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## SOURCES OF INVESTMENT RISK IN URBAN REGENERATION PROJECTS

### ŹRÓDŁA RYZYKA INWESTYCYJNEGO REWITALIZACJI OBSZARÓW MIEJSKICH

#### Abstract

This paper looks at multidimensional risk analysis of urban regeneration projects, used to identify areas of its occurrence. The authors thoroughly analyze the sources of potential threats and attempt to answer the question: What is their contribution into overall urban regeneration' investment risk? The target concept will be used to assess the level of investment risk at the stage of initiation, preparation and planning of urban regeneration projects, which will be used to improve the risk management process.

*Keywords: urban regeneration, risk assessment, risk management, construction investment*

#### Streszczenie

Zakres artykułu obejmuje wielopłaszczyznową analizę ryzyka rewitalizacji, której bazą jest identyfikacja wyjściowych obszarów jego występowania. Autorki dogłębnie analizują źródła powstawania potencjalnych zagrożeń oraz podejmują się oceny ich udziału w całkowitym ryzyku inwestycyjnym przedsięwzięcia rewitalizacyjnego. Koncepcja docelowo ma być wykorzystywana do oceny poziomu ryzyka inwestycyjnego na etapie inicjacji, przygotowania i planowania projektów rewitalizacji, co usprawnić ma proces zarządzania ryzykiem.

*Słowa kluczowe: rewitalizacja, szacowanie ryzyka, zarządzanie ryzykiem, inwestycja budowlana*

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## 1. Risk in construction investments

Construction project risk is an inherent element of every project in all its phases, and being subject to change [1], is not possible to completely eliminate it. However, effective risk management in the aspects of identification, measurement, steering and monitoring means it can be significantly minimised.

In the described context, preparation and completion of construction investment is a particular challenge. Irrespectively of the type of works, it involves undertaking and finishing a number of complex planning, legal, design and construction activities [2] aimed at completing the planned investment within the limits of law, planned budget and time, while achieving the expected level of quality [3]. One of the obstacles occurring in the implementation phase is the variation of risk factors, the probability of their occurrence and the potential outcomes (financial, affecting deadline) create investment risk – proportional to the scale of venture. Without the proper tools to manage risk it is impossible to efficiently realize construction project investments. What is more, conscious work with risk helps to define the proper reaction to dangers and results in seamless completion of planned works [4].

Due to the need of in-depth research for the management of complex investments, this paper contains a multifaceted analysis of risk associated with urban regeneration projects, based on the identification of initial areas of risk occurrence. This paper analyses the sources of potential risk factors, as well as aims to assess their part in overall investment risk of urban regeneration project.

## 2. Identification of areas of investment risk in urban regeneration projects

The subject of urban regeneration, analysed in this paper, is an example of such an extremely complex and time-consuming venture. In its scope it includes: renovations and modernizations of real estate, infrastructural works, demolition, as well as complimentary projects taking place in the direct vicinity of the area covered by the urban regeneration. It involves a lot of participants of different levels of skills and specialities, therefore identifying the key participants working and coordinating works on the project is extremely important. It appears that the inhabitants are one of the most important participants, also called passive participants. The local community is an integral part of the project deciding upon its success, but from an engineering point of view, future tenants may cause many potential issues in the seamless realization of the investment process. The complex and social aspect of urban regeneration determines many specific risk factors.

Keeping in mind all aspects of urban regeneration, the main risk areas both from the investor and contractors side have been presented along with examples. In order to obtain information the following techniques of identifying risks were used:

- analysis and assessment of documentation related to preparing and implementing selected regeneration projects in Gdansk,
- direct observation including consultations with experts involved in the projects,
- analysis of project assumptions and organization structure of selected ventures (communication breaks, bottlenecks, interdependencies),
- analysis of available control lists, registers, literature,



- available statistics regarding risk factors in complex investment enterprises, as well as damages and breakdowns of buildings (looking for analogies with constructions from the turn of 19<sup>th</sup> and 20<sup>th</sup> century).

A detailed list of factors affecting risk investment in urban regeneration was prepared, based on the results of the research described above (taking into account only those factors which negatively affect the project). The list includes risk factors related to particular phases of investment process and inherently connected to the process. What is more, the same kinds of risk occur both on the investor and contractor side, however their intensity and impact depends on the relation (contract) between those parties.

All identified factors have been divided into three groups: technical risk factors, risk factors related to management and organization of the project, and external risk factors. In addition to that psychological and behavioural aspects linked to urban regeneration risk; have been analysed separately, to assess their impact on investment decisions.

### 3. Sources of investment risk in urban regeneration projects

#### 3.1. Technical risk

The term ‘technical risk’ describes all threats linked to quality and efficiency of goals, that are affected by the technology used in the project. Solidity of works in terms of norms and standards followed is not insignificant, similar to difficulties caused by availability and complexity of technology used [5]. During the research the following types of main technical risk factors have been identified:

- conducting works in unusual conditions (major degradation of inhabited buildings and infrastructure, making it difficult to make a full inventory of the building; difficulties in defining scope),
- work on objects of significant historic value (listed objects): the necessity to obtain proper permits and to use special technology and building materials,
- simultaneous renovation of the building and infrastructure, as well as the implementation of complimentary investments in the direct vicinity of the area undergoing renovation: manoeuvring of heavy equipment with limited space – possibility of damaging nearby objects, limited storage space for materials and equipment,
- design errors: increased, not planned for, weight, caused by changes in construction (usually from wooden to reinforced concrete) and changes in the functional plan, insufficient of erroneous assessment of ground and water conditions causing poor selection of foundations technology not taking the real interaction between the foundations and ground into account, incorrect assessment of construction settlement, wrong static diagram,
- significant humidity in renovated buildings (gaps in vertical and horizontal insulation of foundations and basement walls, humid rooms on wooden ceilings lacking proper insulation) insufficient time allowed for building seasoning (potential reoccurrence of biological corrosion),
- lack of current technical documentation regarding underground infrastructure.



### 3.2. Risk related to management and organization

Urban regeneration risk related to management and organizations can be mainly narrowed down to coordination problems, including among others:

- overlap in schedules of buildings renovation and infrastructure (streets) renovation (organization problems with planning and scheduling works),
- overlap in schedules for resettling, renovation and modernization works (dangers caused by bystanders being present on construction site, delays in starting works – resettlements happening too late),
- lack of coordination of resettlements with reintroducing inhabitants to renovated apartments.

Lack of specialized resources and personnel monitoring processes for urban regeneration can cause breaks in communication and issues with flow of up-to-date and reliable information, which is an additional risk factor.

One of the most important risk factors remains the aspect of contracts between investor and contractor, as well as the application of standard procurement procedures in accordance with Public procurement law [Prawo zamówień publicznych] [6]. Risks related to contracts stem from the possibility to freely form them (art. 353<sup>1</sup> of civil code [KC]) [7], which in practice means transferring the majority of risk to the contractor (it is especially burdensome in the case of unusual works). Procurement procedures focus mainly on the price, which again in the case of unique ventures is difficult to estimate.

### 3.3. External risk

The term external risk includes risk factors cause by third parties [5], therefore a possibility of affecting and mitigating this area is limited. It is perceived that the most significant risk in the urban regeneration process relates to the active participation of the inhabitants in the process of regeneration (so called social risk). It can manifest itself in lack of social acceptance of the scope of regeneration, resulting in difficulties in implementing the project and re-occurring pathologies. Other meaningful factors are:

- legal issues with the real estate, private ownership of the revitalized area (lack of accessibility to the object making it difficult to conduct and complete the full scope of renovation and modernization),
- lack of a coherent financing model and procedures allowing for the creation of a budget reserve for urban regeneration (works on revitalization bill have been put on hold),
- bad condition of the environment (post-industrial land, warehouses, post-harbour land etc.; polluted ground waters, high content of toxic substances in the air etc.) discouraging potential investors,
- poor infrastructure in terms of communication with area in scope or non-efficient public transport between the project area and surrounding area.



#### **4. Psychological and behavioural aspects of urban regeneration risk and their impact on investment decision**

Urban regeneration is a process taking place, not only in public areas, but also in individual the personal living space of its inhabitants. Architectural projects can be “friendly” or “frightening” and “grim”, causing enthusiasm, admiration, disgust or fear [9]. The completion of an urban regeneration project should therefore be designed in the most psychologically beneficial layout, the risk relating to the possibility of not creating a proper atmosphere, desired by inhabitants.

With every new spatial situation (change of function or and layout, creation of new objects) an interaction occurs between inhabitants/users and their new environment [9], a kind of adapting. An important aspect of this process is assuring well-being of people in the transformed environment (natural to artificial) [10]. Apart from the interaction with other people and surroundings [11], human development occurs in relation to the constructed space, which creates a frame for forming social bonds. Those processes cause the risk of not satisfying functional (function of the place) and formal needs (aesthetics, style, fashion) of the city community, not taking human psychological conditions into account.

Among the behavioural aspects of urban regeneration risk one can list: status quo bias [12], manifesting in being attached to current way in which the space is used; excessive faith in one’s judgement [13], being convinced that one is right and one’s judgement is correct and justified, which may manifest in the persistent promotion of ones ideas; the role of expectations [14], which may result in social dissatisfaction with outcomes of urban regeneration process. Other behavioural dangers are linked to risk of uncontrolled spreading of negative behaviours, attitudes and beliefs, leading to an escalation of negative perception of the changes [12, 15].

All of these factors, both psychological and behavioural, relate to expressing acceptance or lack of acceptance to the change. It relates to the individual needs of the city’s inhabitants, but in aggregated view it allows us to draw a conclusion on the overall state of local community, its attitude and its level of readiness for change. Those aspects, due to the “soft” nature of the phenomena researched are non-quantifiable and difficult to measure, which is why they are basis of qualitative risk analysis and fulfil the complimentary role to quantitative analysis.

#### **5. Analysis of impact of risk factors on overall level of investment risk of urban regeneration projects**

The essence of risk assessment is identifying the risk factors that when they materialize would significantly raise the level of investment risk. A key aspect is therefore defining sources of risk and its level and impact on the investment, which in this paper is presented as charts showing the share each group of risk sources has in the overall investment risk levels in urban regeneration projects.

The level of detailed analysis conducted, which has been verified with a group of experts, allows for the assumption that the vast majority of potential negative factors has been identified (so called threats or risk factors). It is therefore possible to estimate the share of each of those areas in the overall investment risk of an urban regeneration project, achieved by



creating a so called “reference model”. The model is based on a five-step scale of probability and impact of the occurrence of a risk factor. Level one is defined as a rare occurrence (probability below 1%) at the same time the impact is deemed to be insignificant. Level five defines an almost certain occurrence (border value of probability equal 1.0) with catastrophic impact (significant extension to the time line of the project, significant increase of costs).

Assuming the most unfavourable circumstances of probability being 1.0 and impact of the risk factor being 5.0 risk values were established, so called range (probability x impact) for every factor. The summarised value of risk for every assembled factor allowed, in the next stage of research, standardization of variables in the range 0–1, which in turn allowed for defining an overall share of every analysed urban regeneration investment risk.



Fig. 1. Distribution of groups of risk sources to urban regeneration investment risk (self-sourced)

The approach presented above is typical for risk analysis in the project management environment. On the other hand, looking at the venture from construction investment process it seems justified to differentiate the risk based on the project participant that bears it. Here we can generally identify two main parties: investor and contractor. Their share of risk is not as obvious as in case of the above mentioned list. Depending on the type and complexity of the project it is possible to select different contract types. In case of contracts based on Public procurement law in Poland [Prawo Zamówień Publicznych] [6], as well as those financed by EU, including complex urban regeneration projects, one can differentiate following methods of investment realization:

- design and build (general construction works contract),
- project management (general project execution contract),
- management (contracting; contract for partial construction),
- construction management (subcontract).

The type and content of signed contract are binding in the case of the division of risk between investor and contractor. Due to the of lack of law defining a consistent form of such a contract, at the current stage of research the key information taken into account is the type of the contract. Decision on the type of contract is made by investor, so he defines risk division in any given venture.

Taking the specifics of complex urban regeneration projects into account, as well as extremely difficult processes, including unique works, one can assume that the most realistic picture of risk division between investor and contractor is the general construction works contract and general project execution contract. Participation in overall risk depending on the kind of contract is presented on the chart below (Fig. 2).



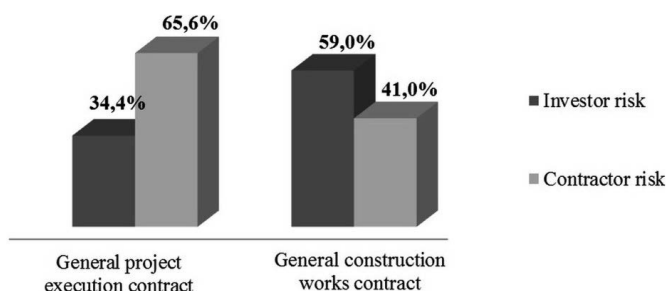


Fig. 2. Division of investment risk between investor and contractor –general construction works contract and general project execution contract (self-sourced)

## 6. Conclusions

The subject of urban regeneration has not been considered before in the technical context of risk management, and systemic processes addressing this area are also lacking. Due to the social as well as cultural impact of the project, the decision to carry out the investment is conditioned, we could say, beyond economic considerations, and certainly does not take into account the potential risks of a technical nature. The initiation of an urban regeneration project is also subject to legal complications due to lack of established laws and regulations, and it is also dependent on securing financing. Here again – social and environmental considerations and partnership agreements determine successful project completion. There are a lack of tools, as well as research directed towards the identification and measurement of technical risks associated with urban regeneration, which ultimately is a source of the largest additional costs in the project.

The research presented confirms the complexity and problematic nature of complex investment ventures, as well as allows for the creation of a general range of risk in respect of significance of specific, key areas and their share in the overall investment risk. The research draws attention to the distribution of power between parties involved in urban regeneration, however, the data obtained is also practical. The solution presented is a base for planned quantitative-qualitative research in this area. The significance of further research is caused by the complexity of an urban regeneration venture. The implication of this complexity demonstrates the need for a holistic approach to the subject, including analysis of relations between different risk areas and factors.

The concept presented, once completed, will be used to assess the level of investment risk at the stages of initiation, preparation and planning of urban regeneration projects, which should result in more a efficient form of risk management.

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