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Risk management and its effect on reducing the project risks

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Abstract

A successful risk management process enhances the construction project to recognize and measure risks and to believe risk repression and risk reduction rule. This study identifies the Risk management and its role in reducing the project risks. The sample of the study was 50 managers of construction projects in Jordan. The researcher used descriptive method and develop questionnaire to collect data. The results of the study showed that there is a statistically significant effect of the impact of risk management to reduce the risk of the project, there is a statistically significant effect of the impact of risk management to reduce the risk of the project related on time, there is a statistically significant effect of the impact of risk management to reduce the risk of the project related on cost, and there is a statistically significant the impact of risk management to reduce the risk of the project related on quality. This study recommended the Establishment of training courses on risk management and Interest in forming a team to manage the risks in the company, also to allocate a budget for risk management.

Key words: Risk management, project risks, Risk management plan, Risk impact.

Introduction

Beginning or development of any project always need avoiding risks, on the basis it is clearly important to identify, analyze, control and manage these risks. Deferent techniques of analyzing and managing risk exist, each presenting special definition of risk management, which can be confusing.

Risk appraisal completely reveals the allergy of the project to its participants to make sure that all dangers are fully understood (Flanagan et al, 2006). As a result, aims and circumstances can be determined at right levels, agreements can be discussed with an exact understanding of possible challenges, and risk alleviation strategies can also be formed in progress. Risk appraisal also develops teamwork by increasing honesty, sincerity, and understanding within the project team (Oracle, 2009).

Risk management is one of the nine information areas spread by the Project Management Institute (Project Management Institute,2008) also, risk management in the construction project management background is a complete and methodical way of recognizing, analyzing and reacting to risks to get the project purposes (institution of Civil Engineers and the Actuarial Profession,2005) The advantages of the risk management process contain recognizing and analyzing risks, development of construction project management processes and effective use of resources.

Construction projects can be greatly complex and fraught with uncertainty. Risk and uncertainty can powerfully have harmful consequences for the construction projects (Flanagan et al,2006)

Therefore nowadays, the risk analysis and management are carried on to be a main characteristic of the project management of construction projects in an effort to contract effectively with uncertainty unexpected events and to get project success. Construction projects are always unique and risks increase from a number of the special sources (Oyegoke,2006). Construction projects are intrinsically multifaceted and active, and connecting various feedback processes (Pheng and Chuan, 2006) A lot of participants – individuals and organizations are actively engaged in the construction project, and their interests may be positively or negatively influenced as a result of the project implementation or project achievement (Project Management Institute,2008). Different participants with different experience and skills usually have different expectations and attentions (Dey and Ogunlana,2004) This naturally creates problems and confusion for even the most experienced project managers and subcontractors(Flanagan et al,2006)..

Risk management assists the project Parties – customer, subcontractor to get together their promises and reduce negative effects on construction project in relation to cost, time and quality aims. Usually, project Parties have tended to attach construction project success with these three features of time, cost and quality according to these important features of Risk management, the researcher conducted a study about Risk management and its role in reducing the project risks.

Problem of statement

Many of projects faced huge risks that impede the success of the completion of the construction project and don't achieve the purposes of construction project (Pagach and Warr,2010) ; these projects risks include three main features of time (The inability to complete the project on time) , cost (Exceeded the cost of the project), and quality (Lack of experience among human recourse at project) and to overcome it, the project manager have to set a Risk management plan containing many stages like to identify, analyze, control and manage these risks then the project can be enabled to achieve the aims and reduce negative effects on construction project in relation to cost, time and quality and do clear steps like Plan to complete the project on time, determine the Specific cost, include all of the Requirements of project, and provide all the materials and equipment, needed to complete the project and the appointment of human resources with high qualifications(Jing et al, 2014)

Hypotheses of study:

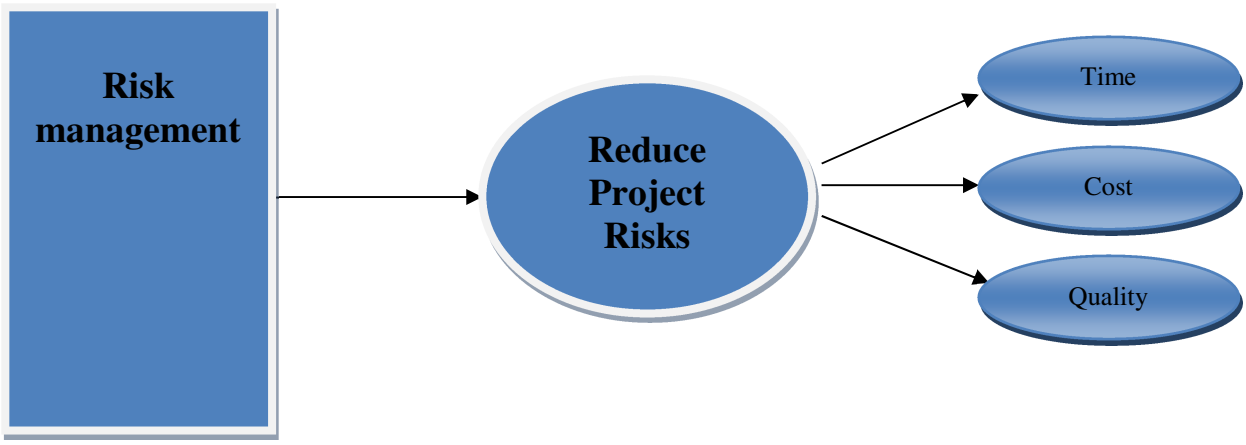
The study has a main hypothesis which is "There are effects of Risk management in reducing the project risks"

Sub-hypothesis of the study:

- There are effects of Risk management in reducing the project risks related on time.
- There are effects of Risk management in reducing the project risks related on cost.
- There are effects of Risk management in reducing the project risks related on quality.

Model of the study:

Independent variable **The dependent variable**



Purpose of the study:

The study has a main aim which is identify the Risk management and its role in reducing the project risks.

Sub-aims of the study:

- Identify the effect of Risk management in reducing the project risks related on time.
- Identify the effect of Risk management in reducing the project risks related on cost.
- Identify the effect of Risk management in reducing the project risks related on quality.

Significance of the study:

This study also shows how the Risk management effects in reducing the project risks related on time, cost and quality.

Literature review

Introduction

This chapter discusses the Risk management in construction projects**.**

Risk management

Risk management is not a modern tool and a lot of studies are said about it (ACT 2004, AZ/NZS 2004, and

Committee 2004). It is an essential part of high-quality management and decision-making at all levels of a project. All sections in a project manage risk incessantly whether they understand it or not, sometimes more thoroughly and methodically, sometimes less.

Project risk management is the culture, processes and structures, adopted by a project, directed towards the effective management of risk in projects. It should be a spread management regulation that is included with all other project regulations. The aim of risk management is to make sure knowledgeable resolutions are made at the correct time and that there is vision of sources of doubt that may effect on the success of a project (Dumitrascu and Nedelcu,2012).

From a project management viewpoint, risk management look for to recognize, stop, include and reduce negative effects and make the most of chances and positive results in the attentions of projects. It is a methodically approach that lets risks to be Controlled, averted, reduced or discarded through a rational, complete and recognized plan(Pagach,2010).

Project risks

Risk is the impendence of or perversion that is either just the once or continuing (physical, emotional, psychosocial, financial, personal injury, medical, environmental, property, financial and reputation/goodwill). A risk happens both from missed chances and possible impendence (Aurora, 2010).
Project risk is an unsure occasion or state that, if it happens, has a positive or negative impact on at least one project aim, such as time, cost, scope or quality (Elakkad,2008).

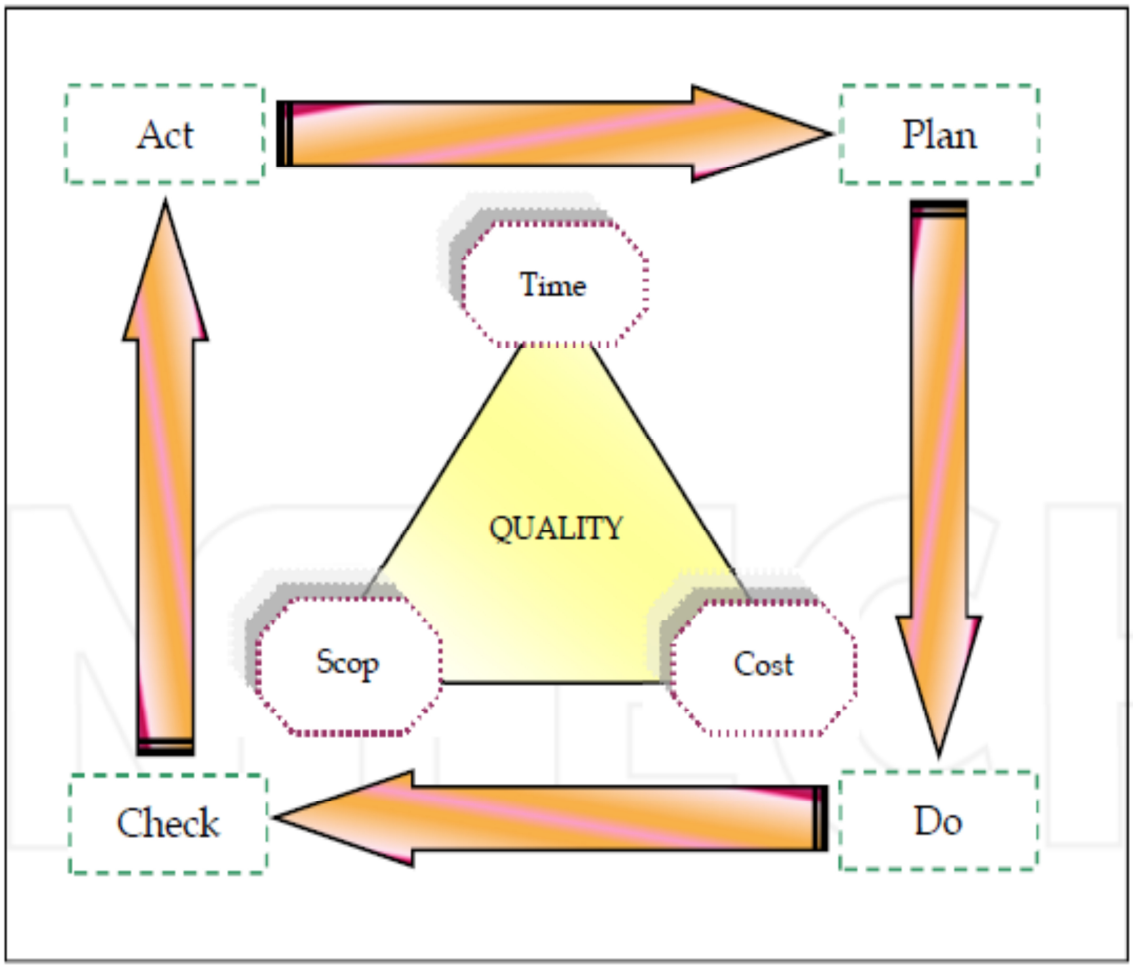
Project risk is the threat faces one of the project baselines, technical (quality), cost, or schedule (time)) and must not be mixed with health and safety risks. However, health and safety risks are affecting on project baselines risks (Federal Aviation Administration (FAA), 2009).

The types of Project risks and management

Dumitrascu and Nedelcu (2012) **mentioned that there are three main type of risks might faced the Project:**

1. **Risks related to Time:** project time risk management has a hard time engaging or retaining good human resources. Also tools providers are busier than common. And Line tube suppliers may take longer than the agreement to bring enough tube (Hulett,2010).
2. **Risks related to Cost:** project cost risk management is firstly interested with the cost of the resources needed to complete schedule actions (PMD, 2008). Project cost management must also consider the impact of project decisions on the cost of using, continuing, and enhancing the product, service, or effect of the project. (PMD, 2008).
3. **Risks related to Quality:** Project quality management consists of processes to ensure that the project will meet the requirements defined and planned, that quality planning processes, quality assurance and quality control (PMD, 2008).

Figure (1) shows that (three main types of risks that might face the Project):



It is important to keep in mind that the aim of a Project Risk Management Process is to increase competitive advantage by gaining revenue on investment from the project. To achieve this aim, the Project Risk Management Process have to accomplish the following aims (Westney,2001):

- Eliminating the use of concealed incidents;
- Reducing the necessary incident through successful risk alleviation;
- Development project manager and team effectiveness by return an impression of distrust with open communication on the subject of risk and doubt.
- Identifying risks in all phases of the project; and providing a technique to manage risk as effectively as other project variables such as cost, schedule, quality and safety.
- Improve portfolio performance through better investment decision-making resulting from better information for optimizing project risk and return.

Chapter Three

Methods and Procedures

This chapter contains description of study methodology, population and sample in addition to the chosen method as well as the tool used to collect data. Also the procedure of construction or development of necessary steps to ensure its veracity and consistency. Furthermore, practical procedures and statistical processing are used in the treatment of the study data as the following:

Study Methodology:

Researcher used descriptive analytical method which is based on the data collection, classification, organization and analysis.

Study population:

Population of the study consisted of all manager in the construction sector in Jordan.

Study Sample:

The study sample was selected randomly based on Demographic variables (age, gender, academic qualification, and experience) from the population of the study equivalent to 50 managers of construction projects in Jordan.

Instrument of the study:

To realize the Risk management and its effect on reducing the project risks in this study, the researcher built and developed preliminary questionnaire which consists of (18) items for this matter through revising the literature review and the previous studies which related to the content.

Reliability

To ensure instruments reliability and validity researcher presented preliminary questionnaire to a number of questionnaire arbitrators and judges whom are experts and specialized in this field, randomly selected from some of manger of construction projects in Jordan In order to ensure that each statement clarity and accuracy of the context, and how suitable is the form of the field which is being measured and their suitability to the aims of the study. and the arbitrators for the preliminary study tool form an approval of 80% and more, on evidence of items sincerity was based on proposals of the members of the arbitration, and has become in its final form consisting of four fields through (18) items. The level of answer scale for each paragraph was according to five point Likert scale identified as follows: one represents Strongly Agree, two represents agree, three represents normal, four represent disagree, five represents strongly disagree. Likert scale was used to judge the results which were divided to High, Average and Low according to the following standard:

The highest value - Minimum value of alternatives / Number of levels

Therefore, the level of response is as follows:

Low level if it was 1+1.33=2.33

Average level if it was 2.34+1.33= 3.67

High level if it was 3.68 and more = 5.00

Validity

To ensure stability, the researcher adopted the method of testing and retesting. Questionnaire has been distributed to a number of quality mangers of construction projects in Jordan. Twenty manger of construction projects are from outside the study sample, as it was re-applied to them after two weeks, where as the value of Pearson's correlation coefficient is (0.65), its a high value and forms acceptance for the purposes of this study. The equation of Cronbach alpha also used for internal consistency and reliability, coefficients were as follows:

Table (1): Stability Rate

domain	number of paragraphs	Cronbach Alpha
The risks related on time	4	%91
The risks related on costs	4	%77
The risks related on quality	4	%82
Risks Management	6	%81

Table (1) Shows that all domains of study got a Ratio more than 65%, this values are acceptable for the purposes of scientific research

Statistical treatment:

For achieving the purpose of statistical treatment, the following statistical methods were used:

1. mean and standard deviations.
2. T-test statistical (One Way Anova) and (Shaffee) test for dimensional comparisons where necessary.
3. the equation of Cronbach alpha and Pearson's correlation coefficient.

Chapter Four:

The results analysis

After identifying the research design an analysis should be identified to the answers of the questions that have been asked inside the questionnaire, this chapter presents the means and standard deviations for the answers of the questionnaire that was used to gather data.

- To answer the main hypothesis, which states: there is **impact of risk management to reduce the project risk** Linear regression was found of domain impact of risk management to reduce the project risk and Table 2 shows that.

Table (2): Linear regression of domain which states: there is impact of risk management to reduce the project risk

the significance level	B value	sum of squares	R square	R value	domain
.003	1.156	14.835	.134	.366[a]	impact of risk management to reduce the project risk

Table (2) shows that there is a statistically significant effect of the impact of risk management to reduce the risk of the project, the value of the significance level was (.003) for the domain of risk management to reduce the risk of the project, this is a statistically significant value at the level of (.005), beta value Was (1.156) which expresses the degree of the impact of risk management on the project risk.

- To answer the first sub-hypothesis, which states**: there is impact of risk management to reduce the project risk related on time** Table 3 shows that

Table (3): Linear regression of domain which states: there is impact of risk management to reduce the project risk related on time

the significance level	B value	sum of squares	R square	R value	domain
.004	1.040	19.980	.102	.319[a]	there is impact of risk management to reduce the project risk related on time

Table (3) show that there is a statistically significant effect of the impact of risk management to reduce the risk of the project related on time, the value of the significance level was (.004) for the domain related on time, this is a statistically significant value at the level of (. 005), beta value Was (1.140) which expresses the degree of the impact of risk management on the project risk related on time.

- To answer the second sub-hypothesis, this states: **there is impact of risk management to reduce the risk of the project related on cost** Table 4 shows that.

Table (4): Linear regression of domain which states: there is impact of risk management to reduce the project risk related on cost

the significance level	B value	sum of squares	R square	R value	domain
.000	.284	8.900	.157	.396[a]	the impact of risk management to reduce the risk of the project related on cost

Table (4) shows that there is a statistically significant effect of the impact of risk management to reduce the risk of the project related on cost, the value of the significance level was (.000) for the domain related on cost, this is a statistically significant value at the level of (.005), beta value Was (.284) which expresses the degree of the impact of risk management on the project risk related on cost.

- To answer the third sub-hypothesis, this states: **there is impact of risk management to reduce the risk of the project related on quality** Table 5 shows that.

Table (5): Linear regression of domain which states: there is impact of risk management to reduce the project risk related on quality

the significance level	B value	sum of squares	R square	R value	domain
.000	.292	7.945	.189	.405[a]	the impact of risk management to reduce the risk of the project related on quality

Table (5) shows that there is a statistically significant effect the impact of risk management to reduce the risk of the project related on quality, the value of the significance level was (.000) for the domain related on quality, this is a statistically significant value at the level of (.005), beta value Was (.292) which expresses the degree of the impact of risk management on the project risk related on quality.

Conclusion and recommendations:

Conclusion

A successful risk management process enhances the construction project to recognize and measure risks and to understand risk repression and risk reduction rules. Construction projects that manage risk successfully achieve financial savings, huger outputs, total accomplishment of developing new projects, and improved decision making. Risk management in the construction project management background is a complete and methodical way of recognizing, examining and reacting to risks to achieve the project goals. The research results show that there is a statistically significant effect of the impact of risk management to reduce the risk of the project related on time, cost and quality. The risk management framework for construction projects can be enhanced by merging time, cost and quality risks to analysis.

Recommendations:

1. Establish training courses on risk management
2. Interest in forming a team to manage the risks in the company
3. allocate a budget for risk management
4. Follow the project team training sessions, each according to its competence.
5. Strictly application of safety codes in companies and projects.
6. Engage contractor in the process of identifying the project concept and planning.

7. Transfer the project risk to the appropriate party able to manage.

References:

ACT Insurance Authority 2004. Risk Management Toolkit. February 2004.

Aurora Rajinder, Senior Lead, and Mumbai Kavita (2010) RISK MANAGEMENT IN HR AND ITS IMPACT ON HR FUNCTIONS, Academic and Operations, Future Innoversity Mumbai

AZ/NZS 4360 2004. Risk Management. Standards Australia International Ltd, Sydney.

Banaitiene Nerija and Banaitis Audrius (2012) Risk Management in Construction Projects, Banaitiene and Banaitis, licensee Intec.

David Hulett (2010) Integrated Cost-Schedule Risk Analysis, http://www.ashgate.com/pdf/SamplePages/Integrated-Cost-Schedule-Risk-Analysis-CH1.pdf

Dey PK, Ogunlana SO. (2004)Selection and application of risk management tools and techniques for build-operate-transfer projects. Ind Manage Data Syst 104(4):334

Dumitrascu Adela and Nedelcu Anisor (2012) Project Costs and Risks Estimation Regarding Quality Management System Implementation, the Creative Commons Attribution License (http://creativecommons.org/licenses/by/3.0)

Elakkad Amro,(2008) PMP Risk-Tolerance Based Schedule and Cost Estimates International Institute for Learning, Inc.

Derek H.T. Walker, Keith Hampson, Renaye Peters, (2002) "Project alliancing vs project partnering: a case study of the Australian National Museum Project", Supply Chain Management: An International Journal, Vol. 7 Iss: 2, pp.83 - 91

Federal Aviation Administration (FAA) (2009) Risk Management Handbook (FAA--H--8083--2) Note,

Flanagan R, Norman G, Chapman R. (2006) Risk management and construction. 2nd ed. Oxford: Blackwell Pub.

Institution of Civil Engineers and the Actuarial Profession (2005). Risk analysis and management for projects (RAMP). 2nd ed. Institution of Civil Engineers and the Actuarial Profession. London: Thomas Telford Ltd.

Jing Ai, and Bajtelsmit, Vickie L. and Wang, Tianyang, (2014)Enterprise Risk Management and Diversification Effects for Property and Casualty Insurance Companies, Available at SSRN:http://ssrn.com/abstract=2422452 or http://dx.doi.org/10.2139/ssrn.2422452

Oracle (2009) The Benefits of Risk Assessment for Projects, Portfolios, and Businesses, An Oracle White Paper

Oyegoke AS (2006) Construction industry overview in the UK, US, Japan and Finland: a comparative analysis. J Constr Res 7(1/2):13–31.

Pagach, Donald P. and Warr, Richard S., (2010). The Effects of Enterprise Risk Management on Firm Performance Available at SSRN: http://ssrn.com/abstract=1155218 or http://dx.doi.org/10.2139/ssrn.1155218

Pheng LS, and Chuan QT (2006) Environmental factors and work performance of project managers in the construction industry. Int J Project Manage 24(1):4–37.

PMD, (2008). Project Management for Development Organizations - A methodology to manage development projects for international humanitarian assistance and relief organizations, Available from: www.pm4dev.com

Project Management Institute (2008) Guide to the project management body of knowledge, (PMBOK® Guide). 4th ed. Newtown Square: Project Management Institute.

Westney Richard (2001) Managing the Cost & Schedule Risk of Offshore Development Projects. Westney Project Services, Inc.

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