POLITECNICO DI TORINO
Repository ISTITUZIONALE

Risk-Adjusted Contingency Management in Construction Projects

Original
Risk-Adjusted Contingency Management in Construction Projects / Thaheem, MUHAMMAD JAMALUDDIN; DE MARCO, Alberto; Narbaev, Timur. - STAMPA. - (2013), pp. 191-195. (Intervento presentato al convegno International Conference on Safety, Construction Engineering, and Project Management tenutosi a Islamabad nel August 19-21, 2013).

Availability:
This version is available at: 11583/2513495 since:

Publisher:
ICSCEPM2013

Published
DOI:

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

13 May 2024

International Conference on Safety, Construction Engineering and Project Management (ICSCEPM 2013)
"Issues, Challenges and Opportunities in Developing Countries"
August 19-21, Islamabad, Pakistan

Risk-Adjusted Contingency Management in Construction Projects

Muhammad Jamaluddin Thaheem
PhD student, Dept. of Urban Studies and Planning, Politecnico di Torino, Turin, Italy
jamal.thaheem@polito.it

Alberto De Marco
Asst. Prof., Dept. of Management and Production Engineering, Politecnico di Torino, Turin, Italy
alberto.demarco@polito.it

Timur Narbaev
Asst. Prof., Turin Politechnic University in Tashkent, Tashkent, Uzbekistan
timur.narbaev@polito.it

Abstract

Successful project management (PM) aims at achieving the triple-constraint (time, cost and quality), respecting the elasticity between the three main drivers. To facilitate this, PM activities are supported by project risk management (PRM) in foresight and earned value management (EVM) in hindsight. Both PRM and EVM, being industry standards, facilitate to plan, and afterwards monitor and control the project cost. However, the two fields do not necessarily interact with each other which, in turn, hinders critical managerial decision making of releasing contingency reserves if demanded by the client since the money can be used as capital for other projects. Also, when inquired at any given point in time (corresponding to partial project completion), the project managers (PMs) find it tricky and challenging to confidently declare the adequacy of existing reserves till the project completion This provides research impetus for potential EVM-PRM integration and managing the contingency adjusted due to risk in the project. There is hardly any literature on this integration, resulting in lack of any viable framework to facilitate critical decision making. With objective to formulate a framework - coupled with necessary tools and techniques - this paper proposes the incorporation of EVM and PRM which aims at not only expanding the body of knowledge in the field of *'project control'*[1] but also assist the PMs in securely and successfully steering the project to close out. The research is still in progress and no conclusive details are furnished as yet.

Keywords

Project management, Project risk management, Earned value management, Contingency management.

[1] Project control may be defined as the management action, either preplanned to achieve the desired result or taken as corrective measures prompted by the monitoring process. Project control is mainly overridden by the project metrics (time, cost and quality/scope); however, also project revenues and cash flow can be part of the project metrics under control. It consists of those action performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary, to achieve the project goals. The key benefit is that project performance is observed and measured regularly to identify variances from the project management plan.

1. Introduction and Motivation

Construction projects are infamous for delays, cost overruns and poor quality (Assaf and Al-Hejji, 2006; Flyvbjerg et al., 2004); same is equally true and even more exacerbated in developing countries (Frimpong et al., 2003; Kaming et al., 1997; Mansfield et al, 1994). Part of the problem rests with inefficient and/or ineffective risk management. For which, project management's (PM) body of knowledge is equipped with project risk management (PRM). It aims at looking into the future, analyzing the risk and coming up with effective strategies to manage it. For the downside risk (also known as threat), one of the effective strategies is to earmark contingency reserves.

These reserves are supposed to perform three tasks: resolve emergencies (if there occurs any downside risk, correct the situation by taking mitigating measures and resuming normal working environment); control schedule (if, due to some emergency or other delays, project is overrunning the scheduled time, expedite the project activities either by putting in more man-hours, better machinery or borrowing external help); and improve facility (by the end of the project – when no critical activities are left behind – minor tweaks and improvements may be introduced into the facility subject to client authorization) (Ford, 2002).

The other part of the problem is connected with (and driven by) the inefficient monitoring and control of the project when it is in progress. It is, however, opportune to mention that since the entire contingency development is done in the planning phase, the active management of the contingency, which is carried out during the execution phase, may not necessarily synchronize, accede and correspond to the planning. Thus, during the course of the project, earned value management (EVM) kicks into in order to find out as to how much value is earned by investing given amount of resources (money, manpower, management). EVM is a powerful quantitative technique which aims at objectively monitoring the physical progress of the project. It facilitates the PMs to determine actual work performance and associated cost and time against what was planned (PMI, 2011).

The construction industry, apart from other things, is attributed by a complex nature of client-contractor relationships. Historically they were seen as adversaries but recently the culture of partnering and trust is introduced (Bresnen and Marshall, 2000). Nevertheless, often due to diverse (and sometime perceptionally opposing) stakes, the clients find it hard to fully trust the contractors, thus raison d'être for project execution consultants (who do not necessarily assist in design and construction only). Nevertheless, contractors cannot survive without engaging and partnering relationships with clients and subsequently getting more and more business/projects. In such competing situations, contractors have to put in exceedingly greater efforts to maintain healthy relationships.

Imagine a situation where a contractor is asked by a very important client to release contingency reserves of an ongoing project which he/she plans to use as capital/equity in a next project. The contractor is duty bound to not only figure out the feasibility of such a decision on priority basis but also to ensure that the decision does not have any negative influence on relationship with client. It definitely puts the decision makers in a tricky and insecure situation. This lack of confidence is mainly driven by the gulf between planning and execution conditions. At this point, the contractor PM needs an effective calculation methodology to ascertain the amount of money that can be released, if at all it is possible to do so.

Therefore, it is paramount that EVM gets integrated with PRM to facilitate such critical decision making. It is exceptionally imperative that contingency reserves are recalculated (if need be) and managed adjusted by the project risk. In order to achieve this objective, this paper aims at bridging the communication and integration gulf between two bodies of knowledge, and offering a practical framework to manage risk-adjusted contingency. The envisaged value-addition by this work encompasses the expansion in the body of knowledge of project monitoring and control, and efficient contingency-management decision making. However, this research is still in progress and the paper does not necessarily report any conclusive aspects of the work.

2. Literature Review

2.1 PRM

Managing risk is exceedingly important to PMs; unidentified, unanalyzed and unmitigated, thus unmanaged risks are one of the primary causes of project failure (Royer, 2000). Risk is considered to be a major factor influencing project success, and PRM is an important process in any capital project (Krane et al., 2010). Therefore, PRM is currently one of the main topics of interest for both researchers and practitioners working in the field of project management. The various approaches available for PRM are shared and standardized by the Project Management Institute (PMI, 2009), which recognizes PRM as the process of identification and analysis of risks, preparation of risk response, and their continuous monitoring and control in the course of the project. Since construction is a risky venture, PRM must not be ignored due to its criticality in coping up with various possibilities (Griffis and Christodoulou, 2000). The purpose of PRM is foreseeing and consequently reducing the impact of or keeping away from the risky situations. To this end, project schedule, budget, cost or quality may be revised, reducing the uncertainties and keeping the project objectives intact (Kim and Bajaj, 2000).

2.2 EVM

EVM traces back its origin back in late 1960s. It initiated as a financial management tool to control defense acquisition projects. US Department of Defense (DoD) defined the project control specifications to correct and streamline the deviations in projects through cost and schedule accounting and reporting. These criteria were then finalized into the American National Standards Institute/Electronic Industries Alliance Standard 748, Earned Value Management Systems (ANSI/EIA-748) (Abba, 2001).

The EVM methodology emerged as PM tool during the 1980s and was available also to other industries across the US. In 1999, the PMI established its first College of Performance Management, today the premier professional organization for EVM research on project planning and control, and included the methodology in its standards (PMI, 2008). Consequently, the technique got across other countries and many industries.

However, the construction industry in particular is still lagging behind the other industries (where EVM has successfully penetrated) and has difficulties in sufficiently adapting the approach which can efficiently help PMs to undertake more objective and effective control actions with integrated information related to future performance predictions and uncertainty (Narbaev and De Marco, 2011).

3. Risk-Adjusted Contingency Management

The research stimulus incentivizes in terms of creating an enabling environment for critical managerial decisions. The active management of contingency during the course of the project will require the recalculation of contingency reserves at critical project milestones based on the past performance. The standard EVM performance KPIs (SV, schedule variance; SPI, schedule performance index; BAC, budget at completion; CV, cost variance; CPI, cost performance index; EV, earned value; ETC, estimate to complete; EAC, estimate at completion; VAC, variance at completion; TSPI, to complete schedule performance indicator) along with risk performance indicators will be calculated. These variables will further be utilized to recalculate the required contingency for the rest of the project. The work on detailed modeling, calculation and formalization of the framework is currently underway. The application will be done once the framework is ready.

4. Conclusion

In retrospect, construction industry is often challenged by active management of contingency reserves; PMs are asked to release the funds even before the projects are completed. This puts contractors in a difficult situation; they come under double-edged sword: neither can they disappoint the clients by not releasing the money, nor they find themselves confident enough to forecast the contingency requirements for rest of the project. This gives raise to the need of practitioner-friendly technique (or set of tools and techniques) which can not only calculate the contingency needs for the remaining project at any given point in time (corresponding to partial project completion) but also facilitate and empower the sustainable decision making; a PM may want to know with confidence as to how sufficient the current contingency reserves are.

The envisaged framework will facilitate practitioners in this critical decision making; it will help PMs understand if the current reserves are adequate for rest of the project and in case a client generated request to release contingency is received, how to safely and efficiently respond to it.

.

5. References

Abba, W.F. (2001). *How earned value got to prime time: a short look back and a glance ahead*, The Measurable News, Spring.

Assaf, S. A., and Al-Hejji, S. (2006). "Causes of delay in large construction projects". *International journal of project management*, Vol. 24, No. 4, pp. 349-357.

Bresnen, M., and Marshall, N. (2000). "Building partnerships: case studies of client–contractor collaboration in the UK construction industry". *Construction Management & Economics*, Vol. 18, No. 7, pp. 819-832.

Ford, D. N. (2002). "Achieving multiple project objectives through contingency management". *Journal of Construction Engineering and Management*, Vol. 128, No. 1, pp. 30-39.

Flyvbjerg, B., Skamris Holm, M. K., and Buhl, S. L. (2004). "What causes cost overrun in transport infrastructure projects?". *Transport reviews*, Vol. 24, No. 1, pp. 3-18.

Frimpong, Y., Oluwoye, J., and Crawford, L. (2003). "Causes of delay and cost overruns in construction of groundwater projects in a developing countries; Ghana as a case study". *International Journal of project management*, Vol. 21, No. 5, pp. 321-326.

Griffis, F.H., and Christodoulou, S. (2000). "Construction Risk Analysis Tool for Determining Liquidated Damages Insurance Premiums: A Case Study". *Journal of Construction Engineering and Management*, Vol. 126, No. 6, pp. 407-413.

Kaming, P. F., Olomolaiye, P. O., Holt, G. D., and Harris, F. C. (1997). "Factors influencing construction time and cost overruns on high-rise projects in Indonesia". *Construction Management & Economics,* Vol. 15, No. 1, pp. 83-94.

Kim, S., and Bajaj, D. (2000). "Risk management in construction: an approach for contractors in South Korea". *Cost Engineering*, Vol. 42, No. 1, pp. 38-44.

Krane, H. P., Rolstadås, A., and Olsson, O. E. (2010). "Categorizing risks in seven large projects - Which risks do the projects focus on?". *Project Management Journal*, Vol. 41, No. 1, pp. 81–86.

Mansfield, N. R., Ugwu, O. O., and Doran, T. (1994). "Causes of delay and cost overruns in Nigerian construction projects". *International Journal of Project Management*, Vol. 12, No. 4, pp. 254-260.

Narbaev, T., and De Marco, A. (2011), "Cost Estimate at Completion methods in construction projects", in 2011 *Proceedings of the 2nd International Construction and Project Management Conference*, Singapore, 16-18 September, 2011, IACSIT Press, Singapore, pp. 32-36.

PMI (2008). *The Project Management Body of Knowledge*, Project Management Institute, Inc., Newtown Square, PA.

PMI (2009). *Practice Standard for Project Risk Management*. Project Management Institute, Newtown Square, PA.

PMI (2011). *Practice Standard for Earned Value Management*, 2nd Ed., Project Management Institute, Inc., Newtown Square, PA.