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Project Management vs Systems Engineering Approach to Project Risks Management

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Abstract

Risk management is a dynamically developing type of management. Risk management refers to processes associated with identification, risk analysis and decision-making, which include maximizing the positive and minimizing the negative consequences of risk events. Risk elimination is necessary to complete the project on time. Managing risks for a project manager can be easier with using several approaches described in this article. The article presents comparison of widespread approach to managing risks in projects with the set of instruments derived from systems engineering. These approaches are SEBoK (System Engineering Body of Knowledge) PM BoK and OMG Essence. Author tries to integrate sets of instruments present in various project management and systems engineering bodies of knowledge and show how ones derive from the others.

Keywords: project, project management, risks of the project, risk management, systems engineering, stakeholders, project requirements, SEBoK

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1. Introduction

Facing the problem of managing risks project manager firstly have to identify risks [1] and the way he does that may determine the further project realization. There are some difficulties to be concerned about:

1. How to define the term 'risk' itself the way to be identically understood by all project team members and to let them efficiently participate in risk management. That problem was raised by one of the PM BOK contributors David Hillson while trying to answer the question 'How to manage the risks you didn't know you were taking?' [2] The thing is that definitions proposed by various standarts still require project manager to apply them to the specific context of the project, organization and stakeholders.

2. Even if the project manager and project team members all have the same understanding of what risk is, there is still a task to find out all risks present in the exact project. On one hand one should doubt if that is even possible (concerning the

How to cite this article: D.V. Zlokazov, (2020), "Project Management vs Systems Engineering Approach to Project Risks Management" in *III Annual International Conference "System Engineering"*, KnE Engineering, pages 208–212. DOI 10.18502/keg.v5i3.6784

Page 208

question by David Hillson), on the other hand it's obviously better to know some risks than to know none. And unfortunately, while PM BOK proposes quite a few possible sources of risks (fig. 1), in practice defining risks always looks like a group of experts trying to remember all the troubles they've faced in their problems (which is not bad if project manager has really experienced team at hand).

Inputs	Tools & Techniques	Outputs
• Risk management plan • Cost management plan • Schedule management plan • Quality management plan • Human resource management plan • Scope baseline • Activity cost estimates • Activity duration estimates • Stakeholder register • Project documents • Procurement documents • Enterprise environmental factors • Organizational process assets	• Documentation reviews • Information gathering techniques • Checklist analysis • Assumptions analysis • Diagramming techniques • SWOT analysis • Expert judgment	• Risk register

Figure 1: Process: Identify risks.

These two difficulties often (at least in Russia) lead to the situation, when risk register becomes useless artefact, which no one knows how to use properly. Author believes that attempt to identify risks at least help project team to observe project from new points of view and understand their job better. That's cold comfort for project customers though that team does not know exact risks and how to manage them, but is highly concerned about them.

Yet, there's something one may find helpful while trying to identify risks. The idea that all the risks of hardware failure, currencies rate fluctuation, weather cataclysms etc. are not exactly the most important risks to manage. One having some experience in project management may recall that all really huge risks came from project stakeholders. That could be anything from the sabotage by the future users of project's product to spontaneous feud between project sponsor, customer and investor. And the new difficulty here is that PM BOK just proposes to be concerned about stakeholders' particular qualities, not actually giving an instrument to understand, why stakeholders act as they do.

2. Results and Discussions

The possible solution to help project manager overcome described difficulties might be found in SE BOK [3]. There are two concepts that project manager can use while performing risk management.

First is that any project is actually initiated to fulfill stakeholders' requirements. And OMG Essence [4] proposes the model of how stakeholders participate in product creation (fig. 2).
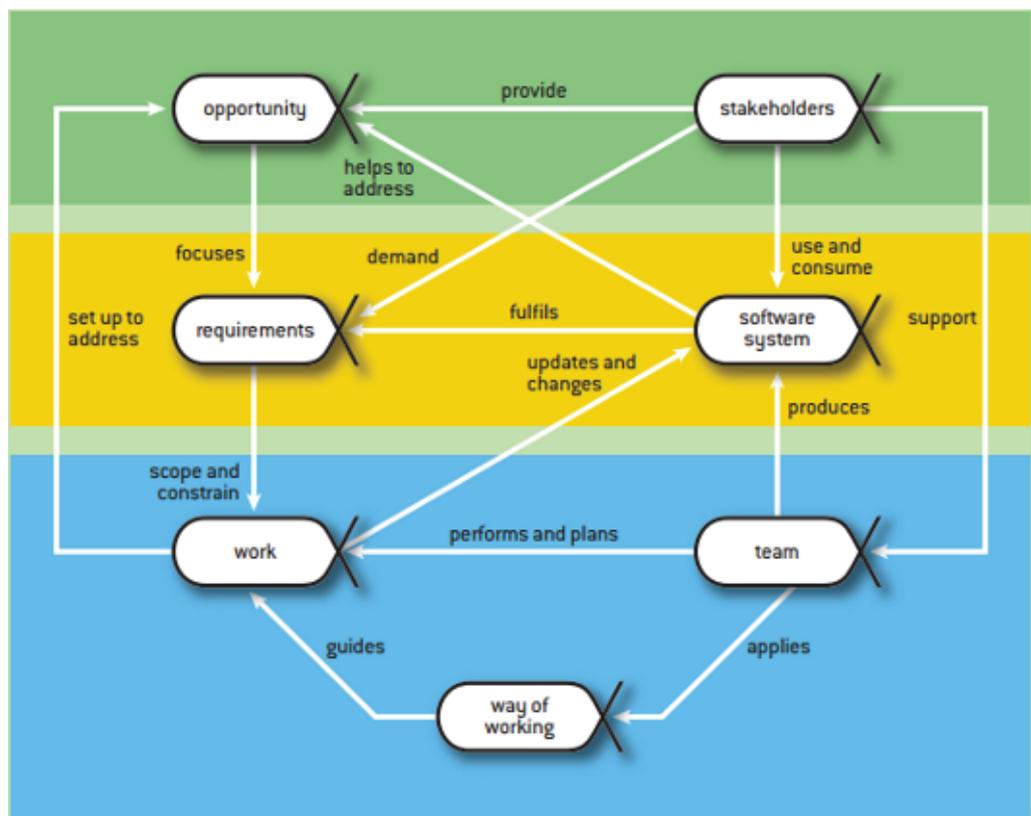

Figure 2: 7 kernel alphas.

Developing this concept, one may say that most of project risks appear when some stakeholders or their needs weren't concerned. Not in terms 'Let us see, how the stakeholder may impact our project', but 'How our product meets the requirements of stakeholders and what may happen if any requirement won't be fulfilled?' This paradigm actually helps to see that project manager really can manage risks but not just try to predict them and react somehow — that returns responsibility and control to project manager.

Second is that stakeholder actually plays roles: in our project, in his organization (or many organizations), he performs some functions and usually is motivated to perform them good. He always acts according to that role. Once project manager understands

that idea, he won't concern stakeholder as someone with particular qualities. That actually helps a lot, because it's really easier to manage project, assuming that any vis-à-vis is just a good man doing his job, but not an enemy of yours trying to spoil all your plans. That also enables the idea of engaging stakeholders, proposed in PM BOK.

One of the widespread examples of risks (in Russia) is that contractor would exceed contract terms and the project won't finish on time. That risk makes project manager to plan project-schedule better, to make reserves, to create cunning contracts, to perform complicated procurements and audits of contractors. And still, contractors often fail to finish their job on time. I've never seen any risk register, not containing this risk.

So, what happens and how can project manager solve the problem? All the methods listed in previous paragraph are the ones manager should use according to project management approach. But what if we concern contractor as the stakeholder that demands some requirements, which we have to be aware of? What are these requirements?

Any contractor is pursuing at least to goals: to make profit and to be present on market for the longest possible period of time. Usually, customer understands that as 'I pay money and I may be a good reference so the contractor may gain new contracts' and therefore the only possible reason of contractor failing to meet the schedule is contractor's incompetence.

But if project manager understands that the manager of contractor doesn't only have role in the project but also in his own organization, he may come to some interesting conclusions. To achieve the goal of being present on the market, contractor has to have enough resources. The crucial resource is competent worker. These workers' income depends on the earned value: the more project tasks are completed, the higher the wage. That, on one hand, helps the contractor's management to keep workers motivated. But on the other hand, on unstable market that creates the risk that workers income would be unstable. You may complete the contract on time, make a profit, pay wages to workers, but there's no guarantee you'll get the new contract soon. So, there's a probability that your workers won't have wages for some time.

One of the recent researches [5] shows that in Russia the stability of income is much more important than the amount of it. That leads to situation when workers leave contractors, who doesn't have contracts at a time, instead of waiting for them. And when the new contract happens, contractor has to find workers somewhere, which may be quite a problem.

That makes contractor to always choose of two possible risks: of paying penalty and of losing workers.

But once the contractor has predictable number of contracts ahead, he is interested in finishing recent contracts as soon as possible.

Knowing that, project manager can:

1. Set such a penalty that will help the contractor to choose finishing job on time rather than overdue;

2. Find a contractor, who has a stable portfolio (even if it might cause higher costs);

3. Help contractor with forming a portfolio.

That may look almost the same as the recommendations provided by PM BOK, but the difference is that now it's not just an advice by highly experienced professional, but an approach that helps project manager to understand risks better.

References

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