Available online at www.sciencedirect.com

ScienceDirect

Transportation Research Procedia 40 (2019) 986–993

Transportation Research Procedia

www.elsevier.com/locate/procedia

13th International Scientific Conference on Sustainable, Modern and Safe Transport (TRANSCOM 2019), High Tatras, Novy Smokovec – Grand Hotel Bellevue, Slovak Republic, May 29-31, 2019

Risk management in traditional and agile project management

Katarína Buganová[a], Jana Šimíčková[a]*

[a] University of Žilina, Faculty of Security Engineering, Univerzitná 8215/1, 010 26 Žilina, Slovakia

Abstract

The dynamic development of the business environment has stimulated the efforts of managers for agile project management. This is mainly due to shortening time limits for project realization as well as vaguely set objectives that change during project implementation. The requirements on project managers and methodological risk management of projects have also changed. Organizations use projects to manage changes and to develop and deploy new products. In a competitive environment, only those who can manage the risks and realize the project more efficiently will succeed. The aim of the article is to highlight the importance of risk management and the possibilities of its implementation in traditional and agile approaches to project management.

Peer-review under responsibility of the scientific committee of the 13th International Scientific Conference on Sustainable, Modern and Safe Transport (TRANSCOM 2019).

Keywords: risk; project; risk management; agile approach; transportation company

1. Risk Management and Its Relations

The risk management in an organisation belongs to the most important internal processes and strengthens the resilience already during the prevention period and is inevitable for ensuring the process security. The risk management aims at coordinating the activity for controlling and managing an organisation with orientation on the risks (Řehák 2018). The risk management represents an important and inseparable segment of the project management. All projects are to be assessed independently regarding to the possible risks because each project is specific and it brings typical risks whose reason is not only the uniqueness of the projects but also the financial demandingness and a longer time period for realising the projects.

* Corresponding author. Tel.: +421 41 513 6715.
E-mail address: jana.simickova@fbi.uniza.sk

2352-1465
Peer-review under responsibility of the scientific committee of the 13th International Scientific Conference on Sustainable, Modern and Safe Transport (TRANSCOM 2019).
10.1016/j.trpro.2019.07.138

The projects are threatened by a whole range of various risks which result from the character of the internal and external environment of their realisation that are changing dynamically. The risks accompany each project and are part of all life cycle stages (Obrová 2013). The risk management in the projects is connected also with the risk treatment which can be considered a cycle of individual stages whose goal is to minimise the losses and damages caused by the crisis phenomena (Ristvej 2013). In this case the risk management has a preventive character and the risk treatment a reactive one.

The risks in the projects can create unfavourable situations that occur in the process of its realisation and affect the overall success of the project. The risk in the project is to be monitored, perceived and we have to be aware of it, to respond to it adequately, to manage it and to deal with it positively. The project risk can be described as an indefinite phenomenon whose occurrence has a positive or negative effect on the project. The project risk categorisation is not strictly uniform for every project. A phenomenon that is a critical risk for one project can be a common one in another project. This means that the project risk management cannot be simply unified for a certain type of the project. The main types of the project risks are the time loss, financial loss, threat for the success, failure of the whole project (Loveček 2015; Klučka 2016; Buganová 2015).

The project contractor has to choose the tools for an effective project realisation in the preparation phase and especially a precise process of the risk management. A more effective risk management is created in such projects that address the interested parties of the projects from the point of view of communication and collaboration in time. If the project´s result is to be successful, the project management has to monitor the risk continuously and to manage them effectively (Osipova 2011; Kampová 2011). The project risk management has to start with making a pre-project phase of the project life cycle. One of the prevention tools that can show the project risk rate is also the feasibility study. Just here we have a space for determining if the project from the risk rate point of view can be realised. If we view the projects from another point of view, i.e. from the point of view of unsuccessful projects whose number is statistically larger, we will find out that especially the incorrect or insufficient project risk management are the frequent and main factors causing the failure of delivering the project.

2. Selected Problems in the Area of Risk Management in Organisations

Due to the development of the market environment also the transport companies had to adapt and to spread their activities from providing the town mass transport towards the business activities. The development of these activities that are oriented mainly on the services of the charter (touring) transport, contractual personal transport and activities connected with advertising is affected not only by the competitors´ strength but also by the changing conditions of the environment on the domestic and foreign market. Also the project management is utilised during the preparation and realisation of their activities as a tool for increasing the successfulness of the business plans.

A lot of organisations are dealing with implementing the company risk management. The problems with implementing the risk management occur in many organisations. The study of William Ibbs and Young H. Kwak shows a large part of organisations dealing with the product development underestimate the importance of the risks (Hudáková 2017; Schwalbe 2011).

This fact is confirmed by the research of the 10th year of the project management in the Czech Republic from 2017 by the company EY and introduces the least successful projects – see the Figure 1.

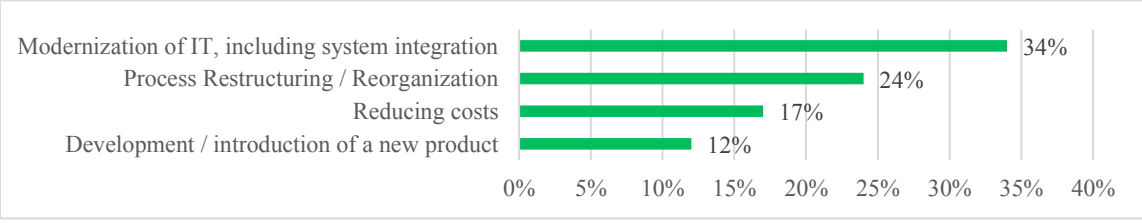

Fig. 1. The least successful types of projects (Source: Knap. Průzkum projektového řízení v ČR 2017. 2018, 2p.).

The most endangered project types – 34 % - are oriented on the IT while the projects aimed at development/implementation of a new product have a value of 12 %. The authors of the research of the project management (Knap 2018) say that two of the three main reasons of failing the internal projects in the companies are the insufficient support of the top management and an inadequate risk treatment. It is to say, these factors are fully under control of the given organisations, i.e. the projects often uselessly fail. The authors also say that the most frequent reason of failing the project is a change of the project scope due to external changes. Those projects that are to increase effectiveness or reduce the costs belong to the most unsuccessful ones.

These facts are confirmed also by the research The State of Project Management from 2018 that shows the most important problems in the area of the project management in the organisations. The results are shown in the Figure 2 (The State of 2018).

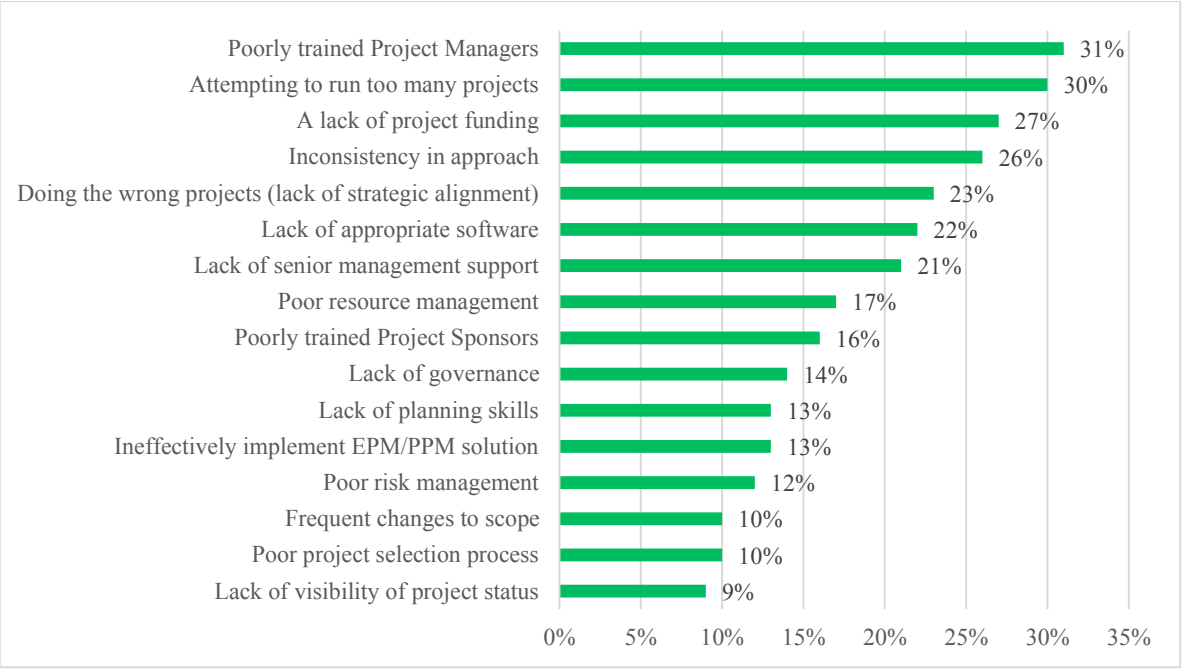

Fig. 2. The most important problems in the area of the project management in the organisation (Source: The State of Project Management Survey. 2018, 21p.)

The inappropriately trained project managers and attempts to start too many projects belong to the biggest problems in the project management area. The inadequate process of selecting the projects and insufficient monitoring of the state of the project are perceived as a less important problem. The insufficient risk management belongs to the less important problems and it indicates that the risk management of the investigated companies is ensured.

The project management implementation method is based on the routine standards in the organisation. The PMI utilised especially by multinationals and PRINCE used mainly by the Slovak companies and the public sector belong to the most frequently used standards of the project management. Both these standards are oriented on the processes (Buganová 2015).

The MS Project has been the most frequently used software of the project management for a long time. The State of Project Management 2018 (The State of, 2018) says that 60 % of the respondents claim they have a professional qualification for the project management according to the standard Prince 2 (it has a web site also for the agile project management – PRINCE2 Agile™). The latest research of the company CollabNet and Version One (The 12th Annual 2018) from 2017 confirms the successfulness of using the agile approach for the project management. Out of more than 1,400 participants, up to 97 % of the respondents are utilising the agile approach to the project management.

Even 98 % of the respondents say they were successful when using the agilely managed projects in their organisations and 74 % claim that more than a half of their agilely managed projects were successful.

3. Analysing and Comparing the Classical and Agile Approach to Project Management

The classical and agile approach in the area of the software development brings two different views. The involvement of the customer to the project planning is an important assumption of the agile methods. The agile approach emphasises the individuality and qualification level of the project team that consists of a smaller number of people than in the case of the classical approach. The comparison of the classical and agile approach of the project management is oriented on the classical model and the agile method Scrum. The main differences of the aspects of both methods are thoroughly shown in the Table 1 according to own processing.

Table 1. Comparing the agile and classical approach of the project management.

Aspect	Classical Approach	Agile Approach
Adaptability	The integration of the change requirements during the project is complicated. The need of change during the implementation requires reworking the project documentation and can have a substantial influence on architecture and design.	The delivery is realised in short repeated periods and enables to respond to the changing needs more flexibly. The architecture design calculates in advance with the possible changes and emphasises the open and universal solutions.
Adaptability to change	The product development is long – the responses to the market requirements are therefore longer. This is taking a risk of failure already when it is submitted.	The contracting authority can adapt the project according to the market changes, the current needs of the customer or the feedback.
Documentation	The documentation is thoroughly prepared and necessary when the activities on the project are handed over.	Only a minimal amount of documentation necessary for maintaining continuity and maintenance in the future.
Value added	The product can be utilised in operation only after it is completed as a whole.	The product and even its prototype is ready for usage more quickly. The company can make money sooner. The customer makes use of the project benefits much sooner.
Processes	It is oriented on fulfilling the determined processes rigorously.	Aimed more at individualities and interaction with people involved in the project.
Project team	A large number of the project teams composed of experts on various technologies. The team can be located regions being far away from each other in the framework of the multinational corporations.	The team members communicate with each other personally and have a close collaboration. During a project a smaller team is able to hand over the information more effectively.
Project manager´s role	The project manager heads the team, divides the tasks and has the primary responsibility for the project´s delivery.	The task of the project manager is divided between the Scrum Master and Product Owner. The Scrum Master creates conditions for the team, while the Product Owner manages the priorities and timing the deliveries of the project and their content.
Budget	The size of the project is important and the costs are a variable quantity.	The project has a concrete budget out of which we want to gain the highest value for the customer.
Delivery scope	The functional product is delivered as a whole even at the end of the project or in several smaller units.	The product is delivered part by part in several repeated actions, i.e. sprints from the prototype up to the final product / service.
Collaboration with customers	At the beginning the customer defines the requirements. The requirements on change are worked out on the basis of in advance	The feedback from the customers is continuously gained on the basis of partial outputs. The feedback has to be involved

Aspect	Classical Approach	Agile Approach
	determined rules and are approved by the management project committee.	into the final shape according to which the project extent is adapted.
Transparency	The problems of the solution design are revealed even after the implementation. The team members are not informed about the problem at the same time.	The errors are revealed sooner due to a more frequent feedback. The project team is informed about the problems and project development regularly.
Leadership	The leadership is of a directive nature with an emphasis on the inspection.	The leadership is carried out more in the form of motivation and coaching.
Life cycle of development	The product as a whole goes through all development phases from defining the requirements up to handing over to operation.	The individual functional units in the framework of each iteration go through a life cycle similar to the classical project.

In the framework of the classical approach the need of a change during implementation requires re-working the project documentation. The agile approach emphasises an open and universal solution and the project design already in advance calculates with the possible changes. However, both approaches have their negatives. In the classical approach the problems are connected with their complicatedness, exactly described processes and delivering a complete product which the customer need not always perceive as a successful one. The large transportation companies can frequently face problems, e.g. the unwillingness of the management to change the routine stereotypes and accept a change of the corporate culture or involving the project owner to the product development during the implementation of the agile methods.

4. Possibilities of Implementing Risk Management Both in the Traditional and Agile Approach to Project Management

The goal of the risk management is to increase the probability and reach of the potential positive events. The risk management presents a key branch of each project (A Guide to 2013). The risk management process usually consists of planning and managing the risks, identifying the risks, the qualitative and quantitative risk analysis, planning the reaction to the risks, monitoring and inspection.

The risk management represents an inseparable and important part of the project management. Therefore several standards and norms developed in various spheres of the company activity which deal with this are.
The most used ones are as follows (Buganová 2012):

- ISO 21500:2012 Guidance on project management,
- IEC 62198:2013 Managing Risk in Project - Application Guidelines. This standard is an updated version of the standard ISO/IEC 62198:2002 Project Risk Management - Application Guidelines,
- ISO 31000:2018 Risk management – guidelines, which is an updated version of the standard ISO 31000:2009 Risk management - Principles and guidelines,
- ISO/IEC 16085:2006 Systems and Software Engineering - Life Cycle Processes - Risk Management,
- ISO 10006:2003 Quality management systems - Guidelines for quality management in projects,
- ISO 9001:2015 Quality management systems – Requirements. Requirements for a more thorough implementation of the risk management,
- ISO/IEC Guide 73:2009 Risk Management – Vocabulary.

The last updated version of IEC 62198:2013 Managing Risk in Project - Application Guidelines in compliance with ISO 31000 Risk Management specifies the framework, principles of the risk management and how these general principles and guidelines are used for managing uncertainty in the projects.

The risk management differs in the case of the agile and classical approach quite substantially. The classical model is typical by its explicit risk management that creates and an overexposed risk management if it selects into the product development stage. The agile approach reduces the threat of an incorrect result and therefore it is integrated into individual project stages. The regular communication with the customers, short iterations and testing are emphasised.

The explicit risk management can be implemented also in the agile approach which thoroughly assesses and subsequently can manage all risks. If we deal with the risks during the period of their development, we will create better conditions for appropriate and effective reactions to the risks. Frequently even a team member need not know about a possible existence and solution of the independent risks before the product development phase. From this point of view the implicit risk management should be a smaller threat for an ineffective risk solution that can arise (Tomlein 2012).

Significant risks can develop also during a transition to the agile method of the risk management. Ujhelyi (Ujhelyi 2012) says that the following risks can develop during a transition of the organisation to the agile project management method:

- a too big number of the team members – a frequent risk of the projects is the inability of the individuals to carry out quality operations, in the case of a smaller project there is a need of a lower number of people and the selection of qualified employees is stricter – this is not always possible in a project with a higher number of people,
- an insufficient synchronisation of the project teams – in the case of a small team it is possible to monitor the result of the team as a whole, the close cooperation of the teams that work on the common functionality is substantial,
- an insufficient change of the employees´ way of thinking during the transition – the managers and executive bosses have to monitor strictly if the procedures are kept according to the new (agile) methods not to return to the previous approaches, the risk consists in an insufficient break of the employees´ links with the past.

The term agile methods became popular due to developing methods created especially for the software development. The agile methods do not use any type of an intentional approach to the risk management and reduce the risk by several repetitions. The feedback mechanisms occurring in the agile methods help responding to the risks in an operational way. The agile methods, e.g. Scrum method to not possess sufficient formal procedures for the risk management. The enrichment of the Scrum by selected procedures from an extensive framework of the risk management PRINCE2 promises better results for delivering products especially in the global development projects. The company Scrum does not determine any formal process of the risk management. The product owner or the development team that want to cope with the risks by a more formal or proactive methods can utilise e.g. a simple risk register or risk matrix. If they do this, it is recommended to prefer the requirements of the highest risk rate in the oncoming Sprint. There is a conception of obstacles in the Scrum guide. An obstacle can be everything that prevents the team from being productive. From the point of view of the risk management an obstacle equals a problem or a risk source. The Scrum framework utilises an iteration or incremental approach to optimise the foreseeability and check of the risk. The authors claim that using the Sprint supports also the risk management because it restricts the risk to one calendar month from the point of view of the costs. The risk management in the organisation by Scrum is not as good as in the case of traditional management methods because some particular procedures of the risk assessment are not fulfilled except for the activities of the risk identification. The Scrim life cycle enables monitoring the products and identifying the obstacles (Tavares 2018; Tomanek 2015; Tavares 2017).

5. Conclusion

A lot of transportation companies utilise the risk management only in connection with protecting the company assets or health of the employees or customers and in the case of the development project they often take over mechanically the information from the previous projects. A suitably selected method for assessing and reducing the risks to an acceptable level is an assumption for maintaining the economic stability and successfully realised projects in the transportation companies. During selecting a method it is therefore necessary to take into account the economic, material and personal resources and last but not least the time framework for implementing the given method. Based on the project character it depends on the management´s decision if they select the traditional or agile approach to the project management. From the point of view of implementing the risk management we recommend, based on the current experience, implementing also in the transportation companies the international standards, e.g. ISO 31000:2018 Risk Management or addressing an external company and having the risk management worked out exactly

according to the company´s needs. Based on the current experience the project management inclines to simpler and more transparent methods and therefore we recommend for the transportation companies that have no experience with the project management to utilise e.g. the method RIPRAN that fulfils comprehensively all requirements of the project risk management in Slovakia. An emphasis of the project manager should be laid especially on supporting the team communication, encouraging the team members to perform the proactive identification of the risks in connection with their working tasks as well as arousing interest in the risks in connection with the fact they are an integral part of fulfilling the project expectations.

Acknowledgements

Publication of this paper was supported by Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic – KEGA No. 030ŽU-4/2018 Research on risk management in companies in Slovakia for the creation of a new study program Risk Management at the FBI UNIZA in Žilina.

References

Aguide to the project management body of knowledge (PMBOK Guide). 2013. 5th ed. Newtown Square: Project Management Institute. ISBN 978-1-935589-67-9.

Buganova, K., Hudakova, M., 2015. Increase of the competitiveness of enterprises through the implementation of risk management projects in Slovakia. In: WMSCI 2015 : the 19th world multi-conference on systemics, cybernetics and informatics : July 12 - 15, 2015 - Orlando, Florida, USA : proceedings. Vol. II. - [S.l.]: International Institute of Informatics and Systemics, 2015. ISBN 978-1-941763-25-4. - S. 394-398.

Buganová, K., Hudakova, M., Strelcova, S., Klučka, J., 2012. Manažment rizika v podniku. 1. vyd. Žilina: Žilinská univerzita v Žiline. 2012. ISBN 978-80554-0459-2.

Hudakova, M., Schonfeld, J., Dvorsky, J., Luskova, M., 2017. The Market Risk Analysis and Methodology of its More Effective Management in Smes in the Slovak Republic. Montenegrin Journal of Economics. 2017. Vol. 13, no. 2, p. 151–161. DOI 10.14254/1800-5845/2017.13-2.10.

Kampova, K., 2011. Foundations of implementation of risk management process within project management. Komunikacie: Volume 13, Issue 2, 2011, Pages 88-91.

Klučka, J., Havko, J., Haviernikova, K., 2016. Risk Management in Cluster's Cooperation in Slovak Republic. Conference: 3rd International Multidisciplinary Scientific Conference on Social Sciences and Arts, SGEM 2016 Location: Albena, Bulgaria. Vol V, Book Series: International Multidisciplinary Scientific Conferences on Social Sciences and Arts, Pages: 577-584.

Knap, P., Mužík, T., 2018. Průzkum projektového řízení v ČR 2017. [online]. Praha: Ernst & Young, s.r.o. [cit. 2018-12-18]. Available from: https://www.ey.com/Publication/vwLUAssets/Projektov%C3%A9_%C5%99%C3%ADzen%C3%AD_2018/$FILE/EY%20Pr%C5%AFzkum%20projektov%C3%A9ho%20%C5%99%C3%ADzen%C3%AD%20v%20%C4%8CR%202017_v%C3%BDsledky%2010.%20ro%C4%8Dn%C3%ADku.pdf

Lovecek, T., Ristvej, J., Sventekova, E., Siser, A., Veľas, A., 2016. Currently Required Competencies of Crisis and Security Managers and New Tool for Their Acquirement. In: 2016 3rd International Conference on Management Innovation and Business Innovation (ICMIBI 2016), PT 2. 2016. p. 3–8. Lecture Notes in Management Science. ISBN 978-981-09-7914-0.

Obrová, V., Smolíková, L., 2013. The role of risk management in successful project management. International Business Information Management Association Conference, IBIMA 2013; Vienna; Austria; Volume 2, 2013, Pages 1496-150321st. Code 106714.

Osipova, E., Eriksson, P.E., 2011. How procurement options influence risk management in construction projects. Volume 29, Issue 11, November 2011, Pages 1149-1158

Ristvej, J, Zagorecki, A, Holla, K, Simak, L., Titko, M., 2013. Modelling, Simulation And Information Systems As A Tool To Support Decision-Making Process In Crisis Management. In: European Simulation and Modelling Conference 2013. European Technol Inst; European Simulat Soc; Lancaster Univ; Ghent Univ; Univ Skovde; Incontrol Simulat Solut. 2013. p. 71–76. ISBN 978-90-77381-79-3.

Řehák, D., Šenovský, P., Hromada, M., Pidhaniuk, L., Dvořák, Z., Loveček, T., Ristvej, J., Leitner, B., Sventeková, E., Mariš, L., 2018. Metodika hodnocení resilience prvku kritické infrastruktury. Ostrava: VŠB-Technická univerzita Ostrava, Fakulta bezpečnostního inženýrství. ISBN 978-80-248-4164-9.

Schwalbe, K., 2011. Řízení projektů v IT: kompletní průvodce. Brno: Computer Press. ISBN 978-80-251-2882-4.

Tavares, G. B., 2017. Risk Management in Scrum Projects: A Bibliometric Study. Journal of Communications Software and Systems 13(1):1. DOI: 10.24138/jcomss.v13i1.241

Tavares, G. B., Silva, E. S. C., Diniz de Souza, A., 2018. Practices to Improve Risk Management in Agile Projects. International Journal of Software Engineering and Knowledge Engineering. DOI: 10.1142/S0218194019500165

Tomanek, M., Juricek, J., 2015. Project Risk Management Model Based on PRINCE2 and Scrum Frameworks. International Journal of Software Engineering & Applications (IJSEA), Vol.6, No.1, January 2015. DOI: 10.5121/ijsea.2015.6107.

Tomlein, M., 2012. Prehnaný a neefektívny manažment rizík a jeho riziká. [online]. Bratislava: STU, Fakulta informatiky a informačných technológií [cit. 2018-10-04]. Available from: http://www2.fiit.stuba.sk/~bielik/courses/msi-slov/kniha/2013/Essayse0ef.html?keyword=40&lang=sk

The 12th Annual State of Agile Report, 2018. [online]. VersionOne, CollabNet. [cit. 2018-10-23]. Available from: https://www.qagile.pl/wp-content/uploads/2018/04/versionone-12th-annual-state-of-agile-report.pdf

The State of Project Management Survey, 2018. [online]. Wellingtone Limited.. [cit. 2018-12-18]. Available from: http://www.wellingtone.co.uk/wp-content/uploads/2018/05/The-State-of-Project-Management-Survey-2018-FINAL.pdf

Ujhelyi, M., 2012. Dokážu veľké spoločnosti vyvíjať agilne napriek rizikám? [online]. Bratislava: STU, Fakulta informatiky a informačných technológií [cit. 2018-10-14]. Available from: http://www2.fiit.stuba.sk/~bielik/courses/msi slov/kniha/2013/Essayse0ef.html?keyword=40&lang=sk