Available online at 2019.creative-construction-conference.com/proceedings/

CCC 2019

Proceedings of the Creative Construction Conference (2019) 064

Edited by: Miroslaw J. Skibniewski & Miklos Hajdu

https://doi.org/10.3311/CCC2019-064

Creative Construction Conference 2019, CCC 2019, 29 June - 2 July 2019, Budapest, Hungary

The Mind Mapping Technique in Project Management

Magdalena Bochenek[a]

[a]*West Pomeranian University of Technology, Faculty of Civil Engineering and Architecture, Aleja Piastów 50, 70-311 Szczecin, Poland*

Abstract

This article presents the mind mapping technique which, despite many potential benefits, is still infrequently used in project management.

The case study provides practical examples for use of the mind mapping technique when implemented in construction projects.

The results of this study showed that the mind mapping technique helps project managers solve problems, define the scope of a project, schedule packages, and manage teams more effectively. Further, mind maps are useful for creating project plans, and for analysing existing plans so that they are easily understandable.

This study concludes that the mind mapping technique is a creative and useful tool for project managers. The mind mapping technique enables the project manager to gather, manage, share, and communicate information quickly and easily.

Peer-review under responsibility of the scientific committee of the Creative Construction Conference 2019.

Keywords: mind mapping technique, project management, new tools for planning

1. Introduction

Construction projects are characterised by a specific uniqueness, distinctiveness, and complexity. To be successfully implemented, every project needs to be properly managed. In its Project Management Book of Knowledge guide [1], the Project Management Institute lists the following types of competencies that are necessary to manage projects: managing the integrity, scope, schedule, costs, and quality of a project; managing human resources; managing communications within a project; managing risk in a project, managing procurement and stakeholders. Each of these areas requires the use of various tools and techniques that support the process of project management.

The mind mapping technique is one of these tools. However, even though it offers numerous advantages when used in the process of managing a construction project, it is not widely used by construction project managers. This paper presents a case study in which the mind mapping technique was used in managing a construction project in Poland. The paper aims to extend the knowledge of opportunities and practical aspects of the mind mapping technique for construction projects.

The article proposed the name "construction project mapping" in relation to mind mapping regarding project management.

*Corresponding author: Author email: magdalena.bochenek@zut.edu.pl

Construction project mapping of project management knowledge areas and examples of possible tools in each area are shown in Figure 1.

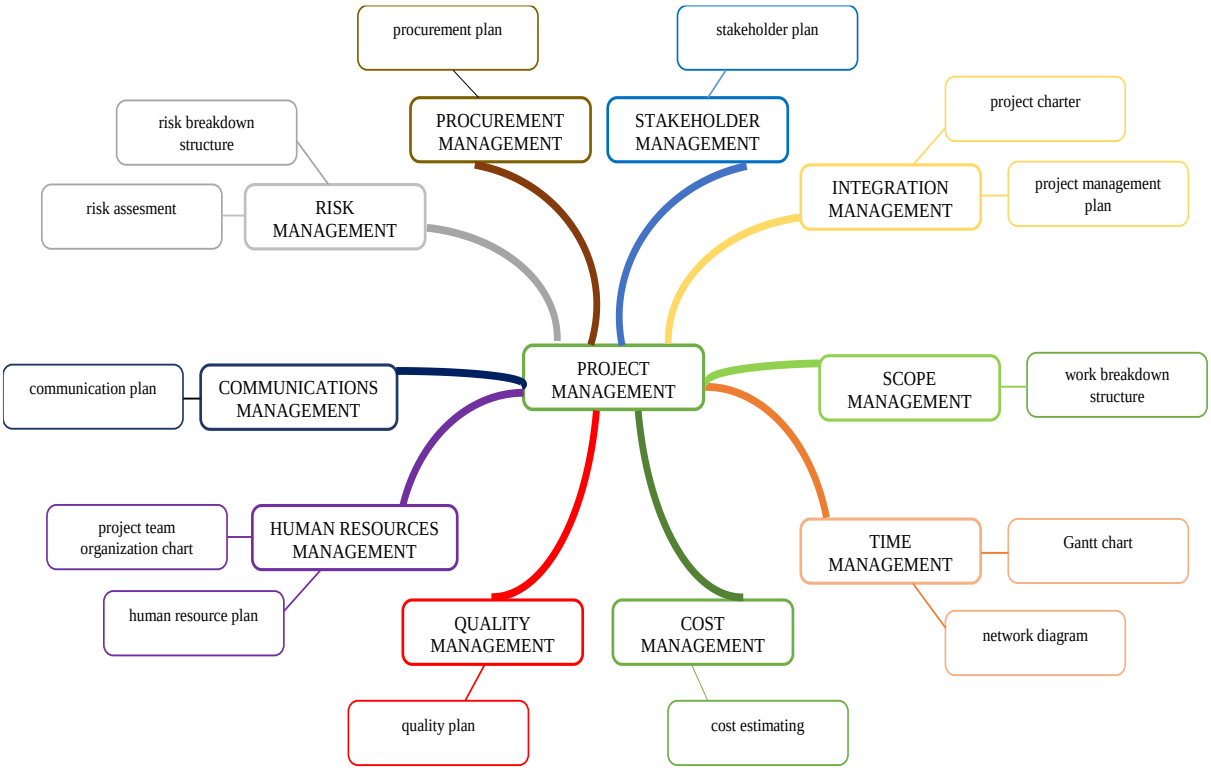

Fig. 1. Construction project mapping of project management knowledge areas and examples of possible tools in each area.

2. The mind mapping technique

Tony Buzan created the mind mapping technique and he is one of the leading international experts in learning techniques and brain functioning. In books [2,3], he describes the basic concepts and premises of mind maps. The characteristic feature of this technique is the use of keywords and images. The main concept or idea is presented in the middle – it often takes the form of an image. From this central image, the most important concepts related to the presented idea branch out. This is the first level of the map. From each of these branches, second-level branches run out – the lines that represent these branches are thinner than the first-level ones; third-level branches stem out from the second-level ones, and these lines are even finer.

The principle of mind mapping creation is shown in Figure 2.

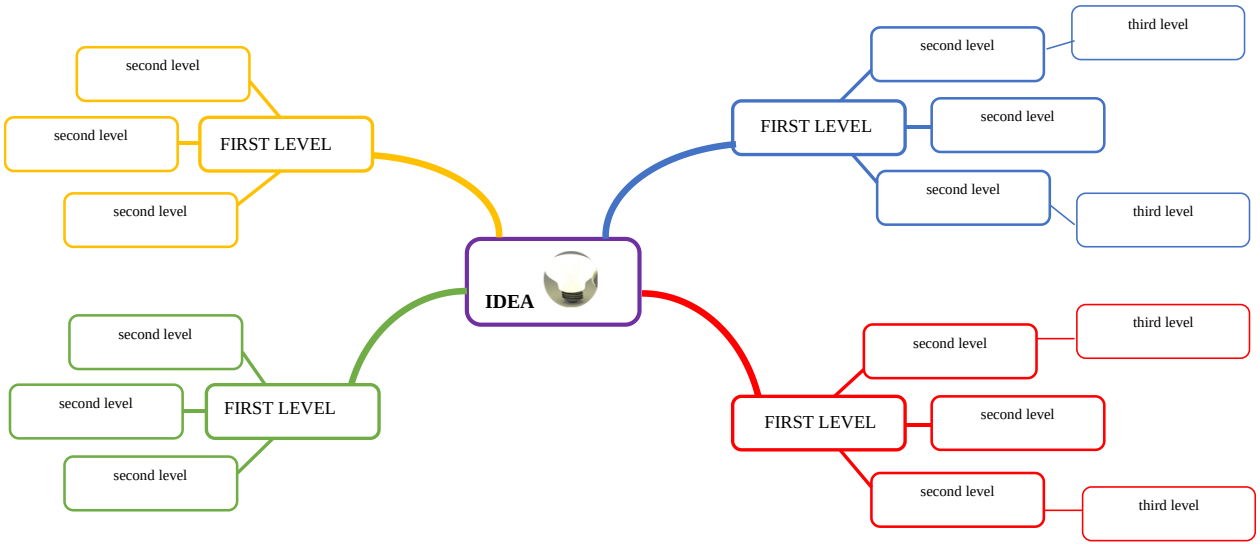

Fig. 2. The principle of mind mapping creation.

There are several possible applications of the mind mapping technique in learning processes [4, 5, 6, 7, 8]. However, few papers discuss the possibility of applying this tool in the context of project management. The paper [9] presents the application of the mind mapping technique in the identification of risk management, which an integral component of project management. This paper extends previous research through a focus on the use of the mind mapping technique in project management.

The paper [10] consider applications for mind mapping in: project management, brainstorming, planning, presentations, interviewing, analysis and problem solving, decision making, meetings.

Mind mapping shown in article [11] were done to emphasise the capabilities of this technique in an iterative way, from the wide concepts of using mind mapping, down to specific examples particularly relevant to patent searching.

3. Case study

In utilizing the mind mapping technique for project management, the case focuses on a building, which is used as a production hall. The site consists of the main production building, a warehouse and a two-storey office/production building. Moreover, there are internal access roads, car parks, and a gatehouse.

The analysed building is made of reinforced concrete and the roof is made of trapeze metal sheets. The external walls are made with autoclaved aerated concrete blocks, which are covered with corrugated metal sheets on the outside. The gatehouse is a one-storey traditionally made (brick) building.

The paper presents the way in which the mind mapping technique was used in selected project management fields, where it's called "construction project mapping".

Firstly, the mind mapping technique was used to prepare SWOT and PEST analysis.

Construction project mapping of SWOT analysis as a strategic planning technique is shown in Figure 3.

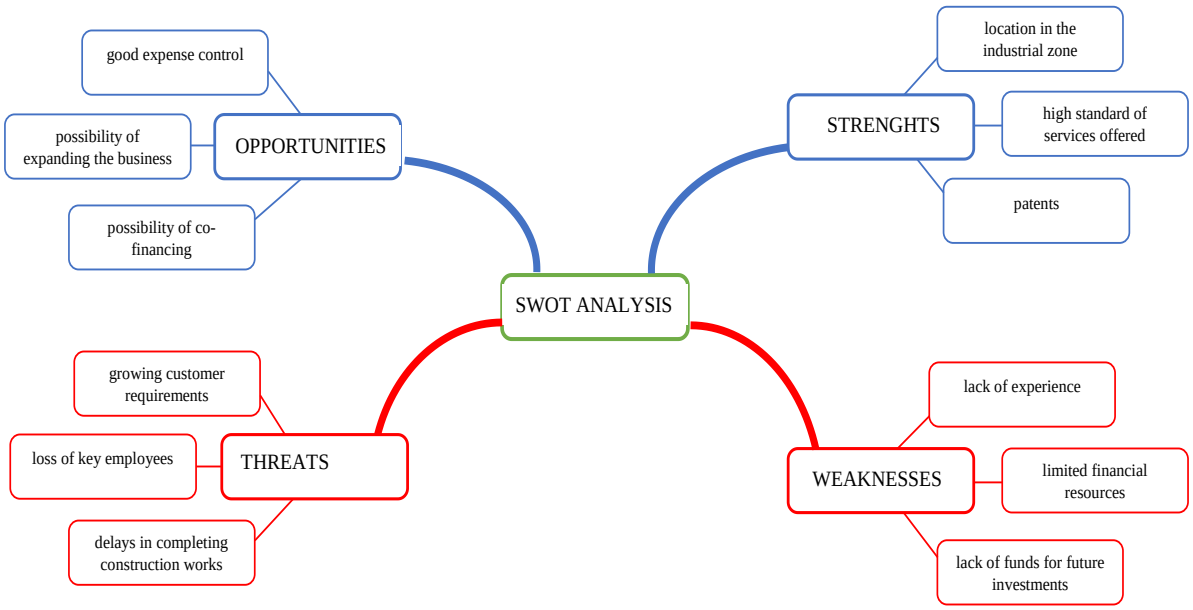

Fig. 3. Construction project mapping of SWOT analysis from the investor's point of view.

Construction project mapping of PEST analysis is shown in Figure 4.

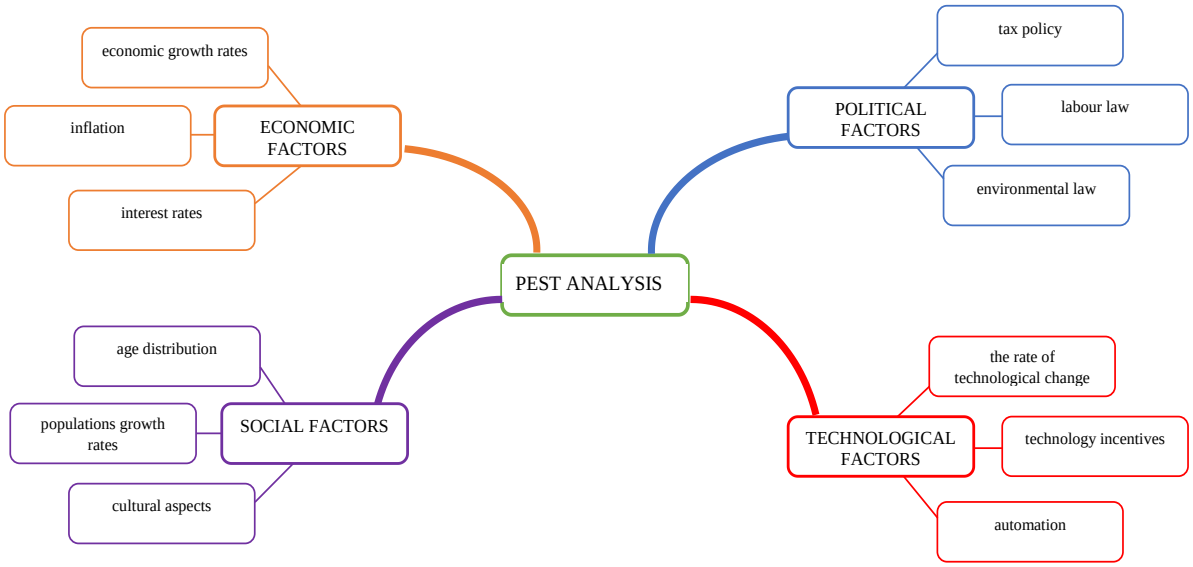

Fig. 4. Construction project mapping of PEST analysis.

Next, the mind mapping technique was utilized to prepare a work breakdown structure (WBS). WBS is based on dividing a project into main tasks, and then dividing these tasks into sub-tasks. This allows personnel to manage the scope of a project in an effective way, and to plan the execution of all the particular tasks. In the case of construction projects, a WBS is usually presented in the form of a chart or a list. In this paper mind mapping was using as a different visualization tool for breakdown structures.

There are several types of WBS, for example [12]:

- product-oriented WBS (project subdivided according to deliverables or products to be produced),
- function-oriented (process-oriented) WBS (project subdivided according to work function).

Figure 5 illustrates selected product-oriented WBS fragment with cost and resources elements using construction project mapping technique.

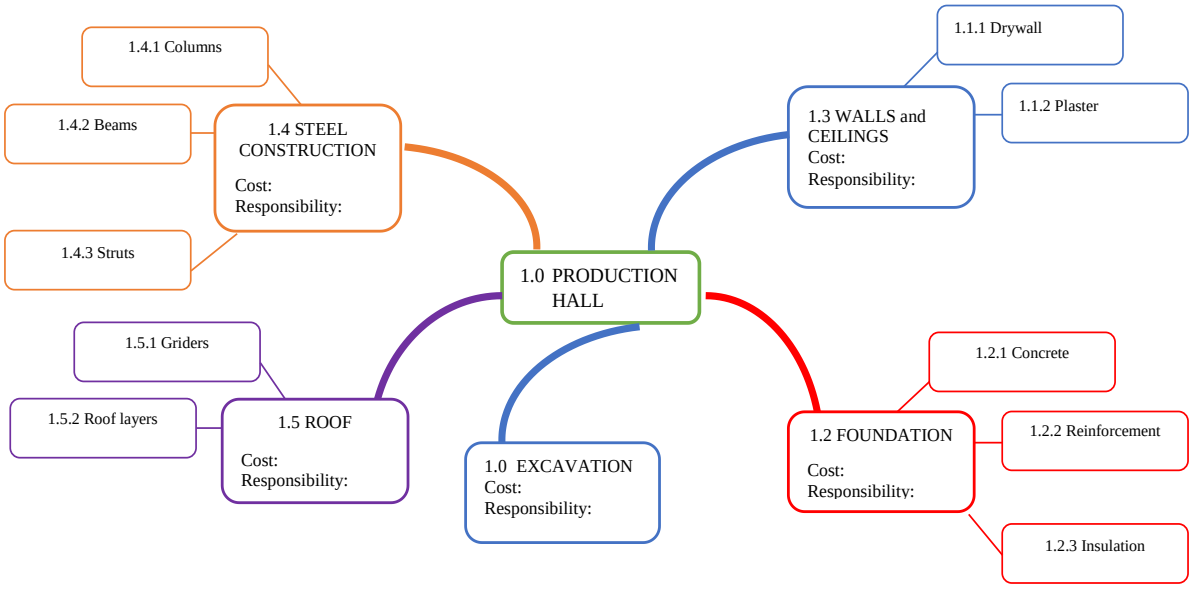

Fig. 5. Construction project mapping of selected product-oriented WBS fragment

Figure 6 illustrates selected function-oriented WBS fragment with cost and resources elements using construction project mapping technique.

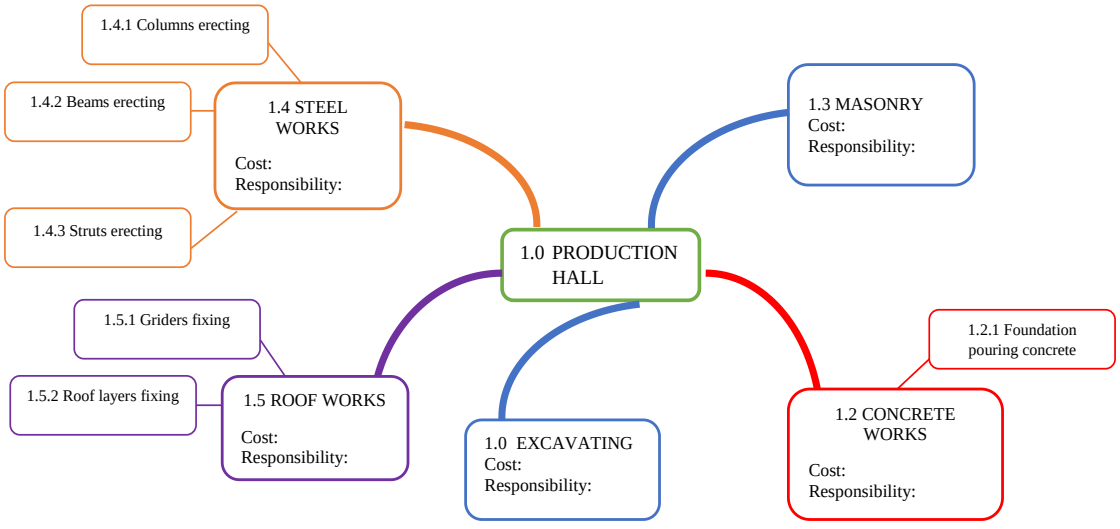

Fig. 6. Construction project mapping of selected function-oriented WBS fragment

Project management has some similar tools to Work Breakdown Structure (WBS) and there are for example:

- Cost Breakdown Structure (CBS) - represents the financial breakdown of a building project into cost targets for work packages.
- Organizational Breakdown Structure (OBS) - represents the resources required to perform the project work packages.
- Risk Breakdown Structure (RBS) - is an hierarchical representation of risks.

Each breakdown structure and its modifications can be presented using the mind mapping technique.

There are several papers on the breakdown structures, such as CBS, OBS and RBS [13, 14, 15], but none of them uses mind mapping technique.

In the next step, the article presents also how mind mapping might be used for stakeholder identify. The article shows the process of stakeholder identification using mind mapping, because it is one of the most important processes in project management and has a potential impact on project success.

Construction project mapping of stakeholder identify is shown in Figure 7.

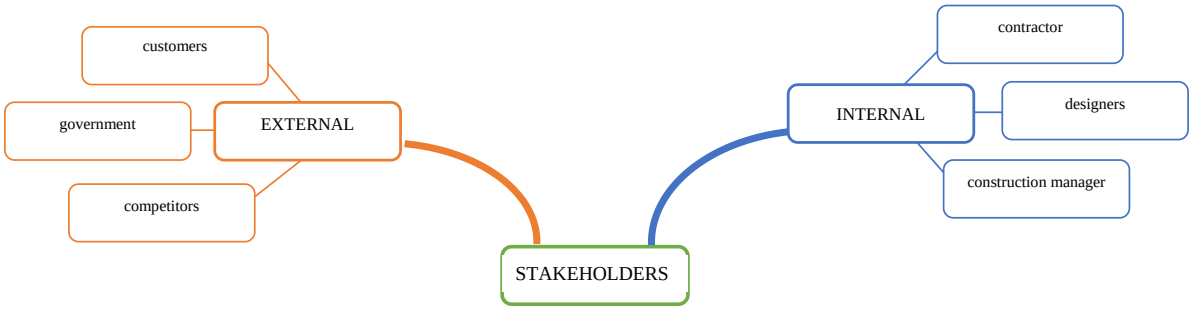

Fig. 7. Construction project mapping of stakeholder identify.

The article presents examples of mind mapping applications in project management. The mind mapping technique can be used in all areas of project management.

In addition to the mind mapping technique, there are more project management tools are capable to make different breakdowns based on the same database with the use of the sophisticated coding system. However, none of these tools construct information in such transparent way like mind mapping. Mind mapping helps to better analyze, understand, synthesize and generate new ideas.

4. Summary

The paper illustrates how mind mapping techniques can be used in managing a construction project.

Mind maps offer the following advantages:

- they present information in a transparent way, so that information is easy to understand,

- they help personnel in collecting and organising thoughts, arguments and ideas,

- they facilitate time management and help increase productivity,

- they play a significant role in generating new and innovative ideas,

- they are a perfect tool that facilitates strategic thinking,

- they make decision-making easier.

Mind mapping can be recommended as a simple and effective tool supporting the work of the project manager. By non-linear organizing of information, it allows to visualize the natural process of creative thinking and allows to control over the whole complexity of projects.

References

[1] A guide to the Project Management Body of Knowledge (PMBOK guide), sixth ed., Project Management Institute, Newton Square, PA, United States, 2018

[2] T. Buzan, Griffiths Ch., Mind Maps for Business: Using the ultimate thinking tool to revolutionise how you work, second ed., Pearson, United Kingdom, 2013

[3] T. Buzan, Mind Map Handbook: The ultimate thinking tool, Thorsons, 2013

[4] J.W. Budd, Mind maps as classroom exercises, J. Econ. Educ., 35 (1) (2004) 35-46 https://doi.org/ 10.3200/JECE.35.1.35-46

[5] P. Farrand, F. Hussain, E. Hennessy, The efficacy of the 'mind map' study technique, Med. Educ., 36 (5) (2002) 426-431 https://doi.org/10.1046/j.1365-2923.2002.01205.x

[6] C.L. Willis, S.L. Miertschin, Mind maps as active learning tools, J. Comput. Sci. Coll., 21 (2006) 266-272

[7] A. Buran, A. Filyukov, Mind Mapping Technique in Language Learning, Procedia-Social and Behavioral Sciences, 206 (2015) 215-218 https://doi.org/10.1016/j.sbspro.2015.10.010

[8] L. Yizhen, T. Yingxin, Y. Yuqi, The Application of Mind Mapping into College Computer Programming Teaching, Procedia Computer Science, 129 (2018) 66-70 https://doi.org/10.1016/j.procs.2018.03.047

[9] Y.-T. Cheng, H.-M. Chuang, Ch. Pei, Risk management of developing assistive devices for elderly, Archives of Gerontology and Geriatrics, 52, (2011) e145–e151 https://doi.org/10.1016/j.archger.2010.10.001

[10] C. Byrnes, Mind mapping. Paper presented at PMI® Global Congress 2010—North America, Washington, DC. Newtown Square, PA: Project Management Institute, 2010

[11] D. Dirnberger, The use of mindmapping software for patent search and management, World Patent Information, 47 (2016) 12-20 https://doi.org/10.1016/j.wpi.2016.08.004

[12] J.M.Nicholas, H.Steyn, Project management for engineering, business and technology, fourth ed., Routledge, London and New York, 2012

[13] Z. Sigmund, M. Radujković, Risk Breakdown Structure for construction projects on existing buildings, Procedia - Social and Behavioral Sciences 119 (2014) 894-901 https://doi.org/10.1016/j.sbspro.2014.03.100

[14] L. M. Khodeir, M. Nabawy, Identifying key risks in infrastructure projects – Case study of Cairo Festival City project in Egypt, Architectural Engineering, article in press https://doi.org/10.1016/j.asej.2018.11.003

[15] W. Chen, C. Li, Y. Yang, Z. Du, Transmission Model of Risk Breakdown Structure in Engineering Project-Chain based on Entropy Risk Element, Systems Engineering Procedia 4 (2012) 268-274 https://doi.org/10.1016/j.sepro.2011.11.075

[16] S. Sequeira, E. Lopes, Simple Method Proposal for Cost Estimation from Work Breakdown Structure, Procedia Computer Science 64 (2015) 537 – 544 https://doi.org/10.1016/j.procs.2015.08.559