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# General identification of risks in the real estate market

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**Abstrakt** The thesis deals with the application of the first phase of risk management on the functioning of the real estate market. It is an identification with subsequent evaluation of risks that may occur on the real estate market in the Czech Republic and influence it. Using a list of 36 possible risks to create strategic decisions. Each risk and assessment is based on expert judgment. Risks are divided into the following areas: technical-technological, manufacturing, economic, market, financial, credit, legislative, political, environmental, human factor, information and force majeure. Risks are assigned to ten basic stakeholders. The overall results are recorded in the risk assessment matrix. The aim is to identify risks with a distribution of probability of appearance and impact for individual stakeholders.

**Keywords** Real estate, market, risk, risk management, identification, evaluation, stakeholders

## 1. INTRODUCTION

The construction industry and the related real estate market are characterized by a high degree of uniqueness. Each implemented project can be considered as unique. Each new project differs in location, technical and technological requirements and, above all, project participants as stakeholders, etc. In a previous study (Holcman, 2019), the possibility of applying project management rules to the real estate market was concluded with the conclusion that these rules would be appropriate, accept and follow them. One of the areas of project management is also risk management.

Identification and subsequent risk analysis serve to reduce future inconsistencies in any area or sector. It is the basis for strategic management of companies to make the right decisions in the long term. However, such an analysis is usually very costly and therefore appears in the annual reports of rather large companies that also operate in the financial markets. In other cases, risk is managed based on the experience of individual managers.

The aim of this work is to identify basic risks with a distribution of probability of occurrence and impact for individual stakeholders on the real estate market in the Czech Republic. Stakeholders may include property owners, investors or the public sector. Each project is unique and its stakeholders may differ somewhat. For the purpose of this paper, the most frequently occurring stakeholders, as shown in Fig. 1, are considered. Risk identification can also be used to predict the emergence of price bubbles on the property market. This work also serves as a basis for further research and questionnaires in real estate business. The list of risks should be helpful to the real estate market as a possible guide for the initial phase of risk management; risk identification. The intention is also to capture the possible future undesirable development of the real estate market and property price levels in the Czech Republic.

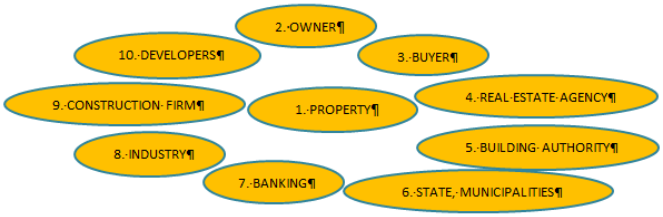


Figure 1: Stakeholders in the real estate market
Source: Author

## 2. METHODOLOGY

Large part solved risks can be considered as systematic risk because their sources are cases of macroeconomic behavior of individual markets, eg. monetary changes in tax legislation or raw material prices, etc. Such risks cannot be diversified. (Fotr, 2014, p. 20) defines systematic risk as follows: *"Systematic risk is a risk caused by common factors and affects, to varying degrees, all economic units, resp. business."*

Risks in the real estate market are divided according to the sectoral breakdown that is presented in (Fotr, 2014, p. 21-23). These are risks from the areas of technical-technological, manufacturing, economic, market, financial, credit, legislative, political, environmental, information and risks that are caused by the human factor or by force majeure. Risks focus on real estate construction, resource and credit costs, communication and human behavior, or the environment. Individual risks were selected in the context of discussion of co-author and consultation of dissertations of the authors of this article. Other options, in addition to group discussion, include checklists, risk registers, cognitive (mind) maps or strategic

analysis tools (SWOT analysis, PEST analysis or Porter's five forces model, etc.) (Fotr, 2014, p. 26). It is therefore a risk identification with expert evaluation. The list of risks is applied directly to the real estate market itself and its functioning, and it is not a one-time application but monitored in the long term. In literature and scholarly work, there are risks to specific stakeholders or generally to companies (construction companies and investors), where there are employees who apply risk management rules in strategic management (Donner, 2010) and (Zhang, Wang, 2016).

In the expert assessment is used a risk assessment matrix to determine the significance of the selected risk factors. Since these are risks in which the probability of occurrence and the intensity of impact are very difficult to express in monetary terms, verbal expressions with a numerical scale are assigned. The probability of occurrence of risk is evaluated by a numerical scale from 1 to 5, where the number one is expressed by the Almost excluded probability of occurrence and the number five is Almost certain, see Table 1. The magnitude of the risk impact is further evaluated on a non-linear scale of power from 1 to 16. By this distribution, the risks are better distinguished from each other. The product of probability and intensity is the appropriate number of points that receive the risk. It is then possible to sort the risks, focus on specific groups and make decisions or take action based on them. The structure of the risk assessment matrix is taken from (Fotr, 2014, p. 40-41). The structure also includes three risk areas - the most significant, medium and low risk. In the next chapter, the results from Table 2 will be rewritten to the same matrix.

Table 1: Risk assessment matrix

| Probability of risk | Evaluation of probability | Evaluation of the intensity of negative impacts | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 4 | 8 | 16 |
| Almost certain | **5** | 5 | 10 | 20 | 40 | 80 |
| Very likely | **4** | 4 | 8 | 16 | 32 | 64 |
| Probable | **3** | 3 | 6 | 12 | 24 | 48 |
| Rather unlikely | **2** | 2 | 4 | 8 | 16 | 32 |
| Almost excluded | **1** | 1 | 2 | 4 | 8 | 16 |

Source: Authors and (Fotr, 2014, p. 40-41)

Risks can generally be accepted, rejected or neutral. Some risks can be diversified, using insurance options, alternative sources to meet objectives, etc. Each risk generally consists of systematic and non-systematic risk. The non-systematic risk may be partially diversified while the systematic risk may not (Fotr, 2014, p. 265). In terms of risks for investors (developers), the most likely diversification according to (Donner, 2010) can be considered: Location - geographical, Property - various uses, Tenant - multi-tenant / single-tenant, Propert - various size, Location - mix of A and B Locations.

Negative impacts of these specifications are always addressed. However, risk analysis in practice evaluates the positive impacts on the project, market, etc. In this paper, however, the authors focus only on the negative ones, because they can affect the real estate market in such a way that the market will not be stable even in the short term. Like all markets, the real estate has its cycle. This is essential, but the solution of real estate cycles is not the subject of this work.

Table 2 below lists the individual risks with the appropriate RX designation, where X represents the order in the table. Each factor is assigned to stakeholders that are primarily affected by the risk. The number corresponds to the stakeholder in Fig. 1. Furthermore, according to the previous paragraphs, the value of the probability of risk and the intensity of the risk impact are added in order to reflect the given risk on the real estate market. This intention highlights the undesirable development of the real estate market and property price levels.

Table 2: List of risks

| The name of risks | Stakeholders according to Figure 1 | Probability of risk | Impact on RE market |
|---|---|---|---|
| **Technical - technological** | | | |
| Construction defects R1 | 3, 9, 10 | 4 | 2 |
| Imperfect infrastructure R2 | 3, 6, 8, 9 | 3 | 8 |
| Different usability of property R3 | 2, 5, 10 | 4 | 4 |
| **Manufacturing** | | | |
| Lack of building materials R4 | 8, 9 | 5 | 16 |
| Errors in design R5 | 5, 9, 10 | 5 | 2 |
| Failure of construction deadlines R6 | 4, 5, 6, 8, 9, 10 | 3 | 1 |
| **Economic** | | | |
| Increase in construction / renovation costs R7 | 6, 7, 9, 10 | 4 | 8 |
| Wage growth R8 | All of stakeholders | 3 | 8 |
| Wrong property price estimation R9 | 2, 3, 4, 7 | 2 | 4 |
| **Market** | | | |
| Competition entry into the sector R10 | 4, 7, 8, 9, 10 | 4 | 8 |
| Foreign investors R11 | 1, 3, 7 | 5 | 16 |
| High share of rental properties R12 | 3, 10 | 2 | 4 |
| Selecting the wrong location R13 | 3, 10 | 2 | 16 |
| **Financial** | | | |
| Change in interest R14 | 2, 3, 7, 10 | 4 | 2 |
| Lack of equity R15 | 3, 6, 7 | 5 | 8 |
| Banking crisis R16 | 6, 7 | 3 | 16 |
| **Credit** | | | |
| Non-compliance R17 | 4, 9, 10 | 4 | 4 |
| Subject insolvency R18 | 4, 7, 10 | 3 | 2 |
| **Legislative** | | | |
| Regulatory Laws R19 | 6 | 4 | 8 |
| Complicated receipt of Building Permit R20 | 5, 6 | 5 | 16 |
| State Tax Policy R21 | 6 | 4 | 16 |
| **Political** | | | |
| Changes in land use plan R22 | 5, 10 | 3 | 2 |

| | | | |
|---|---|---|---|
| Failure to use subsidy programs effectively R23 | 2, 6, 10, | 3 | 4 |
| **Environmental** | | | |
| Environmental protection costs R24 | 6, 9, 10 | 4 | 4 |
| Reducing carbon footprint during construction R25 | 6, 8, 9, 10 | 5 | 2 |
| Liquidation of damages R26 | 2, 8, 9 | 3 | 1 |
| **Human factor** | | | |
| Unqualified personnel R27 | 4, 5, 6, 7, 8, 9, 10 | 2 | 8 |
| Social impact of the environment R28 | 3, 4, 10 | 5 | 4 |
| Population density R29 | 3, 6, 10 | 4 | 16 |
| Consumer behavior R30 | 2, 3, 4, 6 | 5 | 8 |
| **Information** | | | |
| Introducing BIM R31 | 6, 9, 10 | 5 | 2 |
| Online data protection R32 | 4, 6, 7 | 3 | 1 |
| Communication with authorities R33 | 2, 3, 5, 6, 10 | 2 | 4 |
| Media disinformation R34 | 2, 3 | 4 | 16 |
| **Force majeure** | | | |
| Floods R35 | 1, 2, 3, 6, 7, 9 | 3 | 16 |
| Terrorism R36 | 1, 2, 6, 7, 8, 9, 10 | 2 | 8 |

Note: 1. Property, 2. Owner, 3. Buyer, 4. Real estate agency, 5. Building authority, 6. State, municipalities, etc., 7. Banking, 8. Industry (materials), 9. Construction firm, 10. Developers.
Source: Authors and (Fotr, 2014, p. 21-23)

The research team is convinced that this is not a list of all possible risks. Each team would list the risks based on their experience and knowledge. It should therefore always be a group work where everyone contributes their knowledge and, above all, continuous work, where risks are clarified and their impact more specified. This is also the subject of further research phases. Often it also depends on the locality where similar research is carried out. In today's world, where globalization is often inflected, it is not easy to determine the boundaries of the space being solved.

In some cases the risks may be interrelated. For example, according to (Buttimer, Patel, 2008), the movement of interest is also considered a risk affecting the determination of the level of rents, not only in administrative buildings. More risks could be mentioned for specific entities, such as occupancy risk for investors who rent their premises (Donner, 2010). However, this work focuses rather on the general risks that could affect the real estate market as a whole.

## 3. ANALYSIS RESULTS

There are many factors in the real estate market that affect real estate cycles, property price developments or infrastructure development and quality of life and environment. Risk identification and basic analysis make it possible to create a basis for strategic decisions of all stakeholders on the real estate market.
In terms of return on investment in construction, these are long-term decisions that should be addressed by strategic management. Where appropriate, long-term measures must be addressed by individuals entering the real estate market (buyers of real estate for their own housing or recreation).

The risk assessment matrix, see Table 3, summarizes the product of the probabilities of the occurrence of risks and the intensities of impact on the real estate market from Table 2.

Table 3: Risk assessment matrix – results

| Probability of risk | Evaluation of probability | Evaluation of the intensity of negative impacts | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 4 | 8 | 16 |
| Almost certain | **5** | | R5, R25, R31 | R28 | R15, R30 | R4, R11, R20 |
| Very likely | **4** | | R1, R14 | R3, R17, R24, | R7, R10, R19 | R21, R29, R34 |
| Probable | **3** | R6, R26, R32 | R18, R22 | R23 | R2, R8 | R16, R35 |
| Rather unlikely | **2** | | | R9, R12, R33 | R27, R36 | R13 |
| Almost excluded | **1** | | | | | |

Source: Authors and (Fotr, 2014, p. 40-41)

In the most significant risk group are included 17 risks, which is not even 50 % of the entire list. For example, with the risk of R35 - Floods, it is possible to work by building high-quality flood barriers in flood plains, which straightens the local property market. Risk R34 - Media disinformation must be seen as a long-term goal that should be improved by the intervention of experts and researchers. How each risk is to be handled is up to each stakeholder and, of course, to the next stages of the research. In the most important group of the matrix, the most frequent risks arise from the areas of legislation and human factor, followed by a smaller number of market and financial risks.

In the group of medium-term risks are included 16 risks, more or less from all areas of the same number. The exceptions are made by human risk, force majeure, credit and financial. In the last group, only the areas of production, environment and information technology appear.

In the most interesting group of risks, the following stakeholders occur most frequently: State and municipalities (10), Developers (7), Buyers (7), Banking (6), Construction companies (6), Real estate agents (4) and Owners (4). Most of all, the real estate market can be distorted by the public sector, inadequate investments and real estate prices by investors and then by buyers themselves, by which demand can be artificially and often hectically increased. This activity increases real estate prices at low supply. Stakeholders such as Real Estate, Building authority and Industry are influenced by the real estate market, at least to a minimum degree, at the most serious risks. The quality of real estate does not have a major impact on the overall market behavior. The same applies to building authorities that permit construction, as they must only comply with the laws issued by the legislative authorities. The only impact on the market lies in the authorization period, which now appears to be secondary.

## 4. CONCLUSION AND DISCUSSION DETAILS

By identifying and assessing the risks that may occur on the real estate market, risk management has shown that this system is necessary for the real estate market to function in order to avoid unforeseen fluctuations and shocks. Risk management should become part of any entity that is involved in the real estate market. Of the list of listed risks, 33 appear in the risk matrix in the areas of moderate and most significant, but only 3 risks are recorded in the area of minor importance. The right approach to managing significant risks reduces the likelihood of long-term unexpected fluctuations in the property market trend.

Based on expert evaluation, the most risky areas of the real estate market can be considered legislative activity, human factor and risks connected with the circulation of money. The risks with the highest product of probability of occurrence and intensity of impact, ie. 80, 64 and 48, are in this work: Lack of building materials, Entry of foreign investors to the Czech real estate market and Time for obtaining a building permit (product = 80); State Tax Policy, Population density and Media disinformation (product = 64); Banking crisis and risk Floods (product = 48).

The hypothesis of risk management functionality and actual impacts and probabilities will be further examined by a questionnaire survey. This is now the initial phase of risk identification, mainly for the Czech Republic. Risks, subjects or qualifications of impact may vary from country to country, mainly due to history, location, legislation and research teams. However, this contribution can be used as a tool to develop a customized risk analysis methodology. In the future, it is planned to compare the assumption solved with the results of opinions of experts, as representatives of individual entities.

One of the possible consequences of insufficient or no risk analysis in the operational phase of the project is the emergence of an unused area, the so-called brownfield. Very often brownfields arise due to interruption of work on industrial sites or non-use of administrative properties. (Buňat, 2018)

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