International Journal of Contemporary Management
Volume 14 (2015) Number 3, s. 7–22
doi:10.4467/24498939IJCM.15.001.4303
www.ejournals.eu/ijcm

RISK MANAGEMENT IN PRIVATE SECTOR PROJECTS

*Marek Magdoń**
*Seweryn Tchórzewski***

Abstract

Background. A risk is inseparably related to the planning and execution of each project. A project risk is an event that may have impact on the achievement of project goals and objectives. Therefore, it is extremely important to minimize the likelihood of the occurrence and impact of potential negative events, and at the same time to take full advantage of opportunities for improvement. In other words, there is a need for project risk management.

Research aims. Point out the aspects and risk management processes which are perceived to have the biggest impact on the success of a project. Indicate the risk management techniques most often used.

Methodology. The search for project aspects and risk management techniques was based on scientific literature review. Exploration of actual application of risk management in private sector projects was based on surveying experts. The participants were entrepreneurs from across Poland who belonged to the Association of Project Management Poland and postgraduate.

Key findings. Among the many aspects and techniques of the risk management suggestions for those which may increase the chances of achieving project success.

Keywords: risk, project management, project risk management techniques, project success

INTRODUCTION

Risk is a part of the world we live in, of everyday life, of every situation we can think of. We can distinguish 3 main reasons why risk occurs:

* University of Economics in Katowice.
** Silesian University of Technology in Gliwice.

1) a human being is not capable of controlling and/or measuring some of the causal factors;
2) a human being has limited capabilities of information processing;
3) even if the human brain obtained and processed a large amount of information it does not mean that the information would be used (Chavas, 2004).

Therefore, any action taken by a human being, including planning and implementation of a project has a risk of failure. This is due to the essence of the project which is embedded in the future and the effects of its implementation, which is the creation of a unique product or service.

Literature on the subject is dominated by the view that the nature of each type of risk is determined by three basic elements:

1) event (adverse change);
2) event probability;
3) event severity (the impact of this event, results of this event, the size of the threat) (Kerzner, 2009; De Furia, 2009).

In addition, Martin and Heaulme stress that risk also applies to the future, adding yet a fourth component-time (1998, p. 164).

The risk to the project can be defined as an adverse event, which may cause delays in the project; cost overrun, achieving unsatisfactory results and even a total failure of the project (Shenhar & Dvir, 2008). Therefore, risk management in projects is of utmost importance.

Later in the article, after a brief theory of the risk management process in projects, the results of empirical research on the risk management process in projects in private sector will be presented.

RISK MANAGEMENT PROCESS IN PROJECTS

In the mid-1990s the arguments mentioned in the introduction and the fact that while risk cannot be fully eliminated, it can be effectively managed to diminish its impact on achieving the objectives of the project (Cohen & Palmer, 2004), made companies realize that the process of risk management is something more than just an over-estimation of the duration or costs.

Van Well-Stam, Lindenaar, van Kinderen and van den Bunt defined the risk management process as "[...] a broad range of actions and measures, which are aimed at dealing with risks, in order to maintain control over the project" (2004, p. 1).

In the process of risk management one should first try to identify and then analyse any risk events to which the project may be exposed (of course it is impossible to identify all risk events – the point is to identify the biggest number possible of risk events which could be significantly important for achieving the aims of the project), in order to be able to take appropriate corrective and preventive actions. For, in practice, the greater part of risk management is the analysis rather than deployment, so there is more planning than action (Chong & Brown, 2001).

In the subject literature, at least a dozen proposals to classify risk management can be found. One of the primary divisions distinguishes the following four processes:

1) risk identification,
2) risk assessment,
3) dealing with risk,
4) risk control (PKN, 2005).

In project management, in addition to the static risk which does not change during the course of the project, one may come across dynamic risk (most of the risk events will be of this kind). This means that both the likelihood and the severity of the effects may change during the development cycle of the project.

Despite the great importance of the risk management process for the potential success of the project, it is not implemented in every project. This is due to a belief that the action associated with the risk entails an increase in costs (thus decreasing the profit). Another reason is that those involved in a project lack sufficient knowledge in the field of risk management and are not fully aware of the benefits that this process can bring, and the risk analysis itself is often seen by some people as an assessment of the work done (Chong & Brown, 2001; Well-Stam, Lindenaar, Kinderen & Bunt, 2004).

THE RESULTS OF EMPIRICAL RESEARCH IN THE FIELD OF RISK MANAGEMENT IN PROJECTS

Research, the results of which are presented in this section of the article, focused on the process of risk management in projects undertaken by companies in the private sector and was conducted on a sample of 25 companies. The authors admit that because of the limited sample

size in comparison to the number of objects which could have been examined, the research sample should be treated as a poll rather than a thorough study.

The research was conducted by surveying experts (in the form of a survey and an *auxiliary questionnaire*) from September 2010 to February 2011. The participants were the entrepreneurs from the whole Poland who belonged to the Association of Project Management Poland (nowadays International Project Management Association Poland) and listeners of lecture "Project Management in Company" at the Faculty of Organization and Management of the Silesian University of Technology in Gliwice. Due to the nature of the research and its subject its results and conclusions still appear to be up to date, despite the fact that some time has passed since conducting the research.

The selection of research tools was determined mainly by specificity of research sample. Association of Project Management Poland members were answering questions from the survey posted on a Pracownia Badań Rynkowych's (Market Research Lab) website Ankieter.pl. Experts received an E-mail with a request to fill out the survey and its Internet address, as well as a password to protect access to the polls against random people browsing the Internet. On the other hand, postgraduate students were given questionnaires in paper form.

The questionnaire that was used in the research contained 16 questions about the importance of the risk management process and organizational context of the implementation of the projects. Respondents were asked to identify risk management techniques that they used in projects, broken down by different processes. The last question concerned the assessment of the severity of the effects and the likelihood of the occurrence of 49 kinds of risk.

The majority of respondents (52%) admitted that approximately 75% of the projects realised in their businesses were a success. 24% of those polled believed that every other project undertaken by the company eventually managed a successful conclusion. Only in 2 cases (8%) did respondents answer that all the projects were a success. Comparing the survey results cited above with the percentage of projects which included activities related to risk management gives some interesting results. According to 32% of the participants, risk management activities are taken into account in approximately 75% of the projects; the same response rate is granted for about 25% of the projects. None of the

respondents indicated that the activities related to risk management are taken into account in all projects. 62% of the respondents who answered "about 75% of the projects ended successfully" at the same time indicated that about 75% of the projects included activities related to risk management (32% of all replies). A summary of projects that were successful and those that managed risk is shown in Figure 1.

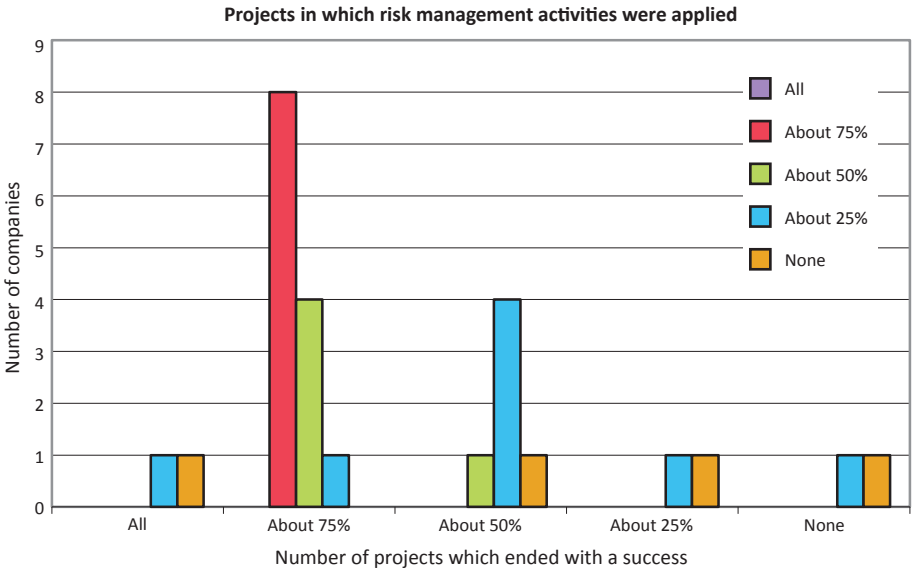

Figure 1. Successful projects and projects in which risk was managed
Source: own elaboration.

The analysis of the number of projects that were a success in given enterprises would not be complete without specifying the characteristics which determine whether a project is seen as successful or not. None of the experts felt the need to extend the list of characteristics presented in the survey, which confirms that the factors which decide about the success of the project are: completion on time, within budget and in accordance with the defined requirements. The vast majority of the respondents (92%) answered that achieving the planned schedule, budget and technical requirements has at least a large impact on the success of the project. None of the interviewees pointed towards these factors having a small or negligible effect. According to the experts the most important factor

for perceiving a project as a success is achieving the planned budget (56% indicated a very large impact of this factor). On the other hand, least important is the employees support for the project – most respondents (44%) considered the impact of this feature on the success of the project to be just mediocre. A full summary of the characteristics decisive on perceiving the project as finished with a success is shown in Table 1.

Table 1. The impact of some aspects of a project on perceiving it as a success

Category	Very big	Big	Medium	Small	Negligible
Achieving the planned schedule	52%	40%	8%	0%	0%
Achieving the planned budget	56%	36%	8%	0%	0%
Fulfilling the technical requirements	36%	56%	8%	0%	0%
Achieving the functional specification	44%	40%	12%	4%	0%
Employees support of the project	12%	28%	44%	16%	0%
Other	0%	0%	0%	0%	0%

Source: own elaboration.

Although risk management activities are not undertaken in all projects (see Figure 4), the majority of respondents (72%) admitted that the success of the project is very much dependent on this type of action. None of the respondents reported that risk management has no influence on achieving success in a project. Therefore, it evinces the great importance of risk management and stresses the need to undertake activities related to the identification, analysis, reaction planning, monitoring and control of risk at the stages of planning and execution of the project. Detailed results of the research in this area are shown in Figure 2.

Of all risk management processes the greatest impact on the success of the project has, according to those surveyed, the identification of risk (35% of the replies) and its monitoring and control (25%). According to the respondent companies, least significant in terms of the impact on the success of the project is the risk measure (1 reply). The impact of individual risk management processes on the success of the project is shown in Figure 3.

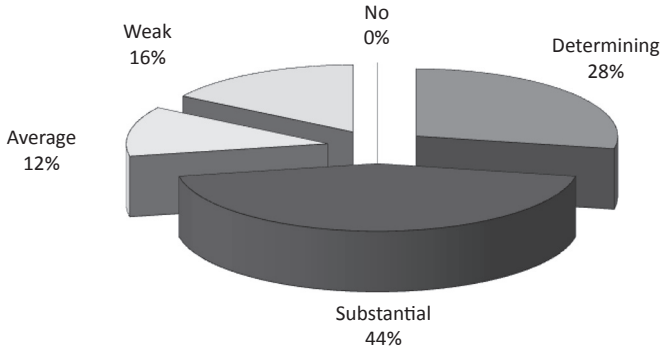

Figure 2. The impact of risk management process on project success

Source: own elaboration.

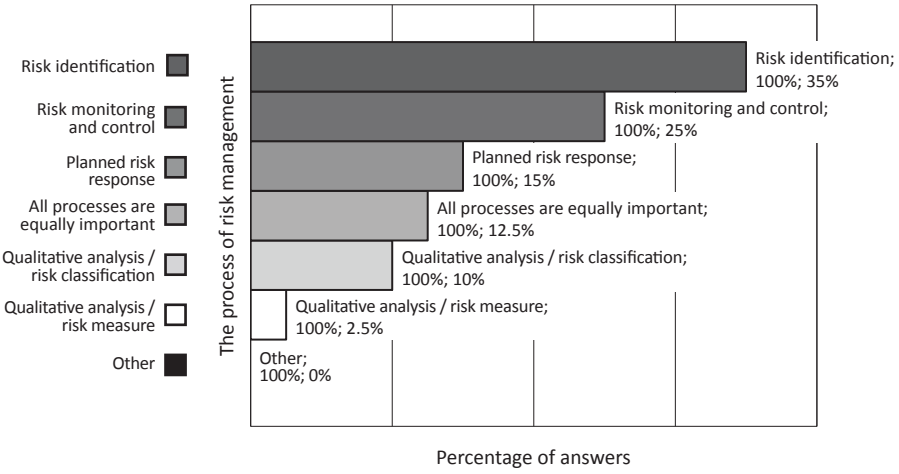

Figure 3. The impact of the individual processes of risk management on project success

Source: own elaboration.

The majority of respondents (68%) in the researched companies said that both aspects of risk are perceived as equally important. According to 28% of respondents the severity of the effects is more important and only one expert assessed that the probability of the occurrence is more important. The importance of various aspects of the risk is illustrated in Figure 4.

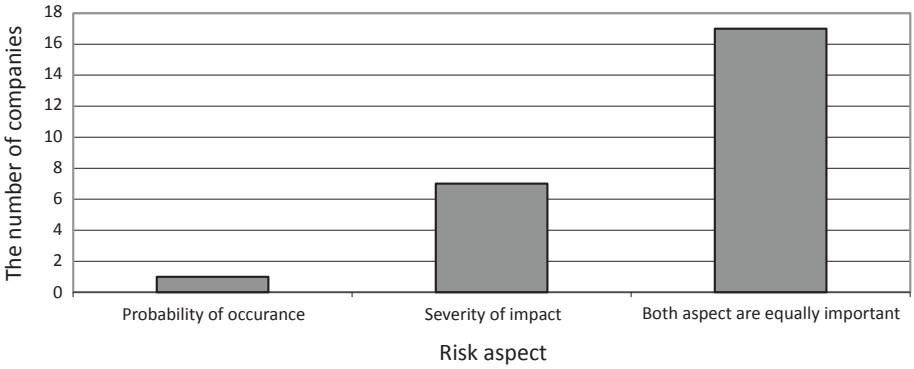

Figure 4. The importance of risk aspects in researched companies

Source: own elaboration.

Empirical studies conducted do not fully support the conclusions of the authors, whose research is dedicated to project management issues, in terms of the significance of company's organizational structure (compare with Frame, 2001; Brandenburg, 2011). Although the majority of respondents pointed out a significant mitigation of risk as a result of introducing specific organizational structures (32%), 52% of those polled believed that the organizational structure reduces the organizational risk to a small or medium extent. Only in the case of 8% of the sample is this degree assessed as very high. Issues discussed are shown in Figure 5.

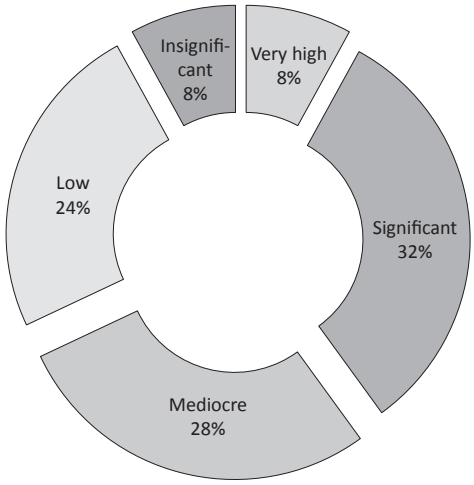

Figure 5. The limitation degree of organizational risk connected with applied organizational structure

Source: own elaboration.

Of particular interest to the authors of this article were the types of techniques which help to manage risks in projects, used in the planning and implementation of projects in the companies in the private sector. The techniques are grouped according to their usefulness in each of the risk management processes. The results of this research are presented in the following tables: (a) techniques most often used for risk identification are provided in Table 2, (b) techniques most often used for qualitative risk analysis are shown in Table 3, (c) techniques most often used for quantitative risk assessment are presented in Table 4, (d) techniques most often used for risk identification and choosing a risk response are provided in Table 5, and (e) techniques most often used for risk monitoring and control depicted in Table 6.

It should be noted that, in respect of most often used techniques in each of the various risk management processes, the respondents could indicate a maximum of three techniques for each process.

Table 2. Risk identification techniques most often used

Technique	Number of answers*	Percentage of observation**
Analysis of project assumptions	19	31
Documentation review	16	26
Brainstorming	10	16
Checklists	5	8
SWOT analysis	5	8
Expert survey	4	7
Delphi method	1	2
None	1	2
Cause and effect diagram (Ishikawa diagram)	0	0
Other	0	0
Total	61	100

Key:

* The number of answers does not equal 25 as this was a multiple choice question and those surveyed could choose up to 3 answers.

** This value was calculated as percentage of all answers.

Source: own elaboration.

Table 3. Qualitative risk analysis techniques most often used

Technique	Number of answers*	Percentage of observation**
Analysis of project assumptions	13	27
Risk assessment	10	20
Comparison of analogy	10	20
None	5	11
Expert survey	4	8
Checklists	3	6
Pareto analysis	2	4
Delphi method	1	2
Risk mapping and risk profiling	1	2
Other	0	0
Total	49	100

Key:
* The number of answers does not equal 25 as this was a multiple choice question and the surveyed could choose up to 3 answers.
** This value was calculated as percentage of all answers.

Source: own elaboration.

The popularity of the analysis of project assumptions in both areas: the identification of the risk and its classification, can be explained by the simplicity and intuitive nature of the applied technique.

Table 4. Quantitative risk analysis techniques most often used

Technique	Number of answers*	Percentage of observation**
Evaluation of Expected Monetary Value (EMV)	7	19
Sensitivity analysis	7	19
Critical Path Method (CPM)	7	19
Decision analysis	7	19
None	7	19
Program Evaluation and Review Technique (PERT)	2	5

Graphical Evaluation and Review Technique (GERT)	0	0
Venture Evaluation and Review Technique (VERT)	0	0
Monte Carlo method	0	0
Other	0	0
Total	37	100

Key:
* The number of answers does not equal 25 as this was a multiple choice question and the surveyed could choose up to 3 answers.
** This value was calculated as percentage of all answers.

Source: own elaboration.

Table 5. Techniques for risk determination and risk response most often used

Technique	Number of answers*	Percentage of observation**
Risk mitigation	14	26
Risk acceptance	9	17
Risk transfer	8	15
Risk avoidance	7	13
Risk profiles	5	9
Checklists	4	7
Decision analysis	4	7
None	3	6
Other	0	0
Total	54	100

Key:
* The number of answers does not equal 25 as this was a multiple choice question and the surveyed could choose up to 3 answers.
** This value was calculated as percentage of all answers.

Source: own elaboration.

Table 6. Risk monitoring and risk control techniques most often used

Technique	Number of answers*	Percentage of observations**
Documentation review	18	38
Risk review	11	24
Measurement of technical results and functional properties	8	17
Audit of planned risk responses	4	9
Checklists	3	6
Analysis of Earned Value	2	4
None	1	2
Other	0	0
Total	47	100

Key:
* The number of answers does not equal 25 as this was a multiple choice question and the surveyed could choose up to 3 answers.
** This value was calculated as percentage of all answers.

Source: own elaboration.

Not applying the techniques in each of the risk management processes, expressed by answering "no", coincides with the effect size of each of the processes on project success assessed by the respondents (see Figure 3). In other words, the smallest percentage of enterprises surveyed do not use any technique in the risk identification process, which has been identified as having the greatest impact on the success of the project. In the quantitative risk analysis, on the other hand, the smallest number of respondents indicated the use of any technique, which goes together with the recognition of this process as having least impact on the project success by the respondents.

It should be noted that none of the experts involved in the study attempted extending the list of techniques used in the risk management process presented in the survey, which might indicate that on the basis of the critical literature studies the authors selected the techniques adequately.

FINAL CONCLUSIONS AND PROPOSALS FOR THE USE OF RESEARCH RESULTS IN PRACTICE OF PROJECT MANAGEMENT

On the basis of the literature and the empirical study, it can be concluded that the success of projects implemented in the private sector is linked to the achievement of the objectives resulting from the "triple constraints". Of these three, achieving the planned budget has the largest influence. A tad less important for the perception of the project as a success is finishing the project within the planned schedule (see Table 1).

Most of the enterprises surveyed answered that at least three out of the four projects carried out by them result in success, and believe that the process of risk management contributes to that success to a great extent. Of all processes/steps of risk management, the biggest impact on success stems from risk identification, risk monitoring and risk control. The least important is the measurement of risk (quantitative risk analysis), which seems to stem from the fact that this stage of the process is generally considered to be the most difficult processes related to risk in the project. Despite the fact that the traders accept the relevance of the risk management process in projects, studies suggest they only realise the risk to a small extent, as no company performs risk management activities in all their projects.

In the tested sample, the vast majority of respondents admitted that the likelihood of a risk event and the severity of its effects should be treated on an equal footing (neither component is more important). Thus, this result departs from the proposals of some researchers to treat the severity of the effects as more important.

The result of the research and the analysis carried out was also an indication of the most common techniques used to manage risk in projects for the private sector. The techniques are grouped according to their suitability in different processes and steps of risk management.

The most common techniques are:

1) analysis of project assumptions, documentation reviews, brainstorming (at the stage of risk identification);
2) analysis of project assumptions, systems for risk assessment, comparison, analogy (at the stage of risk classification);

3) evaluation of the expected monetary value, sensitivity analysis, critical path method and the decision analysis (at the stage of risk measurement);
4) risk mitigation strategy, risk acceptance, risk transfer (at the stage of identifying and responding to risk);
5) documentation review, risk review, measuring the results of the technical and functional properties (at the stage of monitoring and risk control).

Generally speaking, it can be assumed that the degree to which risk management techniques are used in private sector projects is significant. The techniques used least are those associated with a quantitative risk analysis (measure).

At the end it is worth stressing that only a fifth of the companies applies the matrix structure in project management, which confirms problematic issues associated with its use indicated in the literature on the subject. Pure matrix structure, due to the mixing of organizational functions and projects, is a fairly complicated solution; on the other hand, the maintenance of the commission matrix structure through a separate organisational tower which manages the projects is quite expensive (the argument against high maintenance costs concerns also pure project structure).

The research findings allow us to formulate the following recommendations, which may increase the chance of achieving project success:

1) take into account the risk management process during the planning and implementation of projects in the enterprise;
2) introduce an influential project structure to the enterprise (the concept of a project coordinator);
3) put the same importance on both aspects of the risk during the quality risk assessment;
4) use risk management techniques mentioned in this very article.

REFERENCES

Brandenburg, H. (2011). *Zarządzanie lokalnymi projektami rozwojowymi* (3rd ed.). Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach.

Cano, A. del, & Cruz, M.P. de la (2002). Integrated methodology for project risk management. *Journal of Construction Engineering and Management*, *128(6)*, 473–485.

Chavas, J-P. (2004). *Risk analysis in theory and practice*. San Diego: Elsevier Academic Press.

Chong, Y.Y., & Brown, E.M. (2001). *Zarządzanie ryzykiem projektu*. Kraków: Dom Wydawniczy ABC.

Cohen, M.W., & Palmer, G.R. (2004). Project risk identification and management. *Transactions of AACE International*, *Int.01*, 1–5.

De Furia, G.L. (2009). *Project Management Recipes for Success*. New York: CRC Press.

Frame, J.D. (2001). *Zarządzanie projektami w organizacjach*. Warszawa: WIG – Press.

Kerzner, H. (2009). *Project Management. A Systems Approach to Planning, Scheduling, and Controlling*. Hoboken: John Wiley & Sons, Inc.

Martin, J.E., & Heaulme, P-F. (1998). Risk management. Techniques for managing project risk. In: D.I. Cleland (Ed.), *Field guide to project management*. New York: Van Nostrand Reinhold.

PKN, Polish Committee for Standardization (2005). *PN-ISO 10006:2005. Systemy zarządzania jakością. Wytyczne dotyczące zarządzania jakością w przedsięwzięciach*. Warszawa.

Shenhar, A.J., & Dvir, D. (2008). *Nowe spojrzenie na zarządzanie projektami*. Warszawa: APN Promise.

Well-Stam, D. van, Lindenaar, F., Kinderen, S. van, & Bunt, B. van den (2004). *Project Risk Management*. An Essential Tool for Managing and Controlling Projects. London: Kogan Page Limited.

Internet sources

Pracownia Badań Rynkowych Ankieter.pl, http://www.ankieter.pl (access: 20.02.2011).

ZARZĄDZANIE RYZYKIEM W PROJEKTACH SEKTORA PRYWATNEGO

Abstrakt

Tło badań. Ryzyko jest nieodłącznie związane z planowaniem i realizacją każdego projektu. Ryzyko projektu to zdarzenie, które może mieć wpływ na osiągnięcie celów tego projektu. Z tego względu ogromne znaczenie ma zminimalizowanie prawdopodobieństwa pojawienia się i wpływu potencjalnych negatywnych zdarzeń oraz wykorzystanie pojawiających się szans. Innymi słowy, istnieje potrzeba zarządzania ryzykiem projektu.

Cel badań. Celem artykułu jest wskazanie aspektów projektu oraz procesów zarządzania ryzykiem, które są postrzegane jako mające największy wpływ na powodzenie projektu, oraz zaprezentowanie najczęściej wykorzystywanych technik zarządzania ryzykiem.

Metodyka. Poszukiwanie aspektów projektu oraz technik zarządzania ryzykiem zostało oparte na przeglądzie literatury naukowej. Analizę poziomu wykorzystania zarządzania ryzykiem w projektach realizowanych w sektorze prywatnym przeprowadzono na podstawie badań ankietowych wśród ekspertów. Uczestnikami byli przedsiębiorcy z całej Polski zrzeszeni w Stowarzyszeniu Project Management Polska oraz słuchacze studiów podyplomowych.

Kluczowe wnioski. Wśród wielu aspektów oraz technik zarządzania ryzykiem zarekomendowano stosowanie tych, które mogą zwiększyć szanse na powodzenie projektu.

Słowa kluczowe: ryzyko, zarządzanie projektami, techniki zarządzania ryzykiem projektu, powodzenie projektu