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Risk Management in International Projects with Teams in the Virtual Environment – Literature Review

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International projects are considered high risk level projects and this characteristic is known to be a significant obstacle to project success. Applying the appropriate risk management methodology often depends on correctly identifying and understanding the risk factors, which can be understood as barriers to effective risk management. Research on risks and their management in traditional projects are numerous, however, research on the main risks in international projects with teams in the virtual environment (IPTVE) are very few, with emphasis on software development projects, without taking into account the differences between traditional and international ones. Thus, risk management in IPTVE is a new and absolutely necessary approach for the success of the teams in the virtual environment and the performance in managing international projects. This article aims to present the main risk factors, the impact that they can have on IPTVE and to highlight that risk management becomes an essential tool for decision making, in order to minimize the disadvantages of working with international project teams in the virtual environment.

Keywords: International project management, risk factors, virtual teams, global projects, project success

1. Introduction

The expansion of projects beyond the country's borders generated by the phenomenon of globalization has led to changes in the global economy, industries and societies of the world, while requiring a flexibility of traditional project management techniques and processes, as well as an upgrade of these. Many of the companies choose to initiate international projects or are forced to do so in order to survive, gaining access to limited resources, new technologies, the experience of partners abroad and their know-how (Dumitraşcu, I., Dumitraşcu, D., D., 2015b). Project teams in the virtual environment can play a very important role in supporting companies that develop sustainable strategies to align with international environmental protection policies, supporting sustainable development. These teams end up holding the title of "green job" (Dumitraşcu-Băldău I., Dumitraşcu O., 2019), taking into account the fact that one of the important advantages of these teams is the reduction of the carbon footprint (Dumitraşcu I., Dumitraşcu DD, 2015a). At the same time, teams in the virtual environment become life-saving solutions in extreme global situations, such as the covid-19 pandemic, and organizations familiar with this type of project team will have a considerable advantage in their ability to operate efficiently.

Despite the fact that international projects and virtual teams are a reality of recent years, a growing phenomenon, but also a necessity, research in this field is limited, which is why many international project managers are still quite intimidated by building teams in the virtual environment"(Dumitraşcu, I., Dumitraşcu, D., D, 2015b), as a result of the multitude of new disadvantages and risks they generate. The low success rate (Dumitraşcu I., Dumitraşcu D.D, 2020) of international projects is due to their complexity, high risk, changes that occur during the project and therefore, the impossibility of accurately estimating time and costs. Dandage, R.V., Mantha, S.S., Rane, S.B. et al. (2018) stated that successful project management is often based on understanding barriers to effective risk management, applying appropriate risk management methodology, proactive management to avoid barriers, employee attitude, adequate resources, organizational culture and involvement of top management. They also consider that in project management, high levels of risk are considered to be a significant obstacle to the success of the project, which consolidates and highlights the importance risk management process. Rabechini R. J., Monteiro de Carvalho M. (2013) in their research also claim that the results suggest that risk management, even when moderate, has a strong connection with risk levels and project success.

Noting the importance of risk management in the successful management of a project, researchers have given significant importance to risks and their management in traditional projects. In contrast, research on the main risks in international projects with teams in the virtual environment (IPTVE) is very scarce, with a focus on software development projects, not taking into account the differences between traditional and international projects. With these aspects in mind, we consider that risk management becomes an essential tool for decision making, in order to minimize the disadvantages of working with international project teams in the virtual environment.

The purpose of addressing this topic is to identify the main risk factors, to understand the impact they may have on IPTVE, as well as to be aware of the need for a flexible approach of risk management process, adapted to the virtual work environment.

2. Methodology: Selection of Papers

The methodology used for the current paper was the bibliographic research. Because the specific literature explicitly addressed to international projects with teams in the virtual environment is extremely limited, we chose to fragment our searches into two parts, respectively two categories of main keywords. Namely those related to the literature specific to international projects (risk factors in international projects, international project risk management, challenges within international projects) and those related to the literature specific to virtual teams, virtual project teams, including virtual organization that is often used as an equivalent for the term virtual team (risk factors in virtual teams, risks/ challenges within virtual teams, virtual team risk management). Following these searches in recognized databases such as Web of Science, SCOPUS, Science Direct, DOAJ, RePEC, Google Scholar, we have analyzed 47 scientific articles tangent to the research topic and books. We have also analyzed the citations of the authors' works previously published in the studied field, three doctoral theses, books available on online libraries such as Wiley Online Library and we have also used the snowball technique, following some of the important references from the previously identified works. In the searches we included publications in English, Spanish and Romanian.

3. Risk factors in IPTVEs vs. traditional projects

Unlike traditional projects, defined as an atypical complex effort, with a well-defined purpose, non-routine, limited time, budget, resources, costs, requirements and performance, designed to meet consumer needs (Dumitrașcu, D.D. and Pascu , R., V., 2005, p. 8), the international project is explained as a project involving multiple locations, entities, organizations and business units (Lientz B., Rea Kathryn, 2003, p. 21), they occur when projects include people located beyond the country's borders (Jean Binder (2007, p.14) and exceed national borders in general in terms of purpose and nationality of stakeholders (Köster K., 2010, pp. 27-28). In addition, the emergence of the virtual work environment adds the feature of 'virtual' to international projects, transforming them and requiring a readjustment of management processes, including the creation of international project team in the virtual environment, adding new challenges to the project manager list. Thus, the virtual team becomes one of the most important dimensions of the international project, as a result of technological innovation, which provided the necessary means to overcome spatial and temporal communication barriers, as well as to access talent beyond the borders of the country or continents. (Dumitraşcu, I., Dumitraşcu, D., D., 2015b). This type of project team carries out most of its work, remotely, through technology (Brewer, Pam, Estes, 2015), share a work, products or a common project goal (Lee R. Margaret, 2014 , p. 2) and work in the context of a moment of beginning and one of completion of work and time, which they will spend together as a team, well established (Reed, H., A., Knight, V. L., 2010). Also, a project team in the virtual environment will become international, when its members operate outside national borders (Dumitraşcu-Băldău I., Dumitraşcu O., 2019). Thereby, the virtual work environment is the one that exists digitally, being created and maintained by the existence of the Internet.

Based on the above, we can affirm that an IPTVE is much more complex, dynamic and riskier than a standard project, because it incorporates new features and dimensions (Dumitraşcu, I., Dumitraşcu, D., D., 2015a). Shenhar J. A. and Dvir D. (2007, p. 7) stated that the common element of project execution failure is that both executives and project teams did not know how to appreciate, in advance, the degree of uncertainty and complexity or did not know how to communicate these new dimensions to each other, failing to adapt the management style to this situation. Problems that can arise can take many forms, from different technical specifications in certain areas of the world, quality standards, units of measurement, etc., which can lead to delays in project completion, to strong conflicts between team members, such as due to ignoring cultural diversity, lack of trust, poor communication.

Researchers have compiled lists of the most important risk factors for projects such as resource expertise, team diversity, complexity of technology and/or applications, unrealistic budgets and programs. DeMarco T. and Lister T. (2003) provide information on the link between risk and problems that may arise, specifying that "risk is a problem that has not yet manifested itself, and the problem is a risk that has already materialized". This relationship between risk and problem suggests a link between the risks of the project and its failure. The risks that cannot be diminished and that are amplified in problems, can produce various effects, from not meeting the client's requirements, performance problems, to missed opportunities, exceeded budget and even project failure (Reed, A. H., Knight, V. L., 2010).

Köster K. (2010) states that among the risk factors faced by international project managers can be included the management of a very large amount of information in a short time and the formulation of a goal, to which all members feel strongly involved, given the high degree of diversity specific to international projects. Another risk factor is maintaining commitment for a long period of time, which is often necessary due to the extended duration of international projects. Also, Köster K. (2010, p. 2) belives that leaders of international projects must be aware of the nature of cultural differences and must be prepared to work effectively in the presence of diversity, being able to turn these differences into a greater creativity.

Later on, Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014), as a result of the empirical research conducted, they have identified in the qualitative analysis stage the most important risk factors as: the communication factor was determined as the most effective in virtual project risk management, subsequently in order of importance, the lack of resource provision, insufficient knowledge and expertise, inadequate leadership and control, lack of commitment, lack of cooperation and coordination, improper project design and organization, improper timing of tasks, insufficient motivational system, financial situation of the market, lack of information security, lack of mutual trust, political status, different cultures, payment problems and social status. These factors with higher priority compared to other factors have been assigned higher degrees of importance in the risk quantification process. These factors are mostly related to issues that may arise within the project team area, as the authors established also in a previous empirical research (Dumitraşcu I., Dumitraşcu D.D, 2020, p. 167), where at the question in which the subjects are asked to order the answers regarding the main areas responsable for the international projects failure, the majority of the respondents stated that the 'project team area' is in the first place, followed by 'processes' and 'customer' areas. Even though the project team is obviously one of the most important problem areas, global risk factors (political and economic) continue to receive the most attention from researchers (Shadab Alipour, Tadeh Zirakian, and David Boyajian, 2017).

Complementarily, in the existing literature on virtual teams, certain differences have been identified between virtual teams and traditional co-located ones, such as those mentioned by Reed A. H. and Knight V. L. (2010) who specifically stated seven major areas where virtual teams differ from traditional co-located teams, becoming risk areas for virtual teams: insufficient knowledge transfer, lack of project team cohesion, cultural or linguistic differences, inadequate technical resources, lack of experience in connection to the company and its processes, loss of key resources and hidden agendas. The existence of a virtual project environment causes all these risks to occur and cause damage. Because none of these seven pose critical risks in traditional teams, they are called "silent killers" because they are much more likely to occur in virtual projects. Thus it becomes clear the extremely important role of fast and efficient communication within IPTVE, in order to develop a virtual relationship between team members in the virtual environment, based on trust, measuring progress, evaluating results, meeting objectives and, last but not least, achieving control function. In order to overcome this challenge, it becomes necessary compared to projects with traditional teams, to take into account the intercultural communication skills (Dumitraşcu, I., Dumitraşcu, D., D., 2020, pp. 119-127) for the team members and the use of a common language of international circulation (Dumitraşcu, I., Dumitraşcu, D., D., 2020, p. 175), which each member of the teamhas to master it. Wood, M. (2014) supports this idea by stating that when the team will be multicultural in nature (ethnically, organizationally, etc.), there must be a focused effort in educating team members, regarding the specific differences of the cultures involved. This will help the team develop a harmonious relationship, trust and respect. Also, each member of the virtual team must have sufficient technical and PC knowledge to be able to use all the innovative communication tools at his disposal. Settle-Murphy N. M. (2013, p. Xiii) states that organizations are beginning to realize that specialized skills and competencies are needed to effectively lead teams in the virtual environment, being considered more important than establishing the best combination of collaborative technological tools used in the virtual environment. In this regard, the lack of these competencies specific to the members of the IPTVE, becomes an important risk factor.

Another risk factor is the quality of training of project teams in the virtual environment regarding the risk management process. Teams must be able to identify various alarm signals or causes for the risk event. If risks are not properly assessed or managed, effective risk management cannot be initiated, and it is unlikely that appropriate preventive measures will be found or implemented (EU-OSHA, OIRA). Subsequently, the team must have the necessary skills to develop the necessary responses to reduce the identified risks. Each risk may not occur as imagined or may not occur at all. Rad, P., F., Ginger, L., (2003) consider that the stages of risk management must become a routine like the other activities of the project. A risk management monitoring and control plan should include team reviews, task planning, monitoring and control. In this connection, the study conducted by AON (2019) indicates a constant increasing involvement of all departments in an organization in the risk management process.

4. Risk Management in IPTVE vs traditional projects

According to PMBOK - sixth edition (Project Management Institute, 2017), risk management is one of the ten areas of project management knowledge. Risk management must become part of the team's culture in the virtual environment for the process to become effective. Risk is the effect of uncertainty and unplanned events can occur within objectives.

There is a possibility that these events may occur and may have an impact on the organization's ability to meet its objectives. The identification, evaluation and prioritization of these risks through the coordinated and economic application of resources, in order to minimize, monitor and control the impact of these risks on the project, is a short definition of risk management. The probability of these events can also be minimized through a solid risk management strategy (Akendiz, C., 2015, p.5).

Although specialists have different views on the number of steps (2-4 steps) in risk management, everyone agrees that the first step is to identify risk factors, which is an attempt to find and document all possible risk areas for a specific project (Reed, A. H., Knight, V. L., 2010) and maintained throughout the life of the project, because risk management is a continuous activity (Rad, P., F., Ginger, L., 2003). Subsequently, the probability of occurrence and the impact on the project for each identified risk will be estimated. The impact can be on the purpose, cost or duration of the project.

Traditional risk management has been effective in meeting the needs of a single organization and its relationships with its customers and subcontractors, including in ongoing projects. However, the current globalization of markets, business relations and technology has given rise to less collaborative efforts and centralized partnerships, those for the development of multi-organizational programs. These partnerships, embodied in international or global projects, require changes in internal organizational practices, in particular for collaborative communication and significant improvements to an organization's risk monitoring, risk mitigation and management activities (Mohtashami, M., Marlowe, T., Kirova , V., & Deek, FP, 2006). Persson, J. S., Mathiassen, L., Boeg, J., Madsen, T. S., & Steinson, F. (2009) state that the basic principles of risk management seek to generalize the patterns of relationships between organizational contexts (in the form of risk areas and underlying risk factors) and the use of technologies (in the form of resolution techniques) in ways that support human action. Reed, A. H., Knight, V. L. (2011) support the idea that it must be acknowledged that the risks in virtual projects are not the same as the risks in traditional projects. Only then will the risks of virtual projects receive the necessary research attention. Standard risk management plans, although necessary, cannot easily address risk management in complex projects such as international ones. Not only are there new, intensified or modified risks, but some risks can only be detected or managed at the specific level of multilateral collaboration and should be managed by a shared risk management plan. In addition, the risks that may affect several partners in different ways or involve inter-organizational trust, should also be managed at the level of collaboration (Mohtashami, M., Marlowe, T., Kirova, V., Deek, F. , P., 2006).

Researchers Rabechini R. J., Monteiro de Carvalho Marly (2013) showed that the importance of the project context, both industry and country, are significant for the risk levels of the project, while demonstrating that the introduction of the risk management process has a positive impact on the success of the complex project. IPTVEs are complex projects and need flexible processes, apart from the triple constraint. The success of the project usually depends on the combination of all risks, the response strategies used to mitigate the risks and the ability of an organization to manage them. There is a need to develop risk models, tools that contain the risks of developing partnerships in international markets and the factors that affect the manageability of these risks. Douglas W. Hubbard (2020) categorically states that the ultimate common mode failure would be a failure of the risk management process itself. A weak risk management approach is effectively the biggest risk in the organization. Regarding the development of tools to identify and assess specific risks throughout the life cycle of an international project, we have identified the IPRA tool applied specifically to engineering and construction projects, but which does not take into account the development stages of risk response and control strategies (Walewski, JA, Gibson, GE, Jackson, Y., & Vines, EF, 2004). 82 international risks were identified, grouped in fourteen categories and four main areas (Commercial, Country, Facilities, Production/ Operations) corresponding to project life cycle.

The main risk elements found as having a severe impact were related to the commercial and country section (scope development process, schedule, relationship with government, contract type and procedures, currency technology, estimate uncertainty, operational safety, religious and business practices differences, hiring, training and retaining workforce). Thus, it can be seen that the project team is not included as a risk category, which is why we consider that this tool must be completed with this area of risk that we consider fundamental, given that the international project acquires a virtual dimension.

Moreover, while risk management has been successfully applied in the development of international software projects with co-located teams, the resulting techniques fail to address the unique challenges of communication and collaboration that distinguish software projects with dispersed teams from traditional ones. As we have observed both from the bibliographic research (Lientz B., Rea, Kathryn (2003), Goncalves. M (2005), Cleland, I., D., Gareis, R., (2006), Binder J. (2007), Köster K. (2010), Casey V. (2010), Grisham TW (2011), Lee, R., Margaret (2014)) as well as the empirical one (Dumitraşcu, I., Dumitraşcu, D., D., 2020, pp. 167-183) geographical, temporal, cultural and linguistic distance, can have a negative impact on coordination, cooperation, communication and visibility within the team in the virtual environment. Thus, Casey V. (2010) considers that given these new conditions, it must be recognized that the management of a project team in the virtual environment must be carried out in a different way than that of a traditional team, co-located, and the results of his research highlighted six specific areas of project management, which must be approached differently to facilitate the successful operation of the virtual team, including risk management. Casey, V. (2010) showed in his research that risk management process requires additional efforts and activities to achieve its goals in a virtual environment with teams worldwide. Other researchers have also stated that the management of projects with teams in the virtual environment is fundamentally different from that of traditional projects (Khazanchi, D., & Zigurs, I., 2006) and consider that within project teams in the virtual environment must be added new perspectives on planning and resources to mitigate associated issues, new types of risk, risk forecasting, level, impact, scope, source, etc. (Mohtashami, M., Marlowe et al., 2006).

Regarding the effective analysis of risks in virtual teams, Grabowski M. and Roberts K. H. (1999) undertook various researches, identifying four processes that they consider important: organizational structuring and design, communication, culture and trust, suggesting, at the same time, that risk mitigation processes should focus on interface-level communication, develop a common organizational culture of reliability for all members, using effective communication, and build trust among members. The latter is also essential for risk mitigation processes. Subsequently, Grabowski, M., et al. (2007) stated that risk in the virtual organization can migrate among the members of the organization, which makes it difficult to identify and mitigate risks. Because virtual teams are made up of members with their own individual goals, policies and cultures, and because members are tied to temporary alliances that reflect changing market opportunities, developing a common culture of reliability and common commitments to project goals is difficult, because the presence of simultaneous interdependence and autonomy creates an inherent tension in the virtual team. Later, researchers Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014) analyzed the risks in virtual teams based on the PMBOK methodology, taking into account the two constraints specific to traditional projects (cost and time - using fuzzy values for budget and time, in risk response strategies), but they erroneously considered, from our point of view, that virtual teams are similar to traditional ones, being oriented towards the same results and therefore, supporting as the project management methodology can be the same regardless of the type of team. This approach can only be extremely erroneous, given the fact that "the virtual environment amplifies the most difficult aspects of managing a team" (HBR - 20 minutes manager collection, p.23, 2016). Based on the same hypothesis, international project managers can act, explaining the tendency to similarly manage teams in the virtual environment, which can result in an inefficient team, and implicitly, the failure of an IPTVE.

In addition, the virtual work environment supported by the development of information and communication technology, leads to the emergence of new risks for safety and health at work. Identifying these risks can help project managers in establishing effective strategies to prevent them, so that the results of international project teams in the virtual environment are not affected. In the literature we have identified a series of risks, which can be assimilated to the virtual work environment, usually being combined risks, as a result of establishing a correspondence between the risks corresponding to office work, which eliminates those regarding the physical presence of colleagues and are added those generated by their lack of presence, work done at home, work specific to teleoperators, those who work constantly in front of viewing screens. In addition to these risks in the literature, we add the risks specific to the international work environment. In international projects, the interaction between different national cultures, in particular, as well as the existence of other differences, such as linguistic, ethical, educational, etc., can lead to communication difficulties, lack of trust, conflicts, isolation of team members, inadequate distribution of tasks, as well as their unsynchronization with the time of the project, all these leading to mental disorders, such as depression and anxiety (Dumitraşcu, I., Dumitraşcu, D., D., 2017). Following the risk assessment, the main resulting risks, which can significantly affect the performance of project team members in the virtual environment, are psycho-social risks, stress being one of the most complex phenomena to study and analyze, in accordance with virtual work characteristics and those of international projects. Given the implications of the emerging occupational risks effects, it becomes clear that additional information and tools adapted to the virtual work environment are needed to assess and achieve effective risk management (Dumitraşcu, I., Dumitraşcu, D., D., 2020 , p. 57). "In addition, case studies have shown that good OSH management within a company is closely linked to improved performance and profitability. Not only do low safety and health measures represent a much higher cost for companies, but at the same time, a good OSH pays dividends "(Bräunig, D, Kohstall, T., 2013).

Although there are sufficient risks with a discouraging effect to build an international project team in the virtual environment, we consider that the advantages (Dumitraşcu I., Dumitraşcu DD, 2015a) they offer, especially through access to limited resources, are far superior and we support, at the same time, the idea of Kurtzberg T.R. (2014) which states that humans are beings of habit. As we get used to a certain way of doing or seeing things, we not only feel more and more comfortable in that position, but we also defend it as the best way to do those things. People are used to face-to-face interaction. However, studies have shown that if a person loses the ability to see, the other senses develop much stronger abilities to be able to cover the loss. In an analogous way, we can talk about the loss of the possibility to interact face-to-face and the need to develop new skills in order to achieve the same goals. Table 1 represents a summary of the identified risk factors and risks, which we divided into three categories corresponding to the three problem areas in IPTVEs.

Table 1. Risk factors and risks in IPTVEs

Problem area in IPTVEs	Risk factors	Risks
Team	*Virtual work environment, team diversity* (DeMarco T. and Lister T. (2003)); *geographical, temporal, cultural or linguistic differences* (Lientz B., Rea, Kathryn (2003), Goncalves. M (2005), Cleland, I., D.,	*Poor risk management approach* (W. Hubbard (2020)); *difficulty in commitments to project goals, poor communication; dificulty in developping a common organizational culture, lack of*

Problem area in IPTVEs	Risk factors	Risks
	Gareis, R., (2006), Binder J. (2007), Köster K. (2010), Casey V. (2010), Reed A. H. and Knight V. L. (2010), Grisham TW (2011), Lee, R., Margaret (2014), Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014), (Dumitraşcu, I., Dumitraşcu, D., D., (2020)); *employee attitude, organizational culture, involvement of top management* (Dandage, R.V., Mantha, S.S., Rane, S.B. et al. (2018)); *the need to formulate a project goal to which all members feel strongly involved* (Köster K. (2010), Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014)); *lack of project team cohesion* (Reed A. H. and Knight V. L. (2010)); *communication* (Shenhar J. A. and Dvir D. (2007), Köster K. (2010), Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014), Dumitraşcu, I., Dumitraşcu, D., D., (2020)); *insufficient knowledge and expertise* (Settle-Murphy N. M. (2013); (Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014)); *insufficient knowledge transfer* (Reed A. H. and Knight V. L. (2010)); *inadequate leadership and control, lack of cooperation and coordination, improper timing of tasks, insufficient motivational system, lack of mutual trust* (Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014)).	*trust, an inherent tension due to simultaneous interdependence and autonomy* (Grabowski, M., et al. (2007)), *religious and business practices differences, hiring, training and retaining workforce* (Walewski, JA, Gibson, GE, Jackson, Y., & Vines, EF, (2004); *isolation of team members, inadequate distribution of tasks, unsynchronization with the time of the project, risks for safety and health in the virtual work environment* (Dumitraşcu, I., Dumitraşcu, D., D., 2017).
Processes	*Unflexible project management, using the same instruments and techniques as in a traditional project* (Shenhar J. A. and Dvir D. (2007)); *impossibility of accurately estimating time and costs, high levels of risk, inadequate resources* (DeMarco T. and Lister T. (2003), Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014), Dandage, R.V., Mantha, S.S., Rane, S.B. et al. (2018)), *accurately appreciate the degree of uncertainty and complexity, different technical specifications in certain areas of the world, quality standards, units of measurement* (Shenhar J. A. and Dvir D. (2007)); *inadequate technical resources* (Reed A. H. and Knight V. L. (2010)); *management of a very large amount of information in a short time, diversity specific to*	*Difficulty in identification and mitigation risks* (Grabowski, M., et al. (2007)); *technology, estimate uncertainty, operational safety* (Walewski, JA, Gibson, GE, Jackson, Y., & Vines, EF, (2004))

Problem area in IPTVEs	Risk factors	Risks
	international projects (Köster K. (2010)); *improper project design and organization, lack of information security* (Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014)); *loss of key resources and hidden agendas* (Reed A. H. and Knight V. L. (2010))	
Client	*Quality standards, political status; situation of the market,; payment problems and social status* (Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014))	*Required Quality* (Shenhar J. A. and Dvir D. (2007)), *scope development process, schedule, relationship with government, contract type and procedures, currency* (Walewski, JA, Gibson, GE, Jackson, Y., & Vines, EF, (2004))

In conclusion, successful risk management requires more than good processes and the ability to think intuitively also requires discipline and method. Risk management must be proactive to prevent problems and is an ongoing and simultaneous process (many risks are managed at the same time). The opposite of risk management is crisis management, trying to solve a problem after it happens (Prikladnicki, R., Evaristo, R., Audy, JLN, & Yamaguti, MH, 2006), being a different and complex process, with possible costs and / or additional losses. International projects in which a systematic risk assessment and a process of mitigation and associated decisions are carried out, have a higher degree of performance than those in which such processes do not take place. Not all organizations understand that international projects are more complex and the severity of risks is higher than in traditional projects. Risk management needs to be done throughout the entire project life cycle (Walewski, John, 2003). While the resources used in risk management could be used to increase profits, ideal risk management involves minimizing not only the resources used but also the negative effects (Akendiz, C., 2015, p.6).

5. Conclusions and future research directions

The analysis of the specialized literature in the field of risk management in international projects and teams in the virtual environment revealed that the research undertaken was very scarce and focused on either identifying and analyzing risks in international projects (Dandage, RV, Mantha, SS, Rane, SB et al, 2018;), especially those in the field of construction (Walewski, JA, Gibson, GE, Jackson, Y., Vines, EF, 2003; 2004; Shadab, Alipour, Tadeh, Zirakian, David, Boyajian, 2017), or within dispersed teams in software projects (DeMarco, T., Lister, T., 2003; Mohtashami, M., Marlowe, T., Kirova, V., & Deek, FP, 2006; Prikladnicki, R., Evaristo, R., Audy, JLN, Yamaguti, M. H, 2006; Persson, JS, Mathiassen, L., Boeg, J., Madsen, TS, & Steinson, F., 2009) and to a very small extent, virtual project teams (Ghaffari, M., Sheikhahmadi, F., & Safakish, G., 2014; Reed, April H., Knight, V. Linda, 2010; 2011). To date, the risks of this new type of project, namely international projects with teams in the virtual environment (IPTVE), have not been identified and analyzed in depth. Thus, after identifying and analyzing the specific risks, it will be considered to establish the extent of the impact they may have on IPTVE, their prioritization, methods to minimize them, and identifying barriers that may arise in order to effectively manage risks. In addition, unlike previous research undertaken by Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014) we will address a flexible model of risk management within IPTVE, corresponding to complex projects, apart from time constraints and in line with the "multidimensional model" of

Shenhar and Dvir (2007), a new approach to project management that goes beyond the triple constraint, based on the idea of "measuring what you receive and analyzing the benefit of the investment" (Shenhar, J., A., Dvir, D., 2007, p.25). To differentiate projects, Shenhar and Dvir (2007) introduce four essential dimensions: "novelty, technology, complexity and pace", presenting a new working structure, called "diamond structure" (Shenhar, J., A., Dvir, D., 2007, p.27). On the other hand, this structure has some limitations, because project managers must take into account other features of international projects. Thus, we will do the risk analysis taking into account the four new additional dimensions (cooperation, multiculturalism, team dispersion, additional resources), which we proposed in a previous research, a customization of the diamond model for international projects, called "the adapted model of the diamond" (Dumitraşcu, I., Dumitraşcu, D., D., 2015).

We consider that the differences regarding the expected results will consist in a change of the hierarchy of the main risks, with emphasis on those generated at the level of the project team in the virtual environment, taking into account the results of previous research on success factors within IPTVE.

At the same time, the bibliographic research of occupational risks within IPTVE can represent a starting point in conducting an original empirical research on emerging risks in international project teams in the virtual environment, in order to validate the identified risks, based on which it will be possible to develop an OiRA tool, specific to the virtual work environment in international projects.

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References

1. *Akendiz, C. (2015), Risk Management Explained, First Publishing, Germania.*
2. *Atesmen, M., K. (2008), Global Engineering Project Management, CRC Press – Auerbach Publications.*
3. *AON (2019), Global Risk Management Survey, retrieved from https://www.aon.com/getmedia/8d5ad510-1ae5-4d2b-a3d0-e241181da882/2019-Aon-Global-Risk-Management-Survey-Report.aspx*
4. *Bernard, Russel, H., Wutich, Amber, Ryan, Gery, W. (2017), Analyzing Qualitative Data, Systematic Approaches, Second Edition, Sage Publications, Inc., USA.*
5. *Binder, J. (2007), Global Project Management, Gower Publishing Limited.*
6. *Bräunig, D, Kohstall, T .(2013 , ISSA, Calculating the international return on prevention for companies Final report, retrieved from http://publikationen.dguv.de/dguv/pdf/10002/23_05_report_2013-en--web-doppelseite.pdf.*
7. *Brewer, P., E. (2015), International Virtual Teams: Engineering Global Success (IEEE PCS Professional Engineering Communication Series), Wiley-IEEE Press.*
8. *Casey, V. (2010), Virtual software team project management, J Braz Comput Soc 16: 83, 2010, retrieved from https://doi.org/10.1007/s13173-010-0013-3.*
9. *Cleland, I., D., Gareis, R. (2006), Global Project Management Handbook, The McGraw-Hill Companies.*
10. *Curlee, W., Gordon, R., L. (2011), Complexity Theory and Project Management, John Wiley and Sons, Inc., Hoboken, New Jersey.*

11. *Dandage, R.V., Mantha, S.S., Rane, S.B. et al. (2018), Analysis of interactions among barriers in project risk management, J Ind Eng Int, 14: 153, 2018, retrieved from https://doi.org/10.1007/s40092-017-0215-9.*
12. *DeMarco, T., Lister, T. (2003), Waltzing with Bears: Managing Risk on Software Projects, Dorset Publishing Co., Inc., New York, NY, 2003, retrieved from http://ptgmedia.pearsoncmg.com/images/9780133492057/samplepages/0133492052.pdf.*
13. *Hubbard, W. Douglas, (2020), The failure of risk management, Second Edition,* John Wiley & Sons, Inc., Hoboken, New Jersey.
14. *Dumitraşcu-Băldău, I., Dumitraşcu, D., D. (2020), International projects with teams in the virtual environment, Lap Lambert Academic Publishing, ISBN-13 978-620-0-54025-6.*
15. *Dumitraşcu-Băldău, I., Dumitraşcu, O. (2019), Research on the Behavior of Factors That Influence the International Virtual Project Team Performance, Using Data Modeling Techniques, Sustainability 11, 607, 2019, retrieved from https://doi.org/10.3390/su11030607.*
16. *Dumitraşcu, I., Dumitraşcu, D., D. (2017), Occupational emerging risks affecting international virtual project Team Results, 8th International Conference on Manufacturing Science and Education – MSE 2017 "Trends in New Industrial Revolution", MATEC Web Conf., Volume 121, 2017, Article number 07003, section Management and Economic Engineering, retrieved from https://doi.org/10.1051/matecconf/201712107003.*
17. *Dumitraşcu, I., Dumitraşcu, D., D. (2016), Creating Effective International Virtual Project Team, 23rd International Economic Conference – IECS 2016, Revista Economică, ISSN: 1582-6260, Volume 68, Issue 3, pp. 46-56, 2016.*
18. *Dumitraşcu I., Dumitraşcu D.D. (2015a), Virtual Teams management in global international projects, Review of Management and Economic Engineering, Vol. 14 nº 4 (58), pp. 691-701, Todesco Publishing House; ISSN: 1583-624X.*
19. *Dumitraşcu, I., Dumitraşcu, D., D. (2015b), How to face globalization challenges through international project management, Revista de Management şi Inginerie Economică, ISSN 1583-624X, Vol. 14 nº 3 (57), Todesco Publishing House.*
20. *Dumitraşcu, D., D., Pascu, R., V. (2005), Managementul proiectului, Editura Universitatii "Lucian Blaga" din Sibiu.*
21. *Dunbar, Gordon, Project Management Failures - Standish (Chaos) reports (1994-2015), (2016), retrieved from https://www.linkedin.com/pulse/project-management-failures-standish-chaos-report-2015-dunbar.*
22. *European Commission, EU Employment and Social Situation: Quarterly Review (European Commission, Brussels) (2013).*
23. EU-OSHA, OIRA, *https://client.oiraproject.eu/nl/generic/generic-tool-in-english/start.*
24. *Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014), Modeling and risk analysis of virtual project team through project life cycle with fuzzy approach. Computers & Industrial Engineering, 72, 98–105, 2014, doi:10.1016/j.cie.2014.02.011, retrieved from https://www.sciencedirect.com/science/article/abs/pii/S0360835214000540.*
25. *Goncalves. M. (2005), Managing Virtual Projects, McGraw Hill Professional.*
26. *Grabowski, M., Ayyalasomayajula, P., Merrick, J., Harrald, J. R., & Roberts, K. (2007), Leading indicators of safety in virtual organizations, Safety Science, 45(10), 1013–1043, 2007, doi:10.1016/j.ssci.2006.09.007, retrieved from https://www.sciencedirect.com/science/article/pii/S0925753506001263.*
27. *Grabowski, Martha, Karlene H. Roberts (1999), Risk Mitigation in Virtual Organizations. Organization Science 10(6):704-721, 1999, retrieved from http://dx.doi.org/10.1287/orsc.10.6.704.*
28. *Grisham T. W. (2011), International Project Management: Leadership in Complex Environments, John Wiley and Sons.*
29. HBR – *20 minute manager collection (2016), Leading Virtual Teams, Harvard Business Review Press, Boston, Massachusetts.*

30. *Khazanchi, D., & Zigurs, I. (2006), Patterns for Effective Management of Virtual Projects. International Journal of e-Collaboration, 2(3), 25–49, 2006, doi:10.4018/jec.2006070102, retrieved from https://www.igi-global.com/article/international-journal-collaboration-ijec/1945.*
31. *Köster, K. (2010), International Project Management, Sage Publications Ltd., London,.*
32. *Kurtzberg, T., R. (2014), Virtual Teams: Mastering Communication and Collaboration in the Digital Age, ABC-CLIO, LLC, California, USA.*
33. *Lee, R., M. (2014), "Leading Virtual Teams", CRC Press-Taylor & Francis Group LLC, New York.*
34. *Lientz B., Rea, K. (2003), International Project Management, Academic Press.*
35. *Mohtashami, M., Marlowe, T., Kirova, V., Deek, F. P. (2006), Risk Management for Collaborative Software Development. Information Systems Management, 23(4), 20–30, doi:10.1201/1078.10580530/46352.23.4, retrieved from https://doi.org/10.1201/1078.10580530/46352.23.4.20060901/95109.3.*
36. *OSH Wiki Network Knowledge, Isabel L. Nunes, https://oshwiki.eu/wiki/OSH_in_general.*
37. *Persson, J. S., Mathiassen, L., Boeg, J., Madsen, T. S., & Steinson, F., Managing Risks in Distributed Software Projects: An Integrative Framework, IEEE Transactions on Engineering Management, 56(3), 508–532, 2009, doi:10.1109/tem.2009.2013827, disponibil la: https://ieeexplore.ieee.org/abstract/document/4815496, accesat la 26.09.2019.*
38. *PMI (Project Management Institute) (2013), Navigating Complexity, retrieved from http://www.pmi.org/~/media/PDF/Business-Solutions/Navigating_Complexity.ashx.*
39. *Prikladnicki, R., Evaristo, R., Audy, J. L. N., Yamaguti, M. H (2006), Risk Management in Distributed IT Projects, International Journal of e-Collaboration, 2(4), 1–18, 2006, doi:10.4018/jec.2006100101, retrieved from https://sci-hub.tw/https://www.igi-global.com/article/risk-management-distributed-projects/1948.*
40. *Project Management Institute (2017), Guide to the Project Management Body of Knowledge (PMBOK® Guide)–Sixth Edition, Project Management Institute, Inc., USA.*
41. *Rabechini, R., Junior, Monteiro de Carvalho, M. (2013), Understanding the Impact of Project Risk Management on Project Performance: an Empirical Study, Journal of Technology Management & Innovation vol.8 supl.1 Santiago, retrieved from http://dx.doi.org/10.4067/S0718-27242013000300006.*
42. *Rad, P., F., Ginger, L. (2003), Achieving Project Management Success Using Virtual Teams, J. Ross Publishing, ISBN: 1932159037, USA.*
43. *Radović Marković, M., Markovic, D. (2015), Measuring Professional Competencies of Virtual Teams: Fuzzy-logic Based Model, retrieved from http://www.tandfonline.com/.*
44. *Reed, A. H., Knight, V. L. (2011), Major Virtual Project Risk Factors, Journal of Information Technology Management, Volume XXII, Number 4, 2011 , ISSN 1042-1319 retrieved from http://jitm.ubalt.edu/XXII-4/article1b.pdf.*
45. *Reed, H.,A., Knight, V., L. (2010), Project Risk Differences Between Virtual And Co-Located Teams, Journal of Computer Information Systems 19, 2010, retrieved from http://dx.doi.org/10.1080/08874417.2010.11645446.*
46. *Reed, A. H., Knight, V. L. (2010), Effect of a virtual project team environment on communication-related project risk, International Journal of Project Management, Volume 28, Issue 5, July 2010, pp. 422-427, retrieved from https://doi.org/10.1016/j.ijproman.2009.08.002.*
47. *Settle-Murphy N., M. (2013), Leading Effective Virtual Teams: Overcoming Time and Distance to Achieve Exceptional Results, Auerbach Publications.*
48. *Shadab, Alipour, Tadeh, Zirakian, David, Boyajian (2017), On the Application of IPRA Tool in Risk Assessment and Management of International Construction Projects, Journal of Civil Engineering and Architecture, 11, P. 135-140, 2017, retrieved from doi: 10.17265/1934-7359/2017.02.004.*
49. *Shenhar, J., A., Dvir, D. (2007), Reinventing Project Management, Harvard Business School Press, USA.*

50. *Walewski, J. A., Gibson, G. E., Jackson, Y., Vines, E. F. (2004), A management approach to enhance international project risk assessments, PMI® Research Conference: Innovations, London, England. Newtown Square, PA: Project Management Institute, retrieved from https://www.pmi.org/learning/library/management-approach-enhance-project-risk-assessment-8343).*
51. *Walewski, J., Gibson, G., E. Jr. (2003), International Project Risk Assessment: Methods, Procedures, and Critical Factors, retrieved fromhttps://www.researchgate.net/publication/242126776_International_Project_Risk_Assessment_Methods_Procedures_and_Critical_Factors.*
52. *Wood, M. (2014), Virtual Teams: Do the Challenges Outweigh the Benefits?, retrieved from http://www.projectmanagement.com.*
53. *Zofi Yael (2012), A manager´s guide to Virtual Teams, AMACOM.*