used a semi-structured interview outline to gather information in depth. We examined the perceived risks of each project phase as a separate issue.

In the quantitative B2B stage, we evaluated the results obtained due to a national sample of 462 people. The sampling was not representative because investments cannot be categorized in any way. In the previous stage of this study, during the processing of the literature, we attempted to create the conditions for representativeness, but based on our results, investments cannot be standardized due to differences (objectives, methodologies, investment calculations, etc.); thus, the sampling does not meet the criteria of representativeness either. The sampling was realized during personal interviews.

Quantitative data were processed using software SPSS 26.0 (Óbuda University, 1034 Budapest, Bécsi út 96/b), which also evaluated the descriptive statistics by performing bivariate and multivariate correlation studies. In this study, we present the partial results of these primary data.

4. Results and Discussion

General characteristics of the risk approach and risk hierarchy based on the opinion of investors.

4.1. Qualitative Results

As a qualitative result of this primary research, we were able to identify the following perceived risk factors based on secondary research and expert interviews in Tables 3 and 4.

Table 3. Project risk factors perceived by participants in the architectural investment project process. Source: authors' own research, 2018. N = 52 people.

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.)

Table 3. *Cont.*

Perceived Risks
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

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 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;
- The duration of the free decision, adherence to its framework.

Table 4. Service project considerations determining the reduction of perceived risks in construction project investments. Source: authors' own research, 2018. N = 52 people.

Aspects Determining the Reduction of Perceived Investor Risks
continuous information of the customer
giving the customer the opportunity to make free decisions
involving the customer in professional issues
explanation of the steps in the construction project to see what happens next
meeting the deadlines
respecting the budget
introducing a cheaper solution to the customer
presenting other contractor prices and results to allow the customers to compare

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.

As a result of the qualitative research, we formulated a quantitative hypothesis, according to which (H1), groups of contractors with characteristic differences can be created on the basis of the perceived risk factors in the B2B construction market of construction service providers. In order to prove our hypothesis, we implemented the quantitative phase of the research project; the partial results of which are described in the present study.

4.2. Quantitative Results

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

66.6% of respondents in the sample stated that they were the decision makers, which means 308 people. In terms of the sample composition, 31.6% (146 people) stated that they were not decision makers; a total of 8 people did not want to comment on the issue, which means that two thirds of our respondents actively influenced decision making during the investment activities of the surveyed companies.

The distribution of the companies concerned within the sample showed the following picture: limited liability companies (LLC) were overrepresented, as the sample accounted for 60.8%. Among the respondents, the proportion of individual entrepreneurs was still dominant; this accounted for 24.45% of the total sample, i.e., nearly a quarter. The number of deposit guarantee companies appeared in the sample in a small number, which was 7.57%, i.e., 35. This may be due to the fact that in the case of limited liability companies, the directors, who are also internal members, are responsible for the activities of the company with their entire assets, and this is a perceptibly high-risk factor on the contractor's side in the case of a larger volume of investment. The presence of joint-stock companies was low, i.e., 14 respondents, accounting for 3% of the sample. The other answers were indicated by the category 'Others', which means that the respondents indicated a cooperative, municipality, and general partnership.

There was no uniform segmentable period among the respondents for how long they had been engaged in investment activities; without extreme values, they were scattered approximately between 1 and 40 years.

An interesting result was obtained in the case of the question of whether the company's main activity was 'construction industry'. The same percentage of respondents stated 'yes', as many had said they did not. This represents a value of 46.69%, and 28 respondents gave a neutral answer, i.e., almost 6% of the sample; almost half of the sample was committed to the construction industry based on their main activity. The respondents managed an average of 6.28 construction/architecture/investment projects last year and participated in 7.45 projects (e.g., as a subcontractor). This shows that those who answered the question in the sample were the ones who mainly had led the projects and participated in very few cases in a project in which they had not been the decision makers.

Examining the project risk factors, the qualitative research uncovered the risks associated with the project, which were perceived by the contractor of the architectural investment (supply) side; then, the perceived risk factors in our questionnaire were ranked based on the average importance of the mentions.

According to the results, the financial risk (to cover the investment, whether the money is enough to complete the work), the reliability risk (the reliability of the contractors cooperating in the project), and the quality risk (the quality of the work done, e.g., poor quality materials, inadequate work) were the most important aspects on the contractor side together with the flexibility of the collaborators, the availability of the contractor, and the legal risks (e.g., the contract is not appropriate).

It also turned out (see Table 5) that the sample is characterized by a kind of overestimation since none of the items had an average value of 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 the other perceived risk factors differently. It is also clear that the experience of the contractors put legal risks at the top of the perceived risk ranking, which suggests 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). Source: authors' 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).

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 does 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

In order to be able to separate the 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 were 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 as follows:

- 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);
- 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);
- 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 (see Table 6):

- 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, their 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, 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.

Table 6. Contractor risk factor structure for 5 factors. Source: authors' own research, 2018. N = 462 people, total relevance = 56.88%; KMO = 0.906.

Risk Factors/Factor Groups	Financial and Legal Risk Factors	Human and Quality Factors	Health and Psychological Risk Group	The Range of Risks Associated with the Customer	Time Risk
Investment risk (market factors change, so the project will not be financially successful)	**0.739650532**	0.135618209	0.200265563	0.112925152	0.190510841
Credit risk (credit interest rate rises)	**0.711940589**	0.091592357	0.295703072	0.17124916	0.019558177
Expected return on investment (when will the investment bring back the price)	**0.669200342**	0.148531452	0.070752438	0.093886042	0.164026609
Legal risk (contract inadequate)	**0.589038706**	0.340185457	0.323983013	0.129944502	−0.099284854
Coverage of the investment (is the customer's money enough to complete the work)	**0.571156798**	0.441639618	−0.066622845	0.068056801	0.112196081
Changes in legislation (new taxes, contributions)	**0.536317083**	0.215690293	0.374978472	0.194524322	0.071097341
The price of the services (how expensive the service is)	**0.385084958**	0.236411275	0.353695438	0.101449688	0.161374615
Reliability of the contractors cooperating in the project	0.239982439	**0.769682561**	−0.022873692	−0.093167717	0.148028787
Flexibility of the contractors cooperating in the project in case of individual problems	0.155858921	**0.709031054**	0.157460285	0.133577458	−0.08505418
Contact details of the contractors cooperating in the project	0.252843797	**0.698308186**	0.188996042	0.127774303	0.039227324
Reliability of the contractors cooperating in the project	0.239982439	**0.769682561**	−0.022873692	−0.093167717	0.148028787
Cooperation with the customer, exchange of information (share all information, inform about the next step at the end of each work phase, etc.)	0.033171011	**0.533252382**	0.452369601	0.078325083	0.19398377
Customer contact information	0.160343255	**0.52190143**	0.151052796	0.440812597	0.264741343
The quality of the work done (poor quality materials, inadequate expertise for cooperating partners)	0.456837058	**0.516009197**	0.082775637	−0.031076431	0.144666861

Table 6. *Cont.*

Risk Factors/Factor Groups	Financial and Legal Risk Factors	Human and Quality Factors	Health and Psychological Risk Group	The Range of Risks Associated with the Customer	Time Risk
Health risk (built-in substances are harmful to health)	0.305701843	0.288090779	**0.721805753**	−0.033999431	−0.005837631
The social perception of the realized real estate is not what the customer wanted (the opinion of friends and employees will be negative)	−0.000799636	−0.040493122	**0.694161844**	0.318397775	0.179991604
Taste risk: the customer does not like the finished property in the end	0.126216839	−0.016581778	**0.671615781**	0.262973639	0.240523952
Accident risk (someone is injured during the investment process)	0.359196812	0.247112612	**0.645271361**	−0.069412706	0.061903125
Health risk (will I get sick or will the contractor get sick during the process?)	0.219913925	0.150440476	**0.548520972**	0.259525286	−0.051911081
Reputation of the customer	0.123640618	0.144685258	0.058023626	**0.736856548**	0.096902821
The customer's expertise, knowledge, and awareness	0.079624398	0.009441861	0.198631459	**0.734174833**	−0.053461624
Customer flexibility	0.07996056	0.438805424	0.084006536	**0.495542336**	0.338792634
Investment segment (residential or commercial construction for rent)	0.236392366	−0.072008247	0.300288017	**0.438990597**	0.110186329
Period of investment (spring, summer, autumn, or winter)	0.118427388	0.026395918	0.243013503	0.024767455	**0.760059993**
Duration of construction	0.20674014	0.219572722	0.029294916	0.161886255	**0.713734644**

4.3. Characteristics of Segments by Risk Factors

From the subjects of the sample taken among the participants in the construction investment project process, groups of contractors can be created that show characteristic differences based on the perception of risk factors. After the factor analysis of the risk factors, 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. According to the analysis of variance, based on each risk factor, we could determine the difference between at least two clusters, and the (H1) hypothesis was partially confirmed.

The characterization of the generated 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 the sample used for the analysis. The statistical results of the segmentation are shown in Table 7.

Table 7. Contractor segments by perceived risk factors (mentions are in %). Source: authors' own research, 2018. N = 462 people.

Risk Factors	Segments					
	Over-Estimators Cluster 1.	Collaborators, Overestimating Financial, Legal, and Health Risks Cluster 2.	Customer-Based, Overestimating Health Risks and Psychological Risks Cluster 3.	Rationals Cluster 4.	Under-Estimators Cluster 5.	Total Sample (Average) N = 462
Period of investment (spring, summer, autumn, or winter)	**3.12**	2.31	2.15	2.00	2.05	**2.44**
Duration of construction	**3.32**	2.78	2.70	2.82	1.93	**2.85**
Reliability of the contractors cooperating in the project	**3.83**	**3.62**	2.64	**3.53**	2.19	**3.32**
Flexibility of the contractors cooperating in the project in case of individual problems	**3.69**	**3.31**	2.82	3.11	2.12	**3.17**
Contact details of the contractors cooperating in the project	**3.80**	**3.29**	2.61	3.08	1.79	**3.12**
Reputation of the customer	**3.13**	2.09	**2.64**	2.11	1.83	**2.50**
Customer flexibility	**3.60**	2.75	2.66	2.79	2.00	**2.91**
Customer contact information	**3.77**	2.82	2.59	2.81	1.74	**2.94**
Expertise, knowledge of the customer	**2.89**	1.92	**2.71**	1.82	1.71	**2.35**
Health risk (Will I get sick or will the contractor get sick during the process?)	**3.22**	2.55	**2.68**	1.69	1.88	**2.60**
The price of the services (how expensive the service is)	**3.44**	**2.97**	**2.68**	2.42	2.19	**2.89**
The quality of the work done (poor quality materials, inadequate expertise for cooperating partners)	**3.84**	**3.54**	2.73	**3.29**	2.07	**3.27**
Expected return on investment (when will the investment pay its price?)	**3.45**	**3.15**	2.63	2.74	1.90	**2.95**
Investment segment (residential or commercial construction for rent)	**3.02**	2.24	**2.75**	2.05	1.98	**2.53**
Coverage of the investment (Is the customer's money enough to complete the work?)	**3.84**	**3.69**	2.77	**3.44**	1.90	**3.33**
Legal risk (contract inadequate)	**3.77**	**3.45**	2.78	2.29	1.86	**3.09**
Changes in legislation (new taxes, contributions)	**3.61**	**3.15**	2.65	2.15	1.95	**2.93**
Credit risk (credit interest rate rises)	**3.47**	**3.18**	2.75	1.98	1.81	**2.88**
Investment risk (market factors change, so the project will not be financially successful)	**3.58**	**3.24**	2.62	2.23	1.88	**2.94**
Taste risk: the customer does not like the finished property in the end	**3.14**	2.28	**2.60**	1.48	2.10	**2.48**
The social perception of the realized real estate is not what the customer wanted (the opinion of friends and employees will be negative)	**2.93**	2.01	**2.60**	1.26	1.95	**2.31**

Table 7. *Cont.*

Risk Factors	Segments					
	Over-Estimators Cluster 1.	Collaborators, Overestimating Financial, Legal, and Health Risks Cluster 2.	Customer-Based, Overestimating Health Risks and Psychological Risks Cluster 3.	Rationals Cluster 4.	Under-Estimators Cluster 5.	Total Sample (Average) N = 462
Cooperation with the customer, exchange of information (share all information, inform about the next step at the end of each work phase, etc.)	**3.49**	**2.90**	2.66	2.42	1.95	**2.87**
Health risk (built-in substances are harmful to health)	**3.57**	**3.18**	2.64	1.31	2.02	**2.81**
Accident risk (someone is injured during the investment process)	**3.68**	**3.18**	2.65	1.81	2.14	**2.92**

The analysis of the formed five segments was performed 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 groups of service providers as follows:

- 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: "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 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 were more important than the sample average.

The methodological peculiarity of the conducted evaluation analysis is that in the case of a particularly high number of clusters, extreme clusters are expected to appear, which also appeared during the analysis of our sample: the group of "over-estimators of all risks" (Cluster 1) and "under-estimators of all risks" (Cluster 5), who consider all risk factors to be more important than average.

The cluster of "collaborators, overestimating financial, legal, and health risks" (Cluster 2) includes those respondents for whom the financial, health, and psychological risks of the investment project were most important. The subjects of the cluster considered the following risks to be extremely important: risk of illness during the investment; value for money, i.e., quality; the expected return; the type of investment (business or private); financial risks (e.g., hedging risk, credit risk, return risk); and aspects of social or taste risks.

The cluster of "customer-based, overestimating health risks and psychological risks" (Cluster 3) includes those respondents for whom the customer's competence was important (their reputation and expertise) together with the following risks: health risks, the probability of getting sick during the project process; the segment of the investment (housing or business construction for expenditure); the psychological risks (taste risk, i.e., the completed property is not liked by the client in the end); and the social perception of the investment for the realized property is not what the client wanted (e.g., friends, employees will have a negative opinion).

The group of "rationals" consider the cooperation (i.e., the reliability of the contractors cooperating in the project), the quality (i.e., expertise and inappropriate use of materials), and the financial framework (i.e., whether the financial coverage will be enough to make the investment) as the most important risks.

4.4. Socio-Demographic Characters

It was interesting to examine whether there was 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. Thus, 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 criteria 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 was 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. Source: authors' 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.

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

In terms of gender and cluster affiliations, the sample showed that most of "collaborators, overestimating financial, legal and health risks" were 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 was 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 was outstandingly high (91.93%), compared to the expected value (Adj.R. = 3.48), with a total of 62 people. 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 with 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 was 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 was the highest compared to the expected value (16.19%, Adj.R. = 1.27).

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

5. Conclusions

The main objective of this study was the risk-based analysis of investment project processes. As part of this, we analyzed the risks perceived by B2B market participants in line with secondary and primary data, realizing a relevant risk structure and hierarchy, which were applicable to the sample.

Based on the results of the research, we state that according to the participants in the investment process, the most important risk is the coverage of the investment. This is followed with almost equal importance by the reliability of the contractor cooperating in the project process. In third place on the stage, 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 these two aspects. The return on investment and other risks are already lower, but they occupy a prominent place in the ranking of risk factors.

According to our quantitative hypothesis based on the results of the qualitative research:

H1, based on the perceived risk factors, groups of contractors with characteristic differences can be created in the B2B construction market of construction service providers. As a result of the quantitative research, we were able to establish that groups of service providers with characteristic differences can be created among the participants in the construction investment project process, so the hypothesis (H1) was proved.

Overall, the results obtained provide a good basis for creating a structure of risk factors based on the risk hierarchy of the architectural investment project, as well as segmenting within them service provider (contractor) groups and characterizing them in the future. Perceived investment risks are important because if we know the possible risks, we can provide preventive solutions to the actors on the contractor service provider side before they occur. If the contractor side is prepared to face the investor project process, on the one hand, it will reduce the preparation period, and the expected duration of the investment on the other. In addition to organization, all of this results in cost savings. Cost economy, in turn, increases market competitiveness and thus indirectly contributes to economic stability.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

1   In the 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).

References

Balcerzak, Adam P., Tomas Kliestik, Dalia Streimikieneand, and Luboš Smrcka. 2017. Non-Parametric Approach to Measuring the Efficiency of Banking Sectors in European Union Countries. *Acta Polytechnica Hungarica* 14: 51–70.

Banks, Erik. 2004. *Alternative Risk Transfer-Integrated Risk Management through Insurance, Reinsurance, and the Capital Markets*. Chichester: Wiley, 239p.

Bárczi, Géza, and László (szerk) Országh. 1962. *A Magyar nyelv Értelmező Szótára*. Budapest: Akadémiai Kiadó.

Boehlje, Michael, and David Lins. 1998. Risk and Risk management is industrialized agriculture. *Agricultural Finance Review* 58: 1–16.

Castle, Emery N., Manning H. Becker, and A. Gene Nelson. 1987. *Farm Business Management*. New York: Macmillan Publishing Company.

Chapman, Robert J. 2006. *Simple Tools and Techniques for Enterprise Risk Management*. Chichester: Wiley, 494p.

Coenen, Markus. 2004. Risikomanagement und Risiko-Controlling im RWE-Konzern. In *Controlling, No.2*. München: Verlag Franz Vahlen, pp. 97–102.

Coleman, Thomas S. 2011. *A Practical Guide to Risk Management*. CFA Institute Research Foundation M2011-2. Charlottesville: CFA Institute Research Foundation.

Farkas, Szilveszter, and Szabó József. 2005. *A Vállalati Kockázatkezelés Kézikönyve*. Budapest-Pécs: Dialóg Campus, 252p.

Fasse, Friedrich-Wilhelm. 1995. *Risk-Management im Strategischen Internationalen Marketing*. Hamburg: Steuer-und Wirtschaftsverlag Hamburg, 67p.

Fischoff, Baruch, Paul Slovic, Sarah Lichtenstein, Stephen Read, and Barbara Combs. 1978. How safe is safe enough? *Policy Sciences* 8: 127–52.

Frame, J. Davidson. 2003. *Managing Risk in Organizations—A Guide for Managers*. San Francisco: Jossey Bass, 287p.

Hámori, Balázs. 2003. Kísérletek és Kilátások. Daniel Kahneman. *Közgazdasági Szemle* 50: 779–99.

Hardy, Mary. 2003. *Investment Guarantees—Modeling and Risk Management for Equity-linked Life Insurance*. Hoboken: Wiley, 352p.

Hobbs, Peter. 2000. *Professionelles Projektmanagement*. Landsberg am Lech: Moderne Industrie, p. 55.

Illés, Csaba Bálint, and G. Megyeri. 2005. *Biztosítási Ismeretek*. Gödöllő: Szent István University, 200p.

Illés, Csaba Bálint, J. Lehotai, and György K. Takácsné. 1997. *Az Üzleti terv Készítés Alapjai, Gazdasági Szaktanácsok. no.2*. Keszthely: PATE GEORGIKON.

Knight, Frank H. 1921. Risk, Uncertainty and Profit. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*. Available online: https://ssrn.com/abstract=1496192 (accessed on 1 January 2021).

Kliestik, Tomas, Maria Misankova, Katarina Valaskova, and Lucia Svabova. 2018. Bankruptcy prevention: New effort to reflect on legal and social changes. *Science and Engineering Ethics* 24: 791–803. [CrossRef] [PubMed]

Kovacova, Maria, Maria Kliestik, Katarina Valaskova, Katarina Durana, and Katarina Juhaszova. 2019. Systematic review of variables applied in bankruptcy prediction models of Visegrad group countries. *Oeconomia Copernicana* 104: 743–72. [CrossRef]

Luce, R. Duncan, and Howard Raffia. 1957. *Games and Decisions: Introduction and Critical Survey*. New York: Wiley, 509p.

Reissland, John, and Vaughan Harries. 1979. A scale for measuring risks. *New Scientist* 83: 809–11.

Schindelbeck, K. 2002. *Leitfaden zum Aufbau eines Risikomanagements und einer Finanziellen Konsolidierung*. Deggendorf: A COMIÜT Institut für Controlling-und Managementberatung, 18p.

Tversky, Amos, and Daniel Kahneman. 1973. Availability: A heuristic for judging frequency and probability. *Cognitive Psychology* 5: 207–32. [CrossRef]

Tversky, Amos, and Daniel Kahneman. 1974. Judgment under uncertainty. *Heuristics and Biases Science* 185: 1124–31.

Valaskova, Katarina, Tomas Kliestik, and Maria Kovacova. 2018. Management of financial risks in Slovak enterprises using regression analysis. *Oeconomia Copernicana* 9: 105–21. [CrossRef]

Varga, János. 2017. Bases for organizational competitiveness: Leading change and business agility at the Hungarian enterprises. *The Macrotheme Review* 6: 69–81.

Vlahos, Kiriakos. 2001. Tooling up for risky decisions. In *Mastering Risk Volume 1: Concepts*. Harlow: Pearson Education, pp. 47–52.

Wildavsky, Aaron. 1979. No risk is the highest risk of all. *American Scientist* 67: 32–37.

Williams, C. Arthur, Michael L. Smith, and Peter C. Young. 1995. *Risk Management and Insurance*. New York City: McGraw-Hill, 680p.

Wytrzens, Hans Karl. 2009. *Projektmanagement*. Wien: Facultas.wuv Universitätsverlag.