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The Early Warning Procedure in an International Context

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Abstract

The globalized business and organizational environment is creating a growing need for project managers that can operate in a variety of cultural and socio-economic settings and are capable of handling the complexities that arise while working in an international context. It is of course a very important aspect to be considered by project managers to identify the early warning signs of problems timely enough to take preventive actions in order to avoid undesired consequences. This act can be more challenging when performed in an international context which in nature is more complex. In this study we endeavour to scrutinize the early warning identification process as part of the management system in international projects and the possible obstacles which exist within this procedure. A real ongoing international R&D project will be used as an example to help us better clarify the concept.

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1. Introduction

Delivering new products and solutions successfully to the market is vital for many organizations but it is also a very complex and difficult task (Balachandra & Friar, 1997). Although carrying out these type of projects, in an international context, has a remarkable impact on the development of technological potential and international competitiveness for organizations all over the world (Wortmann, 1989), these projects have a high probability of failure. This high probability derives from the fact that not only international projects are usually highly complex

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and are likely to face many challenges regarding various areas, but the nature of R&D projects is complex too. The combination of these creates many more challenges for the project managers which need to be dealt with and puts the project in a quite vulnerable situation. The areas which make international projects complex can be physical distance, language barriers, cultural differences, etc. While the planning phase of international projects does not considerably differ from planning of local projects, project controlling, project organization and project communication present extra challenges for the management of international projects.

Due to vulnerability and complexity of these types of projects it is ever more crucial for project managers to be able to adapt to the project context and enhance their ability to react to unforeseeable events. Treatment of international project as a standard project, lack of sensitivity to local cultures and ignoring the project context are examples of causes of failure of international projects.

Von Zedtwitz et al. (2004) in their work on global R&D projects state that although there are no unique solutions for challenges of global innovation, the management has to however make a choice on how to perform the project in order to face fewer threats of failure.

This article presents an overview on the concept of early warning signs and argues on how identifying and acting upon these signs timely enough can aid project managers in better coping with the uprising challenges and preventing as many problems as possible. We will also scrutinize the possible barriers against identification and response towards early warning signs in international projects due to the specific characteristics of these types of projects. An ongoing international R&D project including 5 different countries and 15 partners from both academia and industry sectors will be used as an example to aid us in better clarifying the concepts. This project will be looked at from the point of view of the single partner which carries out the management and coordination responsibility within the project. The research objective of this study is to explain the importance of awareness of project managers of possible future problems and their actions in order to prevent undesired consequences.

2. Literature Review

2.1. Concept of Early Warning in Projects

The general idea of early warning is a broad concept. It applies to almost any area where it is important to obtain indications as early as possible of some development in the future, usually of a negative nature. The concept of early warning in a management context was first discussed by Ansoff in 1975 and was later supported by Nikander (2002). A weak signal was defined by Ansoff as "...imprecise early indications about impending impactful events...all that is known is that some threats and opportunities will undoubtedly arise, but their shape and nature and source are not yet known" (Ansoff, 1990).

In Nikander's words (2002), "an early warning is an observation, a signal, a message or some other item that is or can be seen as an expression, an indication, a proof, or a sign of the existence of some future or incipient positive or negative issue. It is a signal, omen, or indication of future developments". In his study he devises a preliminary model illustrating the character of the early warnings observations (See figure 1). This model sees project events as a time-bound consecutive stream of events. At a given moment, information about this stream can be obtained (e.g. early warnings of potential future project problems). This information is processed and responses are required in order to influence the flow of the project. A crucial factor in choosing a response appears to be, according to Ansoff, time available for responses before the potential problem significantly impacts the project.

Not much has been mentioned in the literature about the exact time the early warning sign identification should start in the project life cycle. According to Lewis (1993), the prerequisites of project success are the things that must be in order before the project is initiated. We believe that in case early warning signals are identified in the early stage of a project, the available time will be rather long enough for project managers to take the right actions in the subsequent stages of project. For example in case some warning signals related to cost and time limitation are identified in the early stage, budget estimating in the initiation phase can be done more accurately. Identification of early warning signs related to technical issues, can aid the responsible persons to make better decisions on risk management and production of key variables in the execution phase. Of course the challenge lies in the possibility of detecting the early warning signs and their level of reliability.

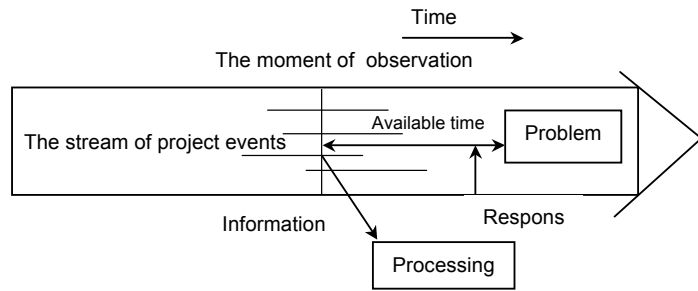


Fig. 1. Preliminary Model Illustrating the Character of the Phenomenon of Early Warning (Nikander, 2002)

Nikander (2002) in his works points out to findings by Ansoff (1990) on possible filters which a message or piece of information should go through before arriving to the firm from the environment of that firm. We assume this piece of information is the one mentioned in figure 1. These filters can either restrict or ease the processing of information.

Three main filters are mentioned by Ansoff including the surveillance filter, the mentality filter and the political/power filter (see figure 2). The first stage requires the company/ project/ organization to choose what kind of information is needed and what type of techniques should be employed to procure it. The mentality filter is in character sociological and psychological. The receiver at this point evaluates the arrived information and makes the decision on what to accept and what to eliminate due to being unnecessary, unrealistic or irrelevant. The last filter is used especially by the decision maker and determines what type of information is permitted to influence the decision making process.

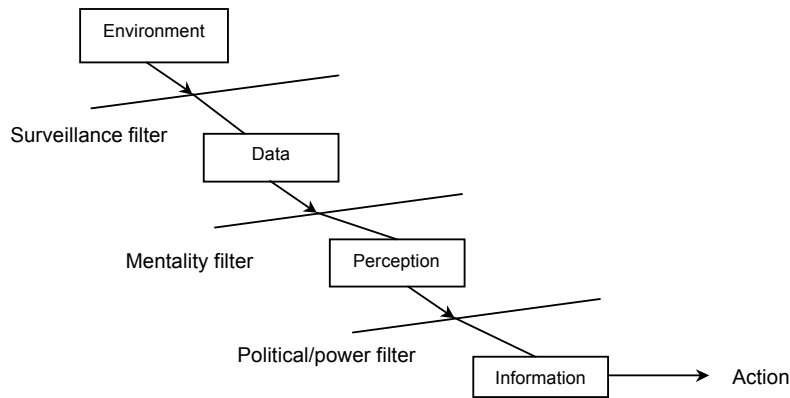


Fig. 2. Management information (Ansoff (1990) in Nikander, 2002)

The approaches for identifying the early warning signs are also important to consider and may vary greatly in different projects and situations. The approaches for identifying the early warning signs are also important to consider and may vary greatly in different projects and situations. According to Nikander (2002), which is consistent with our own findings, very little literature exists that deals explicitly with techniques for obtaining information from the environment. But the project management literature does include some statements which directly or indirectly refer to this concept and its identification approaches (See table 1).

Table 1. Categorization of Sources of Early warning signs in projects.

Early warning sources directly discussed in the literature	Potential Early warning sources in-directly discussed in literature	Early warning sources directly discussed in the literature
Risk analysis (Niwa (1989) ; Nikander (2002))	Stakeholder analysis (Savage et al (1991); Cleland (1994))	Risk analysis (Niwa (1989) ; Nikander (2002))
Project success / failure models (Pinto &Slevin (1988); Lewis (1993), Miller & Lessard (2000))	Cause / effect analysis (Leszak et al. (2000); Parker & Skitmore, (2005); Sambasivan & Soon (2007) ; Ohatka & Fukazawa (2009); Klakegg et al. (2010))	Project success / failure models (Pinto &Slevin (1988); Lewis (1993), Miller & Lessard (2000))
Project assessment methods (Cooper et al. (1997); Cooper (2005); Wateridge (2002); Jaafari (2007); Miller& Lessard (2000); Klakegg et al. (2010))	Maturity assessment (Andersen and Jessen ,2003; Ahern et al. (2004); Cooke-Davies & Arzymanow (2003); Ibbs & Kwak (2000), Kerzner (2001))	Project assessment methods (Cooper et al. (1997); Cooper (2005); Wateridge (2002); Jaafari (2007); Miller& Lessard (2000); Klakegg et al. (2010))

2.2. International project management

According to Lientz and Rea (2003), international projects are different from local projects due to various factors such as cultural and social differences among participants from different countries, language and dialect variations, Legal, regulatory, and reporting requirements, time zone differences, etc. While there are many benefits to performing international projects, the growth of these types of projects has come at a cost. Surveys reveal that the probability of failure in international projects is higher than standard single country projects. One of the main drivers is the higher level of complexity of international projects (Lientz and Rea, 2003). Koster (2010) summarizes the major characteristics of international projects in a way that anyone can understand at by a glance (See Figure 3).

Due to complexity, diversity and high risk of failure, there are certain steps which should be taken for performing an international project. The following are suggested by Lientz and Rea (2002):

- Strategy selection
- Definition of project purpose and scope
- Development of vision and benefits resulting from the project
- Identification of roles and responsibilities
- Performance of an analysis on potential issues
- Determination of resource management
- Establishment of a way for addressing communications

The main focus of this research is the 5th step where potential issues which can impact the project are identified at the start. This act will lead to discussions on how issues will be identified, tracked and resolved. In other words, this step can be interpreted as the early warning procedure introduced by Nikander (2002) where the signals of possible future problems are first identified and the information obtained, after passing the filters presented in figure 2, leads to relevant actions for preventing the problem.

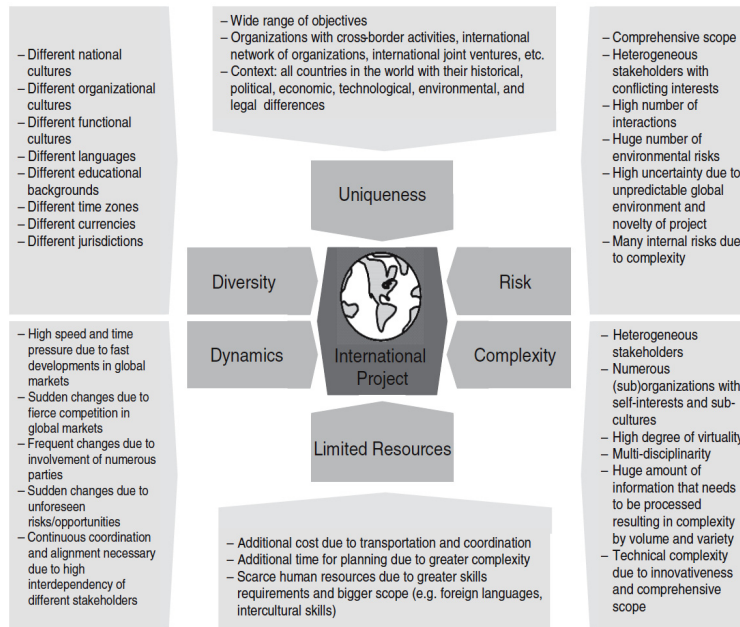


Fig. 3. Characteristics of international projects (Koster, 2010)

2.3. Possible obstacles against effective response to early warning signs in international projects

According to Lientz and Rea (2003) there are certain “stumbling blocks” which may result in international project failure. These include: Treatment of the international project as a standard project, Failure to clarify and communicate goals, Failure to take self-interest into account, Lack of sensitivity to local cultures, Ignoring context, Customer dissatisfaction, Excessive management attention and time overrun. But problems of any type and scale are not developed over night. Ansoff (1975) states that even unexpected discontinuities are indicated by some warning signals. The challenge lies in detecting these signs timely enough to be able to prevent the undesired outcome.

But although there are many early warning identification approaches which exist and are applied in many cases (Haji-kazemi et al., 2013) there are still failures occurring. According to Williams et al. (2012), “we are not very good at picking early warning signs”. In their study they point out problems related to three main areas: understanding of project risk and uncertainty, project complexity and detection of people’s tacit knowledge and comprehending their way for responding and interacting. They also state that established assessments fail to pick up early warning signs. The reason is partly due to technical issues, but mainly found within the minds of individuals.

Hofstede (1984) states that the nature of management skills is such that they are culturally specific, meaning that a management technique or philosophy which is appropriate in one national culture is not necessarily appropriate in another. Taking into account the cultural side of management presupposes an understanding of the way people’s minds can be programmed differently by their different life experiences. Patterns and models of behavior between subordinates and superiors, among colleagues, and towards clients in the work situation have been set outside the work situation.

According to Grisham (2010), project teams must adapt to the international context and local practices, language, time zones, resources, laws, politics, etc. when embarking on projects which are conducted within multiple countries and cultures. Figure 2 represents the main three existing filters which can influence the effectiveness of the early warning procedure. We believe these filters can act differently in different project environments. Hereby we would like to discuss the possible features of these filters in an international context where involves high level of complexity, dynamics and diversity (See figure 3).

Surveillance filter

At this stage, the project organization should choose what kind of information is needed and what kind of techniques should be employed to procure it. This is where the project organization should in fact decide on the specific success criteria to measure and monitor within the project. The specific approach for obtaining the data should be then chosen based on possible resources. This data can be actually a base for identifying early warning signs for potential problems in the future.

International projects involve heterogeneous stakeholders with conflicting interest and high number of interactions. Also they are mainly multi-disciplinary projects associated with huge amount of information that needs to be processed resulting in complexity by volume and variety. Another influencing factor is the different organizational cultures within the project which results to having different points of view toward the project. It is very likely that a success criterion which is important and critical for one organization is not necessarily crucial for others as well. These characteristics can form a challenging situation where the project organizations due to their different views towards the project's goals and their varied interests may not reach a concrete decision on what type of data to look for and the approaches for obtaining them.

Mentality filter

This filter is in character sociological and psychological. Receiver of information evaluates the arrived information and decides what to accept and what to discard due to it being unnecessary, unrealistic, useless or irrelevant. International projects include a wide range of objectives and a broad and comprehensive scope. They involve many internal risks due to high complexity and high level of uncertainty due to unpredictable global environment and novelty of the project. The information which the receiver obtains as a result of project assessments methods or via gut feelings (Klakegg et al., 2010) can have totally different level of importance for different receivers. It is also dependent on the perception of the project's goal by of each party. If different parties have different understanding of the goal, the different categories of arrived information can be prioritized in dissimilar manners and thus it is probable that some of the information which actually contains warnings for potential problems can be overlooked or missed.

Political / power filter

This filter is used specially by the decision maker. It determines what information is allowed to influence the decision making. This is perhaps the most important and influencing element throughout the process which leads to actions taken based on received information from the project. Levagnon and Hodgson (2014) in their work point towards the fact that the international development projects have over time moved towards a potential contribution of a critical perspective which focuses on issues of power.

The information which passes the two first filters should be evaluated by the decision makers. This includes information which has been, in the first stage, recognized as necessary for the project and in the second stage, regarded as useful and relevant. This filter is strongly influenced by the fact that who is included in and who is excluded from the decision making process. Based on Hofstede's cultural dimensions, in countries where there is large power distance among members of the project organization, it will be less likely that all the necessary information pass through the two first filters. Eventually the third filter will be also influenced by this aspect.

The diversity of cultural backgrounds within the involving partners in an international projects and the complexity caused by the heterogeneous stakeholders with conflicting interests and high number of interactions can establish barriers against effective actions towards possible early warning signs of problems.

The strength of this filter is also affected by the level of power of the main decision makers in the project. Anderson and Galinsky (2005) believe that the sense of power increases optimism in perceiving risks and thus lead to more risky behavior. They also state that powerful people might be so focused on the payoffs and have no focus on the consequences of their actions, and more optimistic that they can get away with a range of actions, that their becomes more risky and more likely to violate social and ethical norms. This can be also a source for overlooking information about early warning signs of problems which in case of actualization, can result to undesired consequences for the project.

3. Research methodology

As mentioned earlier, in this study we would like to investigate on the relationship between implementing the early warning procedure and better management of international R&D projects. Also we would like to investigate on possible obstacles which exist throughout the early warning procedure. In order to achieve the research objective, we will build our discussions mainly based on Ansoff's management information model (Figure 2) and Koster's model for international projects (Figure 3) in order to outline the challenges involved with timely identification and reacting upon potential problems within international projects.

The ongoing international R&D project which we will use an example of a real life case consists of 15 partners from 5 different countries. Due to confidentiality of information, we will point to the countries as C1, C2 ...C5 and the partners as P1, P2...P15 throughout the work. The empirical results are based on analysis of available project documents and semi-structured interviews with members of the project management team. The analysis focuses mainly on approaches used for identifying and responding to early warning signs of future problem throughout the project and scrutinizes the impact of implementing the early warning procedure on effective prevention of future problems. The data obtained from available project documents includes detailed definition of project concept and objectives, information on project participants and their roles and responsibilities and the management structure and procedures. The interview data consists of background interviews with members of the project management team, information on identified early warning signs of possible problems throughout the project and the preventive actions which were taken. It also includes the challenges the project management team faced due to specific characteristics of an international project.

It is crucial to mention that the empirical study has its limitations due to the fact that authors base their findings based on data obtained from one work package among the 10 existing work packages. Although this specific work package is the project management unit which should in principal have quite an extensive over view on the project as a whole, it is very important to get insights from other partners as well. Also since the project is still not over, there are still potential problems which may come up or actualize in the future which are not considered in our study.

The research follows an inductive reasoning approach, concluding that the approach can contribute to better management of other similar projects as well. Of course the authors are fully aware of the fact that these types of results are not always logically valid and it is not always accurate to assume that a general principle is correct.

4. Example of a real life international project

The main project objective is to improve industry's ability to produce high quality products more efficiently and with fewer faults. The project was established as an initiative from P1, responsible for management of coordination of the project, and has 15 partners from 5 countries. The project budget is 10+ million Euros and the duration is estimated to be 3.5 years. The project is right now in its third year.

The project consists of 10 work packages. Work packages 1 to 6 are the research and technology development work packages which are planned as vertical activities to develop results to be applied and demonstrated in different applications. The estimated workload of the project equivalents to 76 people working full time within the total project duration.

As mentioned earlier, the main focus of this study will be on work package 10, including project management related activities. This work package only covers legal, administrative and financial management of the project. Scientific coordination, scientific quality assessment/management, research risk management and other research and technology development related activities are covered by the corresponding scientific work packages.

The management structure which is based on experiences from coordination of several international projects consists of various interdependent elements including management of project according to approved plans, monitoring and performance of project control, implementation of procedures for quality management and administrative review process of deliverables, implementation of risk management procedures and implementation of tools to establish a basis for efficient and easy communication within the project.

The project management work package is also devoted to risk management in order to prevent and mitigate the possible risky events. Risks issues in this case range from technical to organizational or communicational problems.

The project management team considers risk management as a dynamic activity and the loop “risk identification-risk evaluation-definition of contingency plan” is to be carried out for the whole duration of the project. Risk are evaluated and analyzed according to their likelihood and seriousness. A risk matrix is developed categorizing the likelihood of risks as low, medium and high and the seriousness of them as, low, medium, high and extreme. From this, a priority list for actions is developed.

Such analysis aids to identify the most significant risks and therefor those need careful management. The resulting grades of risk help the project team to focus on dealing with the most important risks, once evaluated and prioritized, and to mitigate them. A list of identified risks have been developed for the case project by the project management team and categorized based on the probability of occurrence and the level seriousness of them. Also the relevant actions to be taken in order to prevent or manage the risks have been listed. Both technical and managerial risks are considered.

It should be noted that what we are considering through this study is not the risks themselves but the signals which indicate that the risky event is about to occur. In addition, the actions towards those signals are going to be discussed. Early warning responses can in many conditions be different from risk responses.

5. Empirical study results

As mentioned earlier the empirical data, gathered through interviews and document analysis, consists of background interviews with members of the project management team, information on identified early warning signs of possible problems throughout the project and the preventive actions which were taken. It also includes the challenges the project management team faced for identifying and acting toward early warning signs, due to specific characteristics of an international project.

According to the interviews, the project management team was able to identify some of the early warning signs of potential problems which were likely to occur while the project was running. “One of the very first warnings rose in very early stage of the project when we began estimating and allocating the project budget” stated the quality manager of the project. The problem initiated due to the fact that the project owner and the partner responsible for management of the project (P1) had different perceptions on who is the actual project manager in the project. This caused a chaotic situation where roles and responsibilities were rather mixed. Since the project manager allocated by the project organization did not have sufficient experience with large scale international projects, the splitting of budget was not done properly. In case the budget didn’t become broken upon each and every work package, the project would have ended up with a lump-sum budget. Knowing that the project was estimated to require a resource of 900 person month (equivalent to 76 persons working full time), a lump-sum budget would have resulted to serious cost-related problems for the project which in the worst case would have resulted to cutting the budget by the project owner.

Another early warning sign was identified was the lack of communication and common understanding among two specific partners which carried out interdependent tasks within the project which would have caused to delays in delivering specific tasks allocated to them. The project being a fast-track project with strict milestones and deadlines, did not tolerate any delays. The warning in this case was actually transferred to the project management team by a third partner who had previous experience working with one of the conflicting partners. The problem was getting far more serious up to the point where the conflicting partners were to be suspended by the project owner. The project management team then set up several face to face meetings with the conflicting partners and tried to explain the importance of allocating the right tasks to the right persons and enhancing dialogue and communication among interdependent partners.

Sometime after the project start up, one of the key responsible members within the project was changed. The new member did not have enough understanding of the project and his competent did not fully cover the project area. This change caused to frustration for some of the partners. This was identified as an early warning for partners leaving the project in case their requirements continued to be abandoned. The project management team believed that changing the member would be the best solution.

Another main challenge which the project management team faced from the very beginning of the project was the fact that different partners had different perceptions of the project goal. This was mainly due to the different nature of academia and industry and their interests and goals. This was sensed by the project management team and considered as a warning sign for not achieving the final goal. They then took action by performing strong follow up on deliverables of the project by each partner and reminding the main goal of the project to the participants. The different cultural backgrounds are a common challenge in international project and this project was definitely not an exception. The project management team, having sufficient experience with these types of projects, performed proactive management by arranging social events in order to enhance the relationship and communication among partners. Including a non-local member to the project management team with similar cultural background as several partners of the project was also an effective act in order to prevent future problems.

The potential problems, their warning signals and the ideal response to them are listed in table 2. As it is presented in this table, early warning signs of specific problems have been identified and their ideal responses are recognized. But it is interesting to analyze the data presented in order to determine if: 1) these problems have been the only existing problems within the past three years within the project, 2) the warning signs which have been identified have been responded to.

As already mentioned before, authors have only gathered the data from one of the partners involved in the project. We believe that having had contact with the other parties involved in the project, would have shed light on other possible problems within the project. This can be a possible explanation for existence of a surveillance filter which does not allow all the data reach the decision makers which in this case is the project management team. Another assumption is that the data on possible problems within the project is actually received by the project management team but perceived as irrelevant or useless (existence of a mentality filter).

Also, according to the interviews, although problem 3 has been rather clear for all the project management team members and the response seemed logical and consistent, this action was never taken. This was due to the fact that the responsible persons in power did not tend to recognize this issue as a problem and act upon it. In fact, this information could not pass the political/power filter to be actualized.

Table 2. Problems, early warning signs and responses in the project

Potential problem	Early warning sign	Ideal Response
Lump-sum budgeting causing cost related problems	Lack of experience of allocated project manager by P1 with international projects	Breaking budget by quality manager and project coordinator
Delays in reaching key milestones	Lack of effective communication among partners Delay in delivering tasks	Face to face meetings with conflicting partners and clarifying the importance of the milestones
Dissatisfaction of partners which would result to them stepping out of the project	Lack of competence of critical staff Lack of effective communication among project manager and technical staff	Changes in the staff
Not achieving the project final goal	Lack of common understanding of the project main goal	Strict follow up by project management team, clarifying the main project goal to all the partners
Lack of common understanding of the project goal and the deliverables	Difference in cultural background	Arrangement of Social events to include and make strong relations between partners. Including a non-local member in the project management team

It is also worth mentioning that the most severe problems had not been stated in the identified risks' list in the project DOW (Description of Work). The likelihood of occurrence of problem 4, in table 2, has been declared as "low" in the project description. We can see that in reality, things have been slightly different. This somehow indicates that no matter how detailed the risk plan is, it is always likely to face unpredicted conditions through the stream of project events. Keeping an open eye on possible early warning signs which rise within the project and proactively responding to them can be an effective means for preventing failures. This becomes even more crucial in international projects with much higher level of complexity. Of course the existing filters are elements which make

this process more challenging specifically for international projects involved with large amounts of complexity and uncertainties.

6. Conclusions and further work

The complexity, dynamism and risks involved with international R&D projects and the turbulent environment which they are performed in, creates a situation where failing in any way becomes extremely costly for project owners. Traditional project management methods may be unable to fully capture the unforeseeable events and provide insights in to appropriate responses and thus their application can lead to unwanted consequences.

Aside from the use of conventional project management methods, observing and interpreting early warning signals of future possible problems by project manager, according to their experience and observation conditions and the time available, can to a great extent facilitate proactive management and as a result preventing adverse outcomes.

The example presented in this study reveals that although conventional project management methods are an inevitable part of the project management plan, it is likely that unpredicted problems rise during the project. Paying attention to the early warning signals and responding to them at the right time is a support for decision makers to overcome these types of challenges. It also sheds light on existing barriers in the process through which information about potential problems is received by a project member until a proper response to it is actualized.

Fertile areas for future research include investigation on filters which can restrict the processing and responding to signals and messages obtained on possible future problems within the project.

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