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Optimizing risk communication to ease risk management

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Risk management can be difficult to apprehend for partners and customers when it comes to defining tasks and responsibilities through the project´s development phases. What are the risks related to the final product in development? What are the concerns regarding the process? The overall project? What residual risks the end users shall be informed of when integrating, operating and maintaining the developed solutions? The struggle becomes even more complex when stakeholders have different experiences with risk management or have existing infrastructure which involves improving competences or update technologies and need the allocation of the right resource. One role of the risk management is to prepare the stakeholders to take the ownership of their own risks. As overcoming these gaps can be challenging, a communication practice has been developed and used for the European project E-LAND (EU Horizon 2020) in 2019. The aim was to gradually increase the risk understanding by focusing on risk communication and enable the stakeholders taking over their own risks. This emphasis on communication has also been applied in other European projects since, on internal company assessment activities, in different domain applications (energy, digitization, AI and data management). This article presents an update on the risk communication method as lessons learned from a risk management point of view. This paper is sharing some of the difficulties to adapt the risk communication to the project's specificities as its domain application, type and knowledge of the partners, ways of working. The paper describes main challenges when performing risks management (boundaries of the study, difficulties to convince the project management, improvement in templates to the application...). The feedback received from the partners show that this way of performing risk communication has led to an easier risk collection and an increased understanding of the risks by the end of the project.
Keywords: Risk communication, Risk analysis, Risk perception, Risk management, lessons learned, European risk management project, adaptation.

1. Introduction

Risk management constitutes a set of activities and methods that support the identification, analysis and mitigation of potential risks that may arise and occur throughout the life cycle of a project, the development of a process or a solution (Rausand, 2011). Risks, when realized, may lead to losses impacting the quality of the product, the project, or the process under development at higher costs. The goal of risk management is to raise awareness about what can go wrong and to help prioritize decisions on what to protect strategically, and what to focus on within the cost, time and resources available. But risk management does not stop collecting risks and ensuring that mitigations are in place. An essential part of risk management is risk communication.

Risk communication is often considered as central in emergency preparedness and response, e.g., in the medical field, in cybersecurity or societal applications like environment, as a poor risk communication can undermine satisfactory risk assessment and management (Greenberg, 2022) or degrades the decision-making ability (Detels, 2021). In all these application fields, the emphasis is on communicating to a broad audience consisting mainly of untrained non-specialists within the risk field. The main goal of risk communication is to enable the risks owners to make informed decisions to mitigate the effects of a threat (or hazard) and limit their impact (losses). Considering this, risk communication should be part of a strategic pilar for the risk manager to reach their goals: helping the decisions makers to obtain a level of risk understanding to reach agreements and mitigate risks with an adapted solution. However, risk communication is often not seen as a key factor

for risk management to succeed in industrial and development projects.

What makes communication efficient in industrial projects? Can it help the risk collection and increase? What is required to fit a project? Does one communication strategy fit all? This paper reports on the lessons learned through examples from real projects. We also highlight criteria that can improve the risk management process and support reaching better results while reducing the required resources.

2. Background

2.1. General concepts behind risk communication

Risk communication is an academic field that is part of risk management. The goal of risk communication can be defined as "to make sure that targeted audiences understand how risks affect them or their communities by appealing to their values" according to National Consortium for the Study of Terrorism and Responses to Terrorism (2012). Early surveys on the state-of-art can be found by (Covello, 1986) and (Bier, 2001a, 2001b).

Risk communication is a handy tool to understand the various risk strategies and clarifies the risk manager message, especially when communicating on critical situation like crisis management in situations where a broad and non-specialist audience is concerned. Many guidance, advice and articles can be found on risks communicating risks that describe how the vocabulary and the technical habits and jargon can become a barrier to be understandable when a broad and large population is involved. Some guidance on risks communication can be found from the World Health Organization on food management crisis, with a very dedicated template and step to preparedness (World Health Organization, 1998). Some best practices are also applied in other fields (Covello, 2021): establish trust, assure transparency to enable the audience and the stakeholders to make the correct decision. In industrial projects, risk perception can play an important role (Sarshar, 2017). Indeed, perception of risks is a subjective factor despite theoretical practices. It is important to carefully plan and design risk communication to the specific situation and audience in order to reach sufficient risk understanding.

How to communicate risks efficiently outside of crisis and accident management? What is the right level of effort in communication?

2.2. *E-LAND project*

For partners in industrial projects, the risk management process has become a mandatory and integral part of how project management is performed in European projects. In the EU project E-LAND, a risk protocol was put in place to simplify and support risk management. The protocol was both proposed and applied through the E-LAND project which has been previously reported in (Esnoul, 2021, 2022). A take-away was that there are common factors that should be considered to address risks in a simple and understandable way for groups of participants which knowledge and experience can be considered heterogeneous.

On the other hand, the E-LAND risk protocol applies standard risk matrices. These have been subject to many problems as discussed by Aven in the book with the very descriptive title *Misconceptions of Risk* (Aven, 2010). In a paper by Árvai it was argued "that risk communication must become more decision-focused if it is to meet the objectives set forth" (Árvai, 2014).

E-LAND was a Horizon 2020 EU project that has developed a tool suit to optimize the production and the consumption of energy of energy island. An energy island is a community of prosumers, producing and consuming a part of, or the total of their energy needs which may experience dependency on external energy supply. The main challenges in this project were to communicate the risks of the adoption of the E-LAND solution to the energy islands owners as the proposed technology would change their way to interact with the energy grid.

The E-LAND solution to enable the energy islands to be active actor on the energy market and reduce their energy cost by improving an optimal scheduler, compute on user's data (e.g., consumption and production capacities, infrastructures) and external parameters (as forecast, market price). The adoption of this solution enforces a revisit of the way energy production is planned and managed, by implementing a two-way communication tool to ensure the balance on the grid. The project has addressed risks regarding safety, security, and privacy of the project, risk related to the

development of products, and of the pilots, with the goal to empower partners and pilot site owners to manage and address their own risks (in accordance with a E-LAND risk management plan) (E-LAND knowledge centre). The solution has been subjected to a risk analysis, focussing on both the project (process) and the technology (product). The detailed steps of the risk analysis process and results, as well as security aspects can be found in previous publications at ESREL (Esnoul, 2022). In the following we will summarize the basic principle of risk communication and provide updated information and thoughts on the application of the risk communication process.

2.3. *Main assets of the risk communication process from E-LAND*

The main objective for the risk management was to make the remaining risks (risks that have not been closed by the end of the project) of the solution acceptable for the future end-users. With this vision, the risk process in the project have benefits of the following activities:

- Introduction to all the partners to the methodology, including the vocabulary
- Put in place a dynamic and active Arrangement 1-to-1 meeting with task leaders to hear about their issues, main concerns and what they see as relevant risks for their part of the development. During these meetings, only risks that impact the work package
- Organized workshop to collect concerns from the end-users on different conditions regarding technology and energy consumptions (A risk assessment performed top-down and bottom-up to described both perspective of the partners: risks as foreseen by the project organisation and by the pilot sites, that implement the solution on their infrastructures
- Creation of graphics to simplify and support risk perception, and better motivate efforts and rewards the implementation of the mitigation actions
- Adoption of a colour scheme adapted to the level of risks, to ease the reading of the risk picture and its monthly evolution
- Importance of "seeing the risks as a potential not an inherence"
- Communication sheet to generalize the concepts of risks management.

2.4. *Experiences from E-LAND*

At the beginning of the E-LAND project, the risk communication was not performed in an interactive manner. A more traditional update through email exchange and meetings including many partners together were arranged, had yield poor results regarding risks collection and mitigation identification. After the implementation of an improved risk communication plan, the partners started identifying and populating their own risks, and they started taking initiative in identifying "what can go wrong?" and "how can we mitigate our losses?" after just a couple of months. Even if this method was time consuming to establish as seen from the perspective of the risk manager, the overall collection of the risks and documentation of the risks register became quite effective, especially considering the complexity of the project and the variety of needs from the partners. Based on partners feedback, this process, while being time consuming, increased overall risks understanding, which contributed to making the final product more reliable for the end-users.

2.5. *Extension toother projects*

This experience has been re-used and promoted since. It has shown good performance inside the authors own institution to prepare and address the company´s business risks. It has also been proposed and applied as a best-practice approach for performing risks management in other European projects. Indeed, the experience from E-LAND indicates that the risk process seems to be sustainable and a good match to report risks in a wide range of projects. It may help with projects that include many partners, various needs and different levels of maturity. Here the 1-to-1 meetings are central to support risk assessment, tailored and customized to the specific partner. The process was performed by the same team, the routine was well documented with templates, users guide, and all necessary instructions, as well as examples from the first experience, a risk register and associated risk matrix. More details can be found on previous articles (Gao, 2020). (Esnoul 2021, 2022) that does not include the way to adapt the methodology to the various field of application. What are the possible challenges

when what seems to be a successful risk-process is applied in the same way in other European projects? We try to answer some of these questions in the next paragraph.

3. Lessons learned from applying the risk methodology in other projects

When applying the methodology, different drawbacks and challenges were experienced. We informed that some project experiences are related to current on-going European projects. Since the projects are running, some details like, project names or identified risks and their matching level are not described as confidential to the project members. The detailed results regarding identified risks and risks practices would be the objects of future publications.

3.1. *Believing that one method fits all*

Even if the approach was though clearly explained, it may not be clear for everyone. Some definitions or concepts may be missing or misunderstood as intended and executed differently by the partners. For example, we experienced variations in how the concept of "risk", "risk assessment" or "risk register" and "residual risks for the end-users".

One example of such need for adjustment was experienced when considering need of data sovereignty, in the DORADO project (Dorado). The overall aim of the EU funded project DORADO, Digital twins and Ontology for Robot Assisted Decommissioning Operations, is to improve safety and efficiency in nuclear decommissioning by applying digital technologies such as Artificial Intelligence (AI) and Building Information Modelling (BIM), and a dedicated decommissioning ontology. The DORADO project will focus on several technologies that will be developed and integrated to be used with a common data server combining the data flow following the BIM methodology. These include, e.g., point-cloud data, 3D models and change detection, Digital Twins (DTs) based ALARA dose estimation, robot mission optimization, and smart voice assistant interface. The E-LAND toolkit was here proposed to help determining the remaining risks for the end-users after implementation of the tool-suits.

This has become a common observation in risk management and the applied risk methodology did little to address or lift the confusion. It seems that such confusion does not depend on the degree to which one is experienced with risk management and risk processes or not. There is still variable understanding and even confusion. From the reported experience with applying the risk methodology, agreement and explanation of the different vocabulary, and establishment of a glossary was still a requirement.

One of the issues is when agreeing on the work to be provided: what study to perform? High level project risk? Threat and vulnerability assessment? Should the study be updated at the end of the project? If not, then the residual risks and mitigations not implemented during the project may not be included and highlighted to the end users. Is this then compliant with the promised risk assessment for the end-users? These thematic had to be addressed, defined and explained in detail for the stakeholders to discuss what can we use from the previous methods and what is missing.

The main misunderstanding was found in the expectation of "what can risk management provide?". For most people, the as marketed "E-LAND toolkit" method, can do all types of risks assessments "as it". Even if this holds true in theory, adjustments on how method applications are still be required. As any other frameworks, the method may not answer current needs of project development, as there might be variations between the purpose of the developed methodology for and any new project to which it is applied. Examples of such tailoring can be done on the identification of the correct standards for the field of application, special considerations regarding choice of technology, the data in use in the project, as well as adaptation to the partners´ needs, hereunder maturity level, resource needs and availability to name some.

The process followed in E-LAND seems at first sight compatible as it deals with similar data management complexity, existing templates can include guidance for the data management plan like the FAIR principle (FAIR data guide), or for data governance advice from International Risk Governance Council (2005). However, adjustment would still be necessary to align with the requirements to the nuclear fields.

Even if adaptations are a regular part of the risk framework, some of our partners did not consider these changes as a required steps in the analysis, leading to misunderstanding on what the method is providing. This may lead to delays or lack of resource when planning the work.

3.2. *Risks management is not fully required, and does not demand efforts*

Another type of expectation from the partners was that they will become autonomous directly after having followed the first 1-to-1 meeting, thinking that this will free up a lot of time and resources as seen from project risk management point of view. In fact, the risk communication method in place here is time consuming, and especially at the beginning. This is due to that the main intention of the method: building risks competences among the partners. This competence building requires a follow-up through several sessions over some months to be properly mature to the level of expectation. As a risk manager, when sufficient emphasis and resources are focussed on establishing this risk capability in the beginning of a project, we experienced overall a better risks collection through the whole life cycle of the project. We argue that such early investment increases the quality of the risk collection. Despite the higher investment at the beginning of the project, the efforts needed to sustain risk process quality reduced gradually through the project, and the end-results were better. The experience was that a better risks awareness led to a better risk process performance in the project.

An early understanding of risk concepts and the process seemed to create a higher level of trust among the partners in the sense that they shared their concerns in a more open manner. As the 1-to-1 meetings are focused on partner needs, they tend to trust that their problems and requirements will be shared and addressed at higher levels of project management. They also reported that they understood risk reporting not as a threat to expose their possible delays to the project management but more as a way to anticipate and better plan their activity.

3.3. *Risk management is not obligatory*

Sometimes, risks management is not perceived as a required and essential part of the project mandate. It seems to be experienced more as an optional chore than a helpful tool that enables foresight, and comprehension of potential difficulties. This can be further emphasized by project constraints, especially when available resources or funds do not obviously support the efforts needed to answer demands from the risk manager. In projects that experienced economical struggles, the risk update was simply refused by partners by purposely avoiding mandatory risk meetings and not responding to emails regarding risks. Project risk management in European projects is mandatory in the grant agreement. It may become a conflict between the obligation of the risk manager and the partners that have received instructions to not spend any time on the activity, and lead to future difficulties when reporting risk to the commission.

The involvement of the partners is here an essential part of the method. Nonetheless, the implementation or execution of the method still seems to be seen as too much effort, especially with regards to the time and resource required to build initial competence. This is problematic as the benefits may not compensate the training efforts engaged if not implemented sufficiently early in the project. It will also lower the expected results as well as prevent completely fulfilling the requirement of the grant agreement.

3.4. *Variation on the role of risk manager*

As a risk manager, we proposed a process to collect, follow-up risks and communicate. This role in the project can be supported by the project management. For example, being present in project status meetings can help to better understand the progress and harmonize the risk manager´s views on the critical risks in the project.

Sometimes, the proposed methods were not seen as relevant for the project. Some of the proposed risks templates were mentioned as “too difficult” or “not addressing the right priority”. For example, the proposed risk matrix of 5x5 is often admitted being a common way to address enough level of details, with three categories of risks depending on their likelihood and their impact: acceptable, as low as possible, and unacceptable (see Fig.1). As said earlier, there are discrepancies and well-known problems when using risks matrix. However, the difficulties in the project were aimed on the classification and the importance of the risks, what are the unacceptable

risks and what are the impacts if not mitigated in a short time.

This vision of the risk matrix may differ from the habits of other risk managers. They may use other size (i.e. 4x4) or have more categories of risks. This agreement and changes to the proposed templates have to be decided at the earliest in the project and document.

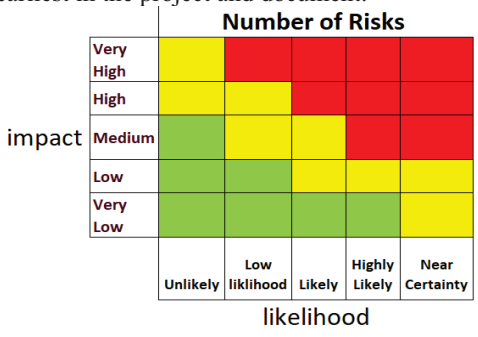

Fig. 1. Risk matrix 5x5with 3 level of risk category. Green – acceptable, yellow – as low as possible (ALARP) and red – Unacceptable.

Whereas some of these failures in risk communication can be overcome with more experience and tailoring, the next part is trying to explain some common factors that have to be considered when thinking about "best processes" for risk management.

4. Discussions

4.1. *Experience does not prevail over verification*

Part of the difference between expectations and reality is that many take for granted that experienced people applied methodologies in a good manner. It is not automatically true that because people are knowledgeable or trained, they will apply systematically and methodically all the steps in the process, without any miss or shortcuts and simplifications. This may lead to weaken the process of risk collection that has been experienced difficult even by those practicing it regularly as it can be influenced by many interfering factors (as economy, availability of the partners, missing documentation, timing and scheduling of the activities, etc.). Some objectives parameters have been introduced earlier in this paper, but more qualities should be considered as the team performing the study. Take a simple example: ask different people to bake a cake, following the instructions of a given recipe. Some may do mistake or miss a step. Some may be applied to the letter. Is it expected that the exact same cake will result from each baker considering they have received the same ingredients in the same proportions? The answer is no, as the way you perform will have an impact on your cake. Reproducibility of risk management and communication is depending on other factor than methods a well performed application from the proposed templates. One can follow the same process and still have different risks register than expected. Parameters and unforeseen variations will affect the final production as human or organizational factor enters in consideration.

4.2. *Risks perception: risks depend on your priorities*

A goal in E-LAND project was to increase the understanding of potential future risks of applying the solution or replicating it. this change of perspective from site to site was achieved thanks to a set of activities: simplification of the communication through simple flyers on technical key aspects in the risks management, monthly meetings with the stakeholders, dedicated end-users' workshop. These activities improved the risks understanding, increase the awareness and reduce uncertainties. Considering different perspectives may lead to cover risks that were not foreseen with a top-bottom analysis from the top project management.

Underestimation of risks is a well-known bias in the risk management. In social sciences, risk is often defined as "*a situation or event where something of human value is at stake and where the outcome is uncertain*" (Rosa), or "*an uncertain consequence of an event or an activity with respect to something that humans value*" (IRGC). Risk perception is the judgement or belief held by an individual, group or society about a risk. Vision of risk is subjective, the evaluation of the risk will also be biased not only by the number of identified risks, but also by their category. Risks perception depends on different parameters as: the experience of the risk manager, the context and impact. At the end, this influence how daring is the management to consider a risk, how much effort is it to lower the highest risks.

4.3. *Misconceptions or good enough*

As indicated in the background, there is a broad amount of literature on risk communication. Similar there are several opinions on what is academic correct, according to an applied research methodology or based on a large and representative group of observed cases. This paper does not go into those discussions as the objective of paper is to share experiences. Sharing of experience is concerned about allowing others to apply what worked and avoid redoing mistakes.

4.4. *Limitations and threat to validity*

If the first occurrence of the process has received good feedback, they have not been evaluated with a systematic collection of data on human views. The feedback received was composed through meetings and a quantitative survey with only a few answers. If the feedback on the process were positive, they may not reflect fully and in detail the opinion of the partners. Some difficulties in the process may have been hidden by this lack of evaluation. This aspect of the validation could be interesting to pursue at the end of the current projects, moreover, considering some of the previously described examples of applications.

5. Conclusions

Risk communication is an important asset of the risk manager to guide the decision makers. Risk communication is a key aspect when engaged with a broad audience or as a part of a crisis management plan. But developing a risk communication process can also benefits the risk management as a whole process in industrial project. E-LAND was developed during a European project and has been applied in other European projects since its first steps. Based on best practices, the concept is to gradually build up risk awareness among the project participants. In practice, we claim that this is achieved thank to a simplified process, the use of direct meetings, and graphical formats to communicate the risk picture.

In this paper, we have shared experiences from applying the E-LAND approach to risk communication in several European research projects. We argue through the project experiences that the investment is seen as beneficial to not only optimize the risk collection but also to ease the implementation of mitigations and the risk identification. At the end, the final product will benefit from an increased trust in the developed solution. Although such efforts may not always be seen optimal in all contexts as it requires a commitment from the risk management and the project partners that may have other priorities and constrains in the project, such as resource availability, costs, time, etc.

The experiences shared in the paper confirms some of the known difficulties when performing risks management (difference in the risks understanding, difficulties to foreseeing challenges, dependent on human variability and organization factors). We see most of them repeated without being treated in a clear and systematic way. We note that these common issues are not dependent on the fields of application but are more influenced by the numbered of participants and the management decisions (as the multiplication of the views can be difficult to merge into the desire output and as the risks manager is dependent on the decision maker). We try to address some lessons learned and observations to overcome the current challenges and ease the risk communication by addressing this topic early to agree upon how risk should be performed without being at the center of attention. A good risk communication can avoid a lot of misunderstandings and misconceptions on what can risks may help the project with and favor to clarify the expectations towards the risks manager. A good start can be to agree on the definitions, good routines and periodical updates together with the project management. Risk management is performed in many distinct ways and should be tailored to provision the needs of the projects and the team. Not to become an over complexified, unchanged and limited tool. Risk managers may find ways to modernize and simply their processes, when possible, through well thought out risk communication. It is then important to oversee the challenges in the project without making the risk management effort unnecessary present and not to forget that the project has its own objectives on deliverables and development.

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