

Project Risk Management in Automotive Industry. A Case Study

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Abstract In this paper, it is made an analysis of the current project risk management procedure followed by the Spanish Business Unit of an automotive multinational company, which manufactures steering wheels and airbag modules. Taking into account the PMI[®] standard, different changes are established in the current procedure for the purpose of defining and implementing a project risk management procedure more useful and efficient.

Keywords: Automotive industry, procedure, project risk management

1.1 Introduction

In the competitive business environment, organizations are seeking to get and stay ahead of the competition by making significant advances in the products and services, and operating as efficiently as possible. Many businesses use projects as vehicles to deliver that competitive advantage. Clearly each organisation wishes to move ahead as quickly as possible, and that involves taking risk as the business exposes itself to a range of uncertainties that could affect whether or not it achieves its desired aim (Hillson, 2009).

Risk can be broadly defined as the probability of variation surrounding an anticipated outcome (Carter and Rogers, 2008). Risk has been examined across multiple disciplines including economics and management (Wiseman and Gómez-Mejía, 1998; Stultz, 1996; Zsidisin, 2003).

Within the project management context, the important thing is not keep risk out projects, but to ensure that the inevitable risk associated with every project is at a

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level which is acceptable, and it is effectively managed. According to the Project Management Institute (PMI[®], 1996), project risk management includes the processes concerned with identifying, analyzing and responding to project risk. It includes maximizing the results of positive events and minimizing the consequences of adverse events.

In the automotive industry, lead time to develop and industrialize new vehicles is significantly decreasing in order to achieve competitiveness with the new models. This fact makes difficult to detect possible errors related to the associated components and process and it also reduces reaction time. To define a process to detect possible risks and to take retaining actions on time are essential to achieve success in the new models launch. On the other hand, big vehicle manufacturers expect of their suppliers to design the different components according to technical specifications. In this way, design departments at the manufacturer manage the vehicle components design together with selected suppliers.

In this paper it is made an analysis of the current project risk management procedure followed by the Spanish Business Unit of an automotive multinational company, which manufactures steering wheels and airbag modules. Taking into account the PMI[®] standard, different changes are established in the current procedure for the purpose of defining and implementing a project risk management procedure more useful and efficient.

1.2 Project Risk Management

Project Management Institute was founded in 1969 on the premise that there were many management practices common to projects in application areas as diverse as construction and pharmaceuticals. It was not until 1981 that the PMI Board of Directors approved a project to develop the procedures and concepts necessary to support the profession of project management. The final manuscript was published as a stand-alone document titled *The Project Management Body of Knowledge* in August 1987 (PMI[®], 1996).

This document is used by the Project Management Institute to provide a consistent structure for its professional development programs including: Certification of Project Management Professionals (PMPs) and Accreditation of degree-granting educational programs in project management.

According to this guide, project risk management includes the processes concerned with identifying, analyzing and responding to project risks. Figure 1 provides an overview of the following major processes.

These processes interact with each other and with the processes in the other knowledge areas as well. Each process may involve effort from one or more individuals or groups of individuals based on the needs of the project. Each process generally occurs at least once in every phase.

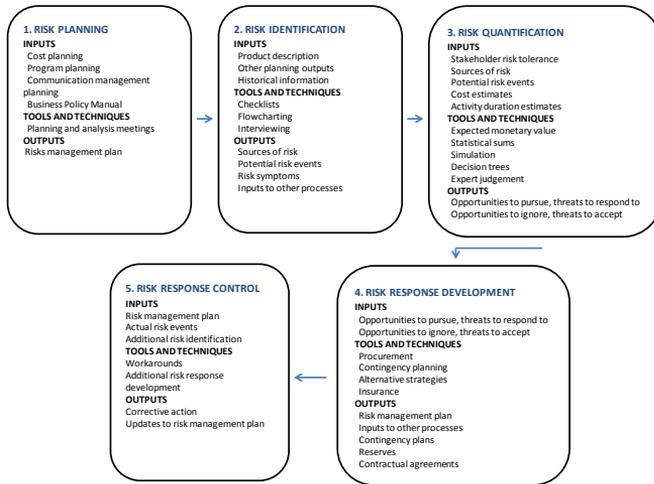


Fig. 1.1 Project Risk management Overview. PMI® standard

1.3 Case Study

This paper describes the case of the Spanish business unit of an American multinational company which supplies automotive components. The company employs approximately 60,000 people in 185 facilities located in 26 countries. It is worth to mention that the company supplies to the most important vehicle constructors, developing and producing active and passive safety systems.

The global sales during the year 2010, last year from which data are available, were around 12 billion Euros, distributed among the following business lines:

1. Passive safety (OSS, Occupant Safety Systems): steering wheel, airbag modules, seatbelts and bags development.
2. Active safety: video and radar sensors to enable advanced driver assist functionality, automatic emergency braking and collision mitigation braking.
3. Active/passive safety integration: collision avoidance and mitigation systems (radio frequency systems, etc.).
4. Components: engine valves, entry systems and presence control systems.

OSSE is the European unit for the development and production of passive safety products. This unit headquarters are located in Alfdorf (Germany) and it has 27 production plants located in 16 countries of the European Community. The business unit in which this case is being developed belongs to the European unit and it is called OSSE Spain-Portugal (OSSE-EP). OSSE-EP employs 2,000 workers distributed among 5 production plants and 3 R&D centers. The main offices are placed in Vigo and it can be found the Economical Controlling and Project

Management departments. The Project Management department is responsible for the coordination of all the activities related with the project development before the serial production.

1.3.1 Project Risk Management in the Company

The organization business process to introduce new products is based on the GIP process (Guide for the Introduction of Products). GIP is a global guide for all the product lines and the purpose is to develop the new product and the related manufacturing process at the same time. This guide considers eight phases (the two first ones are managed by Sales department and the next six are managed by Project Management department). The aim of these eight phases is not only to achieve the customer requirements but to fulfill the company objectives.

Risk management is being identified as a key in the GIP process due to the fact that the risks can affect to different project areas such as the product, the process, the commercial objectives, the logistics flow, etc. For this reason, risk management process affects to the whole project development. To help with this, the company has developed a project risk management procedure (last review: May 2010). This procedure describes the organization objective in terms of risks and it establishes a process to identify, analyze, monitor and control based on the PMI® methodology, although there are differences between both elements.

1.3.2 Analysis and diagnose of project risk management procedure

The next figure shows the flow described in the current project risk management procedure.

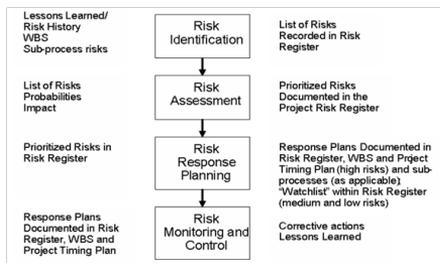


Fig. 1.2 Project risk management flow. OSSE-EP's procedure

The current procedure suggests, also, that the risk project should be included in the Reporting Corporate System (RCS). This system is accessible though the

company's intranet and it works as a Project Management, Purchasing and Operations reporting database. RCS shows two different possibilities: on the one hand, it offers the option to enter risks and, on the other hand, it also gives the option to register issues. Nowadays, most of the time, this tool is being considered for the issues entry and not for the risks one, it means, instead of using RCS as a prevention system it is used to report to the managers those risks that have already become problems for which is needed to find a solution.

Apart from the PRM procedure and RSC, the company has another element available to show the project risk up, this is the SRM (Status review Meeting). These meetings take place once a month and the main objective is to report the different areas responsible about the project with most critical points. And, it is worth to mention that different documents area created during the project's development for the information exchange with the customer. In this sense, some customers request a checklist for the risks identification.

In summary, currently OSSE-EP has different elements available for the project risk management. Nevertheless, all these elements are being used only from time to time, it means, the current risk management is not followed in a methodological way along the project's lifecycle.

In this context, after the PMI® standard analysis, the following points have been detected in the current project risk management system:

1. The risk management is not planned in such a way that the different phases of the process are included in the project planning.
2. The list of risk categories presented in the procedure is very wide and some of the defined risks show ambiguity.
3. The procedure defines four phases for the risk management (identification, analysis, action plan and monitoring). The PMI® makes a more detailed division and identifies six phases (plan, identification, qualitative analysis, quantitative analysis, action plan and monitoring/control).
4. The procedure establishes a numeric scale for the impact and probability. For the risks with a total rating of 12, 16 or 24, an action plan is formulated. The risks with an overall rating below 12 become part of the watch list in the risk register. The PMI®, on the other and, makes a qualitative division in terms of high, medium or low risks. This standard also includes a quantitative analysis to calculate the risk level according with economic values.
5. The procedure doesn't define the risk response plans in detail and it never mentions the opportunity response plans.

1.4 Redesign of project risk management procedure

Taking into account the different points that have been mentioned in the analysis, some improvements have been developed in the current project risk management

procedure. These improvements are related to: risks documentation, impact and probability categories and definitions for threats and opportunities response strategies. All these elements are also integrated in a global improvement related to the redesign of the risk management process phases.

Regarding the documentation, the current list that includes 45 risk categories based on a classification of 8 risk areas (commercial/finances, product/market, product specifications, product and process technologies, customer, program planning, quality and suppliers) has been modified. With the aim of defining a simplest list, less confusing and with no overlap between the different areas, 5 risk areas has been established instead of 8: economic, product and process, suppliers, customer and program planning. Initially, 26 risk categories have been identified but it is worth to mention that this is an open list in which the project manager together with the team can include as many risk categories as they consider.

Furthermore, in this point about documentation, the current procedure is not clear enough regarding the risk plan as a basic element for the management. Therefore, the risks plan has been defined as the basis of the first phase in the new process flow (planning) which should be fed in the next process phases. This plan includes:

- Methodology: it defines the tools and information sources that can be used to perform the risk management.
- Roles and responsibilities: it defines the roles which realize the activities related to the risk management.
- Periodicity: it defines when and how often the different processes related to the risk management should be implemented along the project's lifecycle.
- Risk categories: a structure to decompose the risks is being provided to perform the identification process in a systematic way. At this point, the new list of risks previously defined would be included.
- Formats: a standard risks register format is being together with the needed formats for each of the process phases (identification, analysis, response plan and monitoring). The risks register includes: risk definition, risk/opportunity assessment, risk responsible, period in which the risk may arise, impact level, probability level, risk global value, action plan and follow up.

In the relation to the impact and probability ratings, in order to establish risks priority, the proposal is to remove the impact areas details in the scale. This is due to the fact that the format that has been developed for the risks register already includes the program areas in which the risk may appear, it means, the risks register establishes a relation between the impact and the risk depending on the influence over economic, product or process, suppliers, customer or planning factors. This change makes this phase easier.

On the other hand, the proposal for the probability rating is to keep the current one in which a numeric value (1, 2 or 3) is given depending on the low, medium or high probability assessment. It is considered that this numeric value for the probability in association with the numeric value for the impact (2, 4 or 8) will

help to identify, in an easier way for the priority program, risks which need a response plan. Therefore, it is proposed to keep the existing impact-probability matrix as well as the criteria establishing that all the risks with an overall risk priority rating of 12, 16 or 24 need an action plan.

About the threats and opportunities response, the current procedure only mentions the response strategies for negative effects risks (threats) but never positive effect ones (opportunities). In the new procedure, the risks register format includes some comments which explain the strategies essence. As an example, in case of having to face negative risks, some valid strategies are: to change the risk management plan to remove the threat or to reduce the probability and/or impact until an acceptable level. On the other hand, in case of having to give response to positive risks, it is recommended, for example, to eliminate the uncertainty associated to them, making the opportunity more concrete.

Finally, taking into account all the elements developed, the improvements for the current risk management process are being described. The first proposal starts by defining five phases instead of four: planning (not included in the actual procedure), identification, analysis, action plan and monitoring and control.

The planning phases is the initial one, in which the project manager should report the team about the way to proceed with the risk management throughout the other four phases, by defining the aim aspects previously mentioned that must be included in the risks plan: methodology, roles and responsibilities, frequency for the risks process and risk categories. The project review meeting is being established as basic tool, apart from others, for the risk management plan development along the project's lifecycle. The main objective is that the risk management process becomes part of the program meetings which normally take place once week with one hour of duration.

In the identification phase, it will be used the methodology, information resources, responsibilities and risk categories that were defined in the risk management plan and, in this way, the risks register will be created. Nevertheless, risk identification process will be iterative since new and different risks can arise along the project's lifecycle or probability and/or impact ratings of identified risks can change.

Regarding the analysis and taking into account the main idea of establishing a new product to create a risk management dynamic for all the projects, the proposal is to not include the quantitative analysis, but to establish the risks priority through the qualitative analysis. In other case, management process would be much more complex, and implementation and new procedure's success would be possibly affected.

The risk response plan, as it has been indicated, will be reflected in the risks register document and, in the same way, this document will be used for the action plans monitoring.

The next figure shows the new flow that has been proposed for the project risk management procedure.

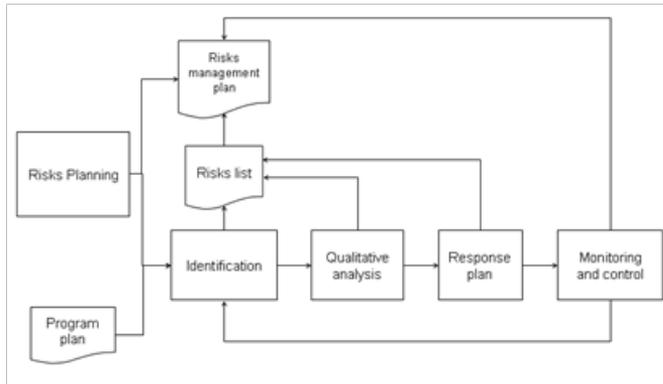


Fig. 1.3 New flow for the project risk management procedure.

1.5 Conclusions

The methodology defined by the PMI® shows that to develop a complete risk management is a complex work requiring a deep dedication along the project and for which, many times, there is not enough time or resources.

The aim of this paper has been to describe the improvements developed for the current risk management procedure in OSSE-EP, in order to exploit the project resources and time. In this way, the risk management process should be followed in parallel to the different project management phases by integrating a risks plan in the beginning of the project and also by using the standard document, methodology and criteria.

Nowadays, the new procedure is under implementation process through the pilot application to a project in development phase.

1.6 References

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