



**VILNIUS UNIVERSITY
BUSINESS SCHOOL**

INTERNATIONAL PROJECT MANAGEMENT PROGRAMME

Edgar Fukson

MASTER'S THESIS

*Sėkminga projektų vadovų dirbančių virtualioje
aplinkoje IT srityje darbo praktika ir metodai*

*Successful practices and approaches of seasoned
project managers who work in virtual environments
within the IT field*

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SUMMARY

VILNIUS UNIVERSITY

BUSINESS SCHOOL

INTERNATIONAL PROJECT MANAGEMENT PROGRAMME

STUDENT EDGAR FUKSON

SUCCESSFUL PRACTICES AND APPROACHES OF SEASONED PROJECT MANAGERS WHO
WORK IN VIRTUAL ENVIRONMENTS WITHIN THE IT FIELD

MA thesis supervisor – Ph.D. Saulius Šimkonis

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A short description of Master thesis: Project management approach in the last few decades became very popular for companies to go with. More and more companies are restructuring their environments to become project oriented and achieve better business results and returns. Recently, even more progressive and innovative approach has started to accelerate - virtual project management. Especially it is popular in the IT field. There are many advantages in this approach - ability to find more experts (no geographical constraints), decreased administrative costs for office, less book-keeping activities etc. However, there are some of the disadvantages too, which are usually noticed too late and are not being addressed properly.

Aims of objectives of Master thesis: To define and investigate the factors of successful practices of seasoned project managers who work in virtual environments within the IT field, and determine the best approaches for navigating the challenges. The objectives are to analyze related literature, which describes virtual project management, conduct interviews and collect practical suggestions and successful practices.

Methods used in Master thesis: An explanatory and discussing literature review is the basis for the theoretical chapters. The research itself is conducted by using the qualitative research with 5 interviewed informants. After the interviews being conducted they were coded and themed.

Research carried out and results obtained: The informants agreed on the virtual project management to be an effective way of managing projects with many advantages. However, they have also mentioned a number of issues and challenges and described the best ways to mitigate those.

Main conclusion: When working in virtual projects it's very important how the communication between the team members and other stakeholders is being done. Additionally, it's vital to use proper technology stack and be informed how to properly navigate with the globally spread team.

SANTRAUKA
VILNIAUS UNIVERSITETAS
VERSLO MOKYKLA
TARPTAUTINĖS PROJEKTŲ VADYBOS PROGRAMA
STUDENTAS EDGAR FUKSON
SĖKMINGA PROJEKTŲ VADOVŲ DIRBANČIŲ VIRTUALIOJE APLINKOJE IT SRITYJE
DARBO PRAKTIKA IR METODAI

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Trumpas darbo aprašymas: Projektų valdymas tapo labai populiarus per paskutinius kelis dešimtmečius ir daug įmonių pradėjo perkvalifikuoti savo veiklą būtent į projektinį stilių tam, kad pasiektų geresnius rezultatus. Vienas iš projektų valdymo tipų, kuris tapo populiarus neseniai – virtualus projektų valdymas. Įmonės pastebėjo, jog, ypač IT srityje, galima sėkmingai vykdyti veiklą būnant skirtingose pasaulio vietose neturint neigiamos įtakos projekto sėkmingumui. Virtualus projektų valdymas turi daug privalumų, tokių kaip – mažesnė darbo jėgos kaina, darbo vietos kainos nebuvimas ir t.t. Iš kitos pusės, šitas būdas turi ir savo neigiamų aspektų, kuriuos reikia mokėti suvaldyti ir sureguliuoti. Jie yra pastebimi pakankamai vėlai, nepasirengus ir gali pakenkti projekto sėkmei.

Darbo tikslai ir uždutys: Nustatyti ir apžvelgti sėkmingas projektų vadovų praktikas, dirbantiems IT srityje virtualioje aplinkoje. Šio darbo uždutys yra išanalizuoti literatūrą aprašančią darbą virtualioje aplinkoje, apžvelgti joje minimus faktorius, atlikti interviu ir surinkti praktinius patarimus ir sėkmingas praktikas.

Darbe naudoti tyrimo metodai: Literatūros apžvalga ir kokybinis tyrimas – 5 interviu su žmonėmis turinčiais patirties dirbant virtualioje ir tradicinėje aplinkoje. Atlikus interviu, garso įrašas buvo sukoduotas ir paskirstytas pagal temas.

Atliktas tyrimas ir gauti rezultatai: Respondentai pripažįsta, jog virtualus projektų valdymas yra naudingas ir efektingas metodas, turintis daug teigiamų aspektų, bet taip pat paminėjo ir kylančias problemas, apie kurias nežinant galima susidaryti blogą įspūdį apie virtualų projektų valdymą.

Pagrindinės išvados: Dirbant virtualiame projekte labai svarbus faktorius yra tai kaip yra vykdoma komunikacija tarp komandos narių ir klientų. Svarbu atsižvelgti į teisingą technologijų panaudojimą ir globaliai išdėstytos komandos specifiką.

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INTRODUCTION

Relevance of the topic. Project management approach in the last few decades became very popular for companies to go with. More and more companies are restructuring their environments to become project oriented and achieve better business results and returns. Recently, even more progressive and innovative approach has started to accelerate - virtual project management. Especially it is popular in the IT field. It was noticed that it is possible to work in virtual environment and lead projects without being physically in one place. There are many advantages in this approach - ability to find more experts (no geographical constraints), decreased administrative costs for office, less book-keeping activities, etc.

Problem description. Virtual Project Management has attracted some of the disadvantages too. Common project managers would notice that the projects are not meeting the set goals. The budgets are over-used, schedule is not met. The reasons are not clear, because all the best Project Management methodology standards are often applied in such unsuccessful cases.

All these consequences are suggesting that virtual project management should be handling some of the activities with different approach. Since, virtual project management is not yet a very mature approach, there are no standards defined which would help project managers to adapt and re-qualify to work in this environment.

In addition, in the IT field, this is even more complicated. This field itself is growing and progressing very rapidly, which makes it even harder for a project manager to keep up with the newest methodologies and field progress.

Having these problems solved would increase efficiency of this approach and provide ability to achieve better results compared with traditional project management approach.

There is a number of researches done on the virtual project management, but most of those are concentrating on a specific topic. There is a lack of researches which would determine general rules and standards how this should be done and what are the main problems which are being faced.

The object of the thesis is to explain the factors which define successful practices of seasoned project managers who work in virtual environments within the IT field.

The aim of the thesis is to investigate the factors of successful practices of seasoned project managers who work in virtual environments within the IT field, and determine the best approaches for navigating the challenges.

The objectives of the thesis:

1. To analyze theoretical researches and articles relevant to virtual project management.
2. To list down and identify specifics of virtual project management found in the literature.

3. Where applicable, to propose the solutions for the factors according to the theoretical research.
4. To conduct a research about the virtual project management IT work and analyze proposed successful practices, approaches and problems.
5. To provide conclusions about successful practices and approaches for IT project managers when working in a virtual environment.

Research methods of the thesis

An explanatory and discussing literature review is the basis for the theoretical chapters. In order to conduct the research, a qualitative research approach using an interview would be applied.

The interview questions will be guided by the following research questions

1. What are the most successful practices of project managers who work in virtual project management settings?
2. What are the challenges faced by project managers in virtual project management settings?
3. How do project managers measure their success in virtual environment settings?
4. What recommendations do practitioners have for project managers who want to successfully thrive in virtual project management environments?

All of the interviewees will be related to IT project management and will have experience working both in virtual and traditional environments. From demographic perspective they will be from - United States, Georgia, Serbia. A bigger number of interviewees are going to be from EdTech (Educational Technology) sector, which implies that they'd be highly interested to collaborate on this kind of academical activity.

1. PROJECT MANAGEMENT APPROACH

1.1 Virtual project management

A project management approach became more popular only about a half century ago (Kwak, 2003). As mentioned by Kwak Y. (2003), In 1950s, “Navy” integrated modern project management techniques and methodologies when working on their “Polaris” Project. In 1960 and 1970, huge organisations like NASA, Department of Defense and also large engineering/construction companies started to integrated Project Management approach, since it was increasing the efficiency of receiving results.

In 1980-1990 project management approach rapidly spread over the software development companies and continued to emerge. So far, the techniques for the project management are being invented and improved constantly. Different domains are having their own best practices, including IT which got some extensive attention from the managerial area.

However, during the last decade a new approach has been invented. The technology is progressing very quickly, twenty-thirty years ago no one would even think that it would be possible to talk or see someone live from the other part of the world for free. The possibilities provided for us by the technology has allowed for the virtual project management to appear. Duarte, D. & Snyder N. (2001) said, “In today’s business environment, organizations adapt quickly or die. Gaining competitive advantage in a global environment means continually reshaping the organization to maximize strengths, address threats, and increase speed”.

Virtual project management is a new approach for the project management, which allows to have a decentralized environment with people all over the world. According to Beranek M., Broder J., Reinig A., Romano N. & Sump S. (2005), “A number of factors cause the workplace to transition toward virtual team environments, in which team members are distributed along a number of dimensions including geography and time. Human resource initiatives attempt to attract and maintain talent by allowing workers to telecommute“ (p. 248). Sometimes the team-members might not even meet each other in-person, because of their different locations. Mostly, this approach is taken by software development companies, Casey V. & Richardson I. (2006) state, “Globally distributed software development is an expanding trend in the software industry today. This has been facilitated by the development of the Internet, e-mail and low cost international telecommunications infrastructure. It has also been made possible by the availability of well educated and technically competent software engineers in low cost economies in Eastern Europe, the Far East and India” (p. 1). As we see, the low cost maintenance of virtual environment is usually overruling the traditional workspace environment. However, there is a number of other aspects, which require additional attention to avoid problems when transitioning into the virtual environment.

1.2 Major differences between traditional project management and virtual project management.

Even though, in both cases of virtual and traditional project management the goal is the same - to achieve set objectives by using limited resources, there are many differences, which not addressed might harm the project in the virtual management approach. According to Casey V. & Richardson I. (2006), “The virtual team differs from the traditional co-site team in that it is distributed across geographical sites and usually time zones. Virtual teams normally operate in a multicultural and multilingual environment, which may cross-divisional or organizational boundaries. The focus of this work is the operation of virtual teams in the software development environment“ (p. 2).

Almost every single activity, when working in a virtual environment, has to be slightly (sometimes more than slightly) changed to accommodate the changed needs.

- Resource Hiring Process
- Project Documentation
- Project Reporting
- Status Updates
- Communication with(in) the team
- Project deployment
- Task evaluation
- Resource effort tracking

All of the activities above are having the same output in traditional and virtual methods, but in latter the approach has to be different. Not understanding this difference is often causing problems with project results and delivery.

Even higher level of uncertainty and complexity comes with software projects. As Casey V. & Richardson I. (2006) wrote, “As organizations have discovered, due to the level of complexity involved in software development offshoring to remote divisions or outsourcing to other organizations is not a simple or straightforward task [17], [5]. Difficulties encountered have resulted from such issues as understanding requirements, integration and the testing of systems [27]” (p. 1). Software development is a complex engineering activity, which requires a lot of attention and thorough planning activities. The software creation and implementation process itself usually is always different and is not repetitive.

2. SUCCESSFUL PRACTICES AND CHALLENGES WORKING IN VIRTUAL PROJECT ENVIRONMENT ANALYSIS

2.1 General project goal understanding and vision in virtual environment

2.1.1 Project manager's approach and attitude

Being a project manager in virtual project environment is different compared with a traditional one. The origin of the motivation should be coming from a project manager. In traditional project management environment it can be easier, because there is real-life communication with the team. However, when it comes to online communication, the easiness to keep motivation up becomes much more complicated. The only contact the project manager has with his team members is usually through the computer. He cannot do proper team-building activities, take the team outside or away for a weekend. The only tool he has is his eloquence. According to Casey V. & Richardson I. (2006), "As this research highlighted there is the effect of factors such as fear and lack of motivation that such a strategy can have on the staff at the outsourcing location and the negative impact this can have on their level of cooperation and productivity [25]." (p. 5)

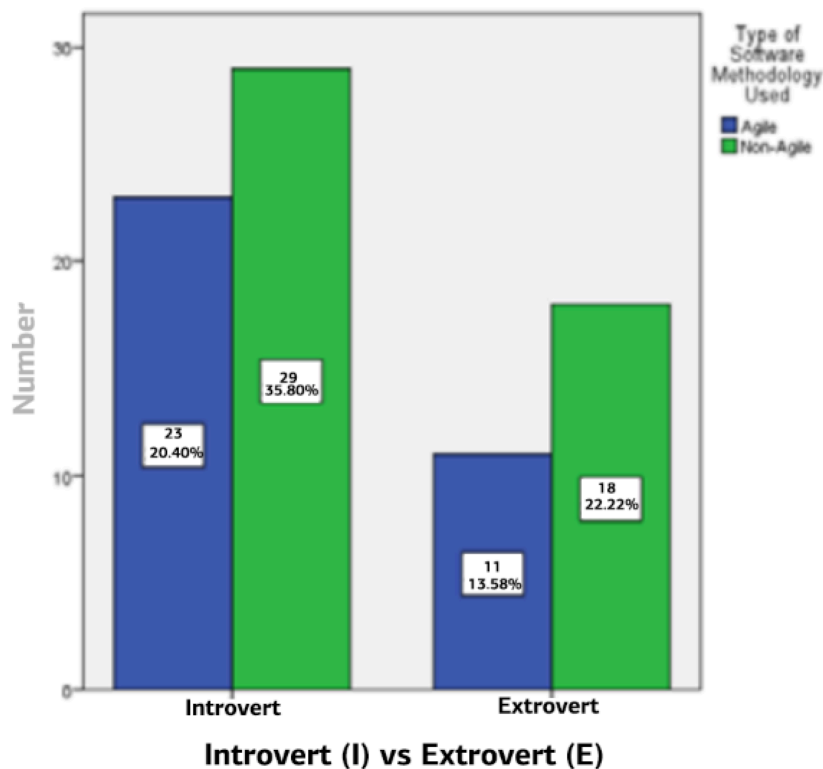
These factors define that working for one or another company in a virtual environment doesn't offer much diversification in environment, when compared with traditional companies - there is a number of benefits which can be used to keep the team member inside. Environment in which a developer is working in is usually the same (his personal or home office) without dependence on the company he (or she) is contracted with.

Project manager has not only be able to motivate team by using his (or her) limited resources, but also to be very diligent with personal responsibility. In traditional project management, when project managers are working in an environment with people, it is easier to direct yourself to work. However, when it's done remotely - being non-ambitious will not only affect project manager's work quality, but also decrease motivation of his (or her) team-members. Casey V. & Richardson I. (2006) stated, "In these circumstances it is clear that the virtual team project manager needs to take responsibility for not only the normal co-site project management activities. They also need to take measures to address and leverage all the factors and issues which arise directly from operating in a geographically distributed and virtual team environment" (p. 2)

When team members are not being communicated with enough pressure, they might lose track of time and forget about the deadlines. As mentioned by Beranek M., Broder J., Reinig A., Romano N. & Sump S. (2005), "Virtual team leaders should support and motivate individual team members actively to ensure their participation during critical project stages" (p. 249). It is crucial for a project manager to be pro-active and keep the pace of the project and communication chain. Team members (usually) are not looking forward to be more active than the project manager is, especially, as per the research done by Beranek M., Broder J., Reinig A., Romano N. & Sump S. (2005) in "Assessing

personality types preferences amongst software developers: a case of Malaysia” article, in software development sphere, people tend to be mostly introverts.

Figure 1 – Introvert vs Extrovert comparison



Source: Mazni Omar, Norliza Katuk, Sharifah Lailee Syed Abdullah, Nor Laily Hashim and Rohaida Romli (2015) “Assessing personality types preferences amongst software developers: a case of Malaysia”

According to DeRosa D. & Lepsinger R. (2010), “In general, we found that the most effective virtual team leaders are able to balance execution-oriented practices with the interpersonal, communication, and cultural factors . . . Specifically, we found that the following five practices separated the most effective leaders from the least effective: the ability to effectively manage change, the ability to foster an atmosphere of collaboration, the ability to communicate team goals and direction, strong interpersonal communication skills, and the ability to empower team members.” (p. 91). They state that the five practices are the the most important for the project managers working in a virtual environment. Of course, the same practices are important for traditional environments too, but in virtual projects the inability to follow those attract more damage. Mostly, it is related with communication and collaboration with the team members. This repeats the previously reasoned specifics of project manager’s work in virtual environment.

Suggestions from literature and related articles:

1. Show high interest in project, participate, show ambitiousnes.

2. Practice communication and negotiation skills.
3. Monitor each team-member individually in aspect of involvement into the project.
4. Be a good communicator and collaborator with your team members. Be able to transfer the information efficiently without losing the interest of the recipient.

2.1.2 Problems when common project management approaches are followed without process enhancement for virtual environment.

Sometimes project managers apply common project management methodologies in virtual environment. The ones, which worked out well with collocated teams, start to bring problems with virtual teams.

An example can be taken from Agile methodology usage. If we analyze the Agile Manifesto, the first item is “Individuals and interactions over processes and tools”. Pursuing this goal is harder in virtual environment, because there is no personal and face-to-face interaction. This means that a project manager cannot blindly follow the commonly spread rules and best practices of the Agile approach, but should adapt as per environment.

Rico D. (2011) states in his article “The Paradox of Agile Project Management and Virtual Teams” about how Agile methodology is efficient in collocated project teams. However, to make it work in virtual environments a certain rules should be applied. These general approaches are described in the two tables below.

Figure 2 – Principles, practices, tools and techniques for ensuring the success of virtual teams

Practice	Description
Near-shore	Geographically distribute work within the same time zone if possible
Compatibility	Utilize teams that are culturally compatible as much as possible
Adaptations	Adapt project schedules for regional-level cultural observances
Retrospectives	Use retrospectives to uncover hidden problems with virtual teams
Ambassadors	Use cultural ambassadors to resolve ethnic differences
Empowerment	Empower distributed teams to have equal authority with other sites
Standardize	Train all project members in the management and development process
Follow-Ups	Follow-up distributed meetings with minutes, decisions, and outcomes
Multimedia	Use video and audio and other conceptually-rich visualizations/graphics

Source: Rico D. (2011) “The Paradox of Agile Project Management and Virtual Teams

Figure 3 – Certain Practices for domestic or globally distributed or domestic virtual teams

Practice	Description
Collocation	Collocate distributed teams within geographic regions if possible
Decomposition	Logically decompose interrelated work to one site as much as possible
Decouple	Minimize unnecessary synchronous activities/meetings between sites
Proxies	Designate proxies to synchronize communications between sites
Meetings	Limit meetings to site leaders and other key technical personnel
Localization	Maximize teamwork, collaboration, and interaction at individual sites
Governance	Establish lightweight governance boards to synchronize standards
Automation	Ruthlessly automate all management and development processes
Integration	Use automated testing, continuous integration, and release management

Source: Rico D. (2011) “The Paradox of Agile Project Management and Virtual Teams”

The quality difference and efficiency decrease is usually only noticed, when the project is already in progress. For example, in Scrum approach, it is natural to have daily stand-ups. In traditional “office” environment it’s common for all team-members just to come to the same cabinet and do a quick review. Schwaber K. (2004) considers a problem when a team member can’t participate in-person during daily scrum meeting, “All Team members are required to attend. If for some reason a Team member can't attend in person, the absent member must either attend by telephone or by having another Team member report on the absent member's status” (p. 135).

In virtual environment, there are obstacles to conduct a daily scrum meeting efficiently:

- a) problems connecting on time – team members forget to join on time, not being able to be around at the particular time every day.
- b) during the call people usually do not concentrate on what others are saying, just browsing the internet or doing other activities.

Because of this, the whole purpose of stand-up disappears and team members still don’t understand what is happening in the project. That’s why some developers who work in virtual environments start to dislike the Agile methodology approach.

Suggestions from literature and related articles:

1. Analyze whether selected project management approach and methodology fits the virtual environment.
2. Adapt the selected project management methodology individually for each project as per existing constraints and environment.

2.1.3 Problems understanding project goal and common vision in virtual environment.

In traditional project management environment projects usually start with a kick-off meeting, where all of the team members are introduced with the project goals, vision and requirements. This meeting is to make sure that everybody understand what is the goal and the expected result for the client. However, in virtual environments, this meeting is sometimes just replaced by an email, which

doesn't describe much and just have a specification attached and in case if the meeting is happening, it's still a virtual meeting, which sometimes can't transfer all the information across all team members. Dow W. & Taylor B. (2008) emphasize the importance of that, "At the beginning of a virtual project, the project must hold a project kick-off meeting. This meeting may be the first time that some members have a chance to meet each other and converse. The project manager must define the scope, goals, and objectives of the project and motivate the team to approval before the meeting concludes." (p. 57).

The lack of face-to-face communication is increasing the chance to have mis-informed team. Beranek M., Broder J., Reinig A., Romano N. & Sump S. (2005) are putting emphasis on how important the common understanding of a goal is, "All of the team members should understand what constitutes project success and share the common goal of achieving that end. If goal alignment is not formally established among team members, individuals tend to pursue different priorities and virtual projects often fail." (p. 250)

Additionally, project managers may think that the whole idea of the project is clear (because it's clear for them) and everyone in the team have the same understanding and level of information. However, usually it's not like that, team-members might not understand it and sometimes don't even care. This aspect requires additional attention from a project manager.

DeRosa D. & Lepsinger R., (2010) specifically put emphasis on this point, "Clearly communicated, shared team goals are especially crucial for virtual teams because they give members a sense of purpose and meaning" (p. 98). This thought might be considered being applicable for any project related work, because the vision and the goal is very important. However, they add the following part, which shows the main concern, "that sustains them when they are working alone or without regular direct contact with the team leader or other team members." (p. 130). It is being emphasized that team members usually work alone and they can't feel the same tempo and general vision from the clients and stakeholders, which is being felt by the project manager. When being constrained with the limited information provided by the project manager, without having full understanding of what is the main goal, it can get the person demotivated and prevent from revealing the full potential.

Following these thoughts, DeRosa D. & Lepsinger R., (2010) provide suggestions how to close that gap, "Early on in a team's formation, provide a clear sense of purpose. Explain how the team's work contributes to the organization's overall goals and revisit these goals as things progress." (p. 98). Certain activities can help achieving that:

Table 1 – Suggestions how to improve the understanding of the project goal and vision

1	Invite key stakeholders to v-meetings to discuss how the team’s work impacts the organizational strategy
2	Involve team members in discussions about setting or prioritizing goals to increase commitment.
3	Ensure that the virtual team’s goals are mutually supportive of other functions and teams.
4	Periodically revisit goals to ensure that, given changes in the internal or external environment, they are still appropriate and feasible.
5	Put a process in place to set and reset priorities; frequently revisit priorities and recalibrate as necessary.

Suggestions from literature and related articles:

1. Schedule a well prepared kick-off meeting.
2. Make sure that each team-member understands the project goal and requirements by making them explain it in their own words.
3. Include specific activities described in the analysis part, in order to improve the understanding of the project goal and vision.

2.2 Virtual Project Environment specifics

2.2.1 Team Distribution and distinction

2.2.1.1 Time zone Differences

One of the most distinguishing factors between traditional and virtual project environments is the team-member’s location being spread all over the world. It was not an accidental that Casey V. & Richardson I. (2006) said, “The virtual team differs from the traditional co-site team in that it is distributed across geographical sites and usually time zones. This is causing the project to be operated during different time zones” (p. 2). New to virtual environment project managers sometimes don’t even think about the problems, which can be caused by these factors until they face it personally. It might be a very minor deficiency at first sight, however eventually it causes very serious problems and scope creeps.

When working within software projects it can be thought that working at the same time (ignoring different time zones) might not be that important for developers to communicate one with another, however it’s essential to have at least part of the day, when you can reach your team member. Meeting scheduling is very painful in this environment. Lecoq B. (2012) said, “Due to time zone differences, it is difficult to set up meetings with the entire team, much like juggling balls with different shapes—one labeled China, another India, and so on.” (Time differences chapter). What can be a perfect time for one person, will be a middle of the night for another. A very organized and detail oriented management approach is required here to find the golden middle and make sure that all team members are comfortable with that. The fact that meeting arrangement takes more time to find an

appropriate time to schedule is deviating the schedule and pushing forward milestones and deadlines. Especially, if a very urgent meeting has to be held in order to find answers for blockers, preventing further product development.

Different time zones can cause decrease of information flow quality, as Gibson C. & Cohen S. said, “Working across time zones not only extends workdays but may also limit the choice of communication technologies. As teams grow in size, technology limitations make some communication technologies inefficient and impractical. Things inevitably go wrong when technology is new, and unexpected problems can derail team functioning.” (p. 236). It is being pointed out, that when being in different time zones, some additional technologies might need to be used. When this is something new to the team, which is happening when the company is scaling – there will most probably be deficiencies.

DeRosa D. & Lepsinger R. (2010) have found a research with a suggestion on how to mitigate the problem of scheduling meetings across different time zones, “Zeller discussed her team’s challenge with finding times that were convenient for members across multiple time zones. She recommended rotating meeting times so that the same team members do not always get stuck working at undesirable hours. If you are a global virtual team, this is one way you can alleviate a significant burden on team members.” (p. 140). This proposal allows to balance the comfort zone for all of the team members. There will be situations when a member will need to meet at an inconvenient time, however he (or she) wouldn’t feel that it’s only he (or she) who is sacrificing. Everyone are going to participate in meeting during an inconvenient time on certain occasions. This, though, might include some trouble while setting up the meetings, especially if those are planned to be recurrent, because these kind of meetings will not be scheduled at the same time for every instance with this approach.

Deadlines themselves are also understood differently under various time zones. For someone, the exact time when the deadline is defined can be end of the day or even night. It’s logical that this team-member will not be efficient in producing proper deployment or after-launch maintenance at this time of the day.

On the other hand, there are some advantages too of having team from different time zones. It means that, if your team is big enough, you can always keep the pace of development and have almost 24 hour long development cycle for the whole week. Alnsour H. (2014) said, “Project work can also be completed over a longer time period by team members in different time zones, increasing speed and flexibility, improving relations with stakeholders and reducing effective travel costs (Junemann and Lloyd, 2003). Therefore, organizations are increasingly dependent on virtual teams for activities such as design, production, and logistics” (p. 50). In addition, maintenance or support for operational activities can be done quicker and with shorter response time.

Additionally, Rico D. (2011) said, “Why would anyone want to discard the benefits of collocated teams? <...> There are over six billion highly-talented people in the world and it’s impossible to collocate all of them”. He is emphasizing on one of the main advantages of the virtual environments – having access to a huge pool of talented people across the world. It’s impossible to collocate all the bright people physically, but it’s not a big challenge to be done in a virtual environment.

Suggestions from literature and related articles:

1. To avoid problems of communication timing between virtual team members, a very diligent planning and policy is required to be set.
2. To work around time zones, managers of virtual teams need to think, lead, and communicate differently than a traditional team leader – always to understand the consequences of every request or action in different time-zone
3. Rotate meeting times in order to balance the amount of meetings at inconvenient time for each team member.

2.2.1.2 Cultural Difference

Cultural difference is another aspect which can decrease the pace of the product development. People tend to think and act differently in different cultures, which can drive to have different unexpected output. Oertig M. & Buergi T. (2006) said, “Virtual teamwork is more complex than working face-to-face (Heimer and Vince, 1998) and site specific cultures and lack of familiarity are reported to be sources of conflict (Hinds and Bailey, 2003). Vakola and Wilson (2004) warn that the importance of the human element and the way that people co-operate with each other should not be taken for granted.” (p. 23). The fact that people don’t communicate together informally (lunch, coffee breaks, watercooler chats), when it would be a convenient time to understand and learn about different cultures, means that the only communication they have is work-related and there is no time to understand cultural specifics. Those specifics can be related with the way they work or communicate and in certain situations create conflicts.

An example of this kind of situations can be also taken from Oertig M. and Buergi T. (2006) article. They have noticed a cultural difference between European and US attitudes. Europeans (German) project members were feeling some level of distrust to the American managers, because of their “good hearty openness” and “I’m your friend” kind of communication. On the other hand, American managers were not sure about commitment and motivation from Swiss colleagues, which didn’t show high enthusiasm.

Lecoq B. (2012) also touched this topic quite widely. He is saying that it is becoming very important to manage cultural differences between the project members. Project members from

different cultural backgrounds do often have different attitude, values and beliefs or even behavioral norms, which can result into miscommunication and then which can lead to mis-understanding the task/project/goal and get the project delayed and miss the deadline. He is also providing an example when some cultures are very resistant to say “no”, whereas others can do it without any uncertainty. For example, if there is an outsourced team in India, management has to understand that their cultural background is different and replying with negative answer is highly against their values and behavioural norms. In that case if you ask “Can you implement this feature within X days?”, most likely the answer will be “Yes”, however - the real answer will only be seen in X days.

These cultural differences have high impact in virtual project management for software projects. IT related projects have a lot of uncertainty and usually an expert in some kind of field is doing predictions on whether this problem (or feature) can be solved and what time will this take. If there are some communicational problems in understanding each other, then it can lead to a very huge schedule or resource related problems.

In addition to existing cultural differences, there is another challenge which appears in virtual teams - insufficient level of language knowledge, which is being used in project communication. In IT this is not mandatory to know perfect English in order to be a good developer. There is a lot of information in any language. It's common to see a, for example, Russian speaking developer, with only basic English knowledge, but an expert level programming skills. DeRosa D. & Lepsinger R. (2010) noticed that problem and put emphasis on it when operating in virtual environment, “Another common challenge on cross-cultural virtual teams is communication. Language barriers can pose big problems, and these problems are exacerbated when people are not face-to-face.” (p.141). That means that, when being in virtual environment, most of the time the main way of communication is verbal. When there is a deficiency in this kind of communication generally, non-verbal communication comes to help – hand, body movements or facial expression. The lack of that in virtual environment is causing the exacerbation. DeRosa D. and Lepsinger R. (2010) define a few suggestions found in their research work, “Some virtual teams have warm-ups, or informal (non-work related) conversations, at the beginning of meetings. These warm-ups help team members transition from their native language and listen to one another to become accustomed to accents or unfamiliar pronunciations.” (p.141). These activities would not solve the main issue, but will at least allow to warm-up before the work related conversation and get used to hearing the way person communicates and talks.

Suggestions from literature and related articles:

1. Create a shared understanding of team goals and objectives.
2. Do not assume things — Communicate, Communicate, and Communicate.
3. Build trust.

4. Accommodate problems occurring when team-members can't operate by using the same language efficiently.

2.2.2 Communication

Communication between team members is mentioned in almost all of the previously discussed sections, but it needs to have a separate one to analyze the specific details of it. Virtual project requires a kind of communication which is not being taught from the childhood. People start to understand how to communicate online much later compared with in-person communication. These reasons can cause problems communicating properly and transferring the information.

Oertig M. and Buergi T. (2006) mentioned, "Lack of face to face contact was more problematic and many missed what they called the 'office atmosphere' and the opportunities presented by striking up a conversation in the cafeteria or hallway." (p. 25). Sometimes, those small talks in cafeteria, hallway or by watercooler can trigger new project ideas, game changing problem solutions or other innovations. Having replicated this kind of environment in virtual teams improve the general atmosphere and attract new ideas. Lecoq B. (2012) echoes a similar fact, "A significant percentage of our communication happens through nonverbal cues and context". As an indirect suggestion, he offers to do the following, "Use a collaboration team website where virtual team members can share information and get to know one another.". It's not going to solve the problem of neither not having watercooler conversations or by lack of non-verbal communication, but that would improve the atmosphere in the team knowing that people shared information about themselves with one another.

The same important point was figured out by DeRosa D. and Lepsinger R. (2010) , "Virtual team leaders report that the lack of face-to-face contact makes it tougher to build trust within their teams, engage their teams, and monitor their team members' work." (p. 84). This is rolling back to the same issue – lack of communication and time spent to get to know each other is resulting to having trust issues and keeping steady level of engagement. After doing the research, they have also found a way to mitigate this problem, "When we interviewed team members and stakeholders, they consistently mentioned responsiveness and follow-up as critical elements of communication. Our study also found that top performing virtual team leaders had higher ratings on several items related to communication effectiveness. For example, they scored significantly higher on responding effectively, providing timely feedback to team members, and sharing information in a timely manner." (p. 100). When the whole communication is happening online, as they have found, being able to response quickly and effectively improves the level of trust and engagement. This applied both for the team-members and the stakeholders or clients. From one side – it's important to keep team-members engaged to have an efficient process of product development, on the other hand it's also important to

keep the external stakeholders and clients with up to date information in order to prove them that the virtual environment is a good process to follow and get positive feedback from them.

Duarte, D. & Snyder N. (2001) used a phrase called *Information Richness*, “Information richness has to do with the amount and variety of information flowing through a specific communication media . . . For example, the information richness in a video conference with text and graphic capabilities is high because there is a large amount of information available, including spoken words, facial expressions, body language, and environmental information about each attendee’s surroundings. Much of this information is not present in other forms of communication, such as audio conferences, voice mail, and e-mail.” (p. 27). They are stating that by using enriched ways of communication will improve the data quality and throughput which. Communicating purely through chat wouldn’t allow to transmit the information either fully or precisely.

In addition, the same aspect of the communication being very important was mentioned by Townsend A., DeMarie S. & Hendrickson A. (1998), they said, “Virtual team members will be challenged to adapt to the telecommunication and informational technologies that link its members. Virtual team members will have to learn to use effectively new telecommunications systems in an environment where an important client or coworker is frequently never physically present.” (p. 22). It is aligned with the fact that the communication will need to be adjusted to serve virtual environment needs effectively.

Suggestions from literature and related articles:

1. Get to know the team-members personally.
2. Be quick in responding and don’t keep people waiting for replies.
3. Keep team-members up to date with the newest information.
4. Use enriched information types when possible.

2.2.3 Celebrating project success

When working in a traditional project environment, teams might have some special traditions to celebrate deliverable or project success. These traditions can vary from group lunch to big parties or even trips abroad. This is especially actual in IT companies, where most of the work is done by sitting in front of the PC, without much of the dynamics. This is a kind of a benefit, which is missed in virtual environment. It’s an advantage and disadvantage at the same time. On the bright side – there is no need to have expenses to have all people collocated, but on the other hand all of the celebrational and team-building activities are missed. There are ways to mitigate this issue with alternatives.

Lecoq B. (2012) says, “Create ways to virtually celebrate successes as a team. For example: As main milestones are reached, you can send a gift certificate to every team member and the next day,

people have to tell you how they spent it – it allows you to have some fun while discovering more about the personal side of each team member.”. This kind of approach is not as commonplace as sending bonus payments, but it adds some personality and care to each of the team members. Similar approach was also suggested by DeRosa D. & Lepsinger R. (2010) “It’s important that organizations and virtual team leaders develop strategies to reward and recognize virtual teams and their members. For example, find opportunities to “spotlight” team members and to virtually celebrate successes as a team. Some leaders use e-certificates, e-newsletters, and other online mechanisms to recognize team members.” (p. 36). As it can be noticed, they also do not suggest just paying bonuses. Showing team-members that their work is really appreciated and to spend some additional time preparing the rewards, even if that’s something intangible, is going to be gratefully acknowledged. At the same time, we cannot deny the fact that money is important. Bonuses is a vital part of the motivation, but it should be a natural thing, which is openly discussed during the project start. Team members should understand in which cases they are going to achieve bonuses (product developed on time, budget and with required quality) and when not.

Suggestions from literature and related articles:

1. Find alternatives how to motivate team-members after reaching important milestone.
2. Understand that bonus payments are important, but can’t be used as the main celebration material.

2.2.4 Technology tools

When working in a traditional environment, there are variety of items / resources, which help to achieve the results – computers, phones, meeting rooms, drawing boards, cards, notebooks, flipcharts and etc. In virtual environment all these resources need to be converted into an online tool. Technology is vital in this case and tools used to achieve the results are playing an important role.

DeRosa D. & Lepsinger R. (2010) started this problem analysis with the following discovery, “Thirty-nine percent of leaders reported challenges associated with a lack of resources. And although co-located teams must also deal with this problem, virtual team leaders frequently suffer from the lack of a specific type of resource—technology” (p. 84). This might sound strange, because internet is full of different tools and proposed technologies. However, it’s a challenge to find the correct tool package, integrate together, define a policy of how to use it and train the staff. It’s easy to describe how to use a flipchart, but not as easy with online technologies. IT projects and companies are not an exception, being experienced in a programming language or engineering is not making that person tech savy in all of the new tools being developed.

Further, DeRosa D. & Lepsinger R. (2010) analyze how different tool usage can affect the efficiency, “For example, email, which is a one-way medium, is best for tasks that require little

collaboration. On the other hand, when teams need to solve complex problems or make decisions, technology such as videoconferencing or collaborative software tools, such as Hewlett-Packard's Halo or Cisco's TelePresence, are best." (p. 142). This theory of theirs was followed by the research results - "One global virtual team in our study attempted to use emails to make decisions and solve problems. However, they found that trying to do so led to delayed and low quality decisions." (p. 142). From here we can conclude that the way the communication and workflow policy is defined in the project is very important and can affect the efficiency. It's important to analyze and to understand the best way of usage for each of the tools.

Lecoq B. (2012) has collected a list of tools which are most commonly used by the project teams and what are the most usual use-cases for each:

Table 2 – Online collaboration tools categorization and suggestions

Communication	Skype, Lync (conference calls at no cost across multiple regions)
Desktop Sharing	Skype, WebEx, Go To Meeting, Lync (live demo, presentation, cross-sharing information)
Collaboration team website	SharePoint, Basecamp. Project Server (team member can share and access the latest information concerning the project)

Suggestions from literature and related articles:

1. Analyze and sensibly define the best tools for the virtual environment.
2. Train team-members and introduce a technology policy on how and which tools to use.

3. RESEARCH METHODOLOGY

The purpose of this study is to explore the experience of individuals with project management expertise in both traditional face-to-face and virtual setting environments.

3.1 Restatement of research questions

This study is guided by the following research questions:

1. What are the most successful practices of project managers who work in virtual project management settings?
2. What are the challenges faced by project managers in virtual project management settings?
3. How do project managers measure their success in virtual environment settings?
4. What recommendations do practitioners have for project managers who want to successfully thrive in virtual project management environments?

3.2 Analysis unit and sample size

The analysis unit for this study is a project manager (PM) with experience in both traditional and virtual project working environments. In this research the interviews were conducted with 5 informants.

3.3 Purposive sampling and Sampling frame

In other words - expert sampling. This sampling allows to collect information from people who are highly experienced and knowledgeable in the topic they will be interviewed. It is important to find people who worked in both kind of environments in order to receive objective opinion and advice. The best data in case of this problem analysis could be fetched by processing purposeful sampling.

3.4 Criteria for inclusion

1. These PMs have at least a three years of experience in virtual project management and prior experience in traditional project management.
2. All of the informants are working in the information and technology (IT) field and currently serve (or served) project manager's position.

3.5 Data collection

Interviews are conducted by doing a voice call. Each of the conversation is being recorded with prior informant approval. After the interview, the audio file is transcribed. Further, the transcription is

analyzed and coded by using a number of themes which are interrelated with interview and research questions. The final result provides tangible data for the further research.

3.6 Interview Protocol

The interview questions prepared were modulated in a way to get as much information about virtual project environment and the differences compared with the traditional one as possible. Because of the general topic being so innovative and yet not so deeply defined (even by the literature), it's not valuable to have very specific and narrow questions, because that wouldn't allow the informants to spread and expand the scope of the answer and enrich the details.

Table 3 – Interview design

	Question	Question reasoning
1	<p>When did you start working in project oriented environment? Could you describe the activities you were doing back then?</p> <p><i>Supporting questions if needed:</i></p> <p>a) <i>How did your day look like?</i></p> <p>b) <i>How big was your team?</i></p> <p>c) <i>Was it usual in those days to work in a project environment</i></p>	<p>Understand for how long the interviewee is a project manager and whether he was working as a traditional project manager. Understand how did his day look like, what activities included into his work.</p>
2	<p>What kind of projects have you been (and still are) working on?</p> <p><i>Supporting questions if needed:</i></p> <p>a) <i>Have you always been in that field?</i></p> <p>b) <i>Why did you decide to change it?</i></p>	<p>To confirm whether the interviewee is working (or has worked) in IT field in order to comply with thesis requirements.</p>
3	<p>How successful the projects were when working in a traditional project environment?</p> <p><i>Supporting questions if needed:</i></p> <p>a) <i>What were the biggest factors of</i></p>	<p>The question is required in order to grab a general understanding of interviewees position about project management and find out the reasons why the projects were succeeding / failing back when working in traditional project environment.</p>

	<p><i>failure?</i></p> <p><i>b) What were the biggest factors of success?</i></p>	
4	<p>How would you describe your work now, when you are working in a virtual environment?</p> <p><i>Supporting questions if needed:</i></p> <p><i>a) How did your day as a manager's changed?</i></p> <p><i>b) What other activities have appeared in your daily routine? (Which disappeared?)</i></p> <p><i>c) How hard (What things should change) it is for a project manager to transform his mind to start working in a virtual environment?</i></p> <p><i>d) Did you notice any changes in the team you are working now? Have the flexibility and motivation changed?</i></p>	<p>To understand how is the day different now, what activities are done.</p> <p>To compare the kind of tasks which were done before and now.</p> <p>To understand what it takes to transform the mind of a person to become a virtual project manager..</p> <p>Collect information on how different teams are in traditional and virtual projects.</p>
5	<p>What are the biggest problems you confront now when working in a virtual environment?</p> <p><i>Supporting questions if needed:</i></p> <p><i>a) Did you have these problems before when working in a traditional environment?</i></p> <p><i>b) Do you know how to mitigate these problems nowadays?</i></p> <p><i>c) Do you see a trend in what are the most usual problems when working in virtual environment and which are connected exactly with the fact of being in a this</i></p>	<p>To understand what are the most usual problems, how project manager is solving them. Compare whether these problems are only appearing in virtual environment.</p>

	environment	
6	<p>How successful the project are now, when working in a virtual environment?</p> <p>How did the rate of success for projects changed now. Did some of the factors from traditional project env disappeared? Maybe some new appeared?</p> <p><i>Supporting questions if needed:</i> a) <i>Do you feel the success rate changed compared with traditional project environment you worked in before?</i></p>	<p>To generally, to understand whether it's better/worse now, when working in a virtual environment. And if it's better/worse - is it directly connected with the change from traditional to virtual style.</p>
7	<p>What would be your suggestions for traditional project managers who would like to start working as a virtual project managers?</p>	<p>To find out what are the suggestions and tips for a traditional project manager, when he wants to become a virtual project manager.</p>

3.7 Relation of the interview protocol to the research questions

The development of the interview questions was guided by the following research questions. In order to avoid direct answering on the research questions, the interview protocol was prepared in a way to find out about the same research question from another perspective, when the informant wouldn't even understand what is the main question for the research.

Table 4 – Research Questions

Research questions	Interview questions
1. What are the successful practices of project managers who work in virtual project management settings?	1,4,6,3,2
2. What are the challenges faced by project managers in virtual project management settings?	5,3
3. How do project managers measure their success in virtual environment settings?	4,6

4. What recommendations do project managers have for other practitioners who want to successfully thrive in virtual project management environments?	7,2
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3.8 Data coding and analysis

After collecting all of the audio recordings and transcribing them into plain text, the next step was to find valuable thoughts from the interview and mark (highlight) them. The following step was to create a number of themes which were used for tagging purposes. Each theme had both relation with Research and Interview questions, which made it easier to group important thoughts together.

After having all of the main ideas grouped and tagged, the details for each of the research questions were defined and the quotes were grouped by one more level of context. This allowed to create themes which drove the research results. However, while doing the analysis, some of the thoughts required elaboration from the interviewees. An additional round of communication was processed and new information received.

3.9 Researched Informants

A total of 5 informants were interviewed. All of the informants are very familiar with both kind of management types and environments. Most of the informants have more than 15 years of professional work experience. This allowed them to express their opinion and thoughts from different perspectives.

Table 5 – Informants

Informant	Traditional Management Experience (years)	Virtual Management Experience (years)
001	10	8
002	3	6
003	16	4
004	15	7
005	4	3

Informant 001

The Informant 001 started her career of project management in traditional environment back in 1996. The work took place in an educational organization implementing innovative educational technologies. Between then and 2004 there were occasional projects in virtual environment, but since 2005 she got fully converted into a virtual project environment and only did projects there. The projects she was working on are for technology companies from Fortune 100.

Informant 002

The Informant 002 started her career 9 years ago. First 3 years were spent by working in a traditional project environment, then the rest were spent by working in virtual project environment while travelling (being a digital nomad). The sphere she has worked in all the time is software development.

Informant 003

The Informant 003 started his career 20 years ago as a project manager working in a traditional project environment. He was working in that environment until 2011 and since then converted into working in a virtual one. The sphere he took place in was changing from time to time, but for the last 10 years it was specifically in education technology and innovations.

Informant 004

The Informant 004 has in total 22 years of experience working in management positions. The change between traditional and virtual project environments was happening a few times, which helps to understand the aspects of each with having different time (different technological progress) in mind.

Informant 005

The Informant 005 started his career in a local IT company working as a project manager and delivering project to governmental agencies. Later, he decided to shift into a freelancing mode and started working as a remote IT project manager.

4. RESEARCH RESULTS

4.1 Theme 1: Successful Practices of Communication

4.1.1 Communication with external stakeholders

The informants have mentioned a number of best practices while working in a virtual environment. The communication quality and consistency is very important. In the virtual environment this is the key factor of data transmission and information disposal. The problem of communication with key stakeholders appears, when these people are not used to work virtually. According to Informant 001, “The biggest factor, I would say, for the complex ones was staying in regular communication with key stakeholders of the milestone owners” (personal communication, 2016-10-19). Stakeholders won’t have time or desire to learn it, because they are, most of the time, operating their activities.

That’s why, the goal of a project manager is to be proactive and communicate with external stakeholders as tightly as possible and push as long as it’s needed to retrieve the answers. In some cases, stakeholders didn’t choose the company which is hired to do the work to be in virtual environment, so this is responsibility of the project manager to handle this situation.

4.1.2 Partially collocated teams

The above is solving the problem of communicating with external resources. However, there are ways to have efficient communication strategy between the internal team too. There is a very important aspect of whether the whole team is working remotely or only part of it. Informant 002 said, “I think that it’s quite important to decide if you are going to do it virtually or not, because if it happens that the whole team is collocated and then you just have one person who is working somewhere else, that can be an issue, because that person is missing out on a lot of offline communication that is happening in a classical ‘water cooler’ chat and stuff like that, but once you have the whole team as a distributed virtual team, I think that no problems in collaboration/communication would appear if you use good tools” (personal communication, 2016-11-02). Having a single person (or part of the team) being separated from rest of the members who reside in an office is a big risk. The virtual people are missing the whole amount of inside communication, relationship, ideas and even jokes/fun. There can be situations, when a very important project related decisions are decided during a coffee break internally. If there are other, key team members missing (working remotely) and they won’t grab the same idea - it would defect the workflow of the projects.

The solution here is to either have the whole team being remotely connected from the beginning or apply a very strict policy of not having any project / work related communications

internally, at least without having the rest of the remotely working team connected through a phone line.

4.1.3 Synchronous and asynchronous communication

In traditional environment, people mostly tend to rely on synchronous communication, where the communication streams and the time it takes to transfer information is dependent on the speed of people replying (getting back). In virtual environment, having in mind the differences between time zones and flexible work schedules that would become a very inefficient process. The solution here is to use technological tools which would allow to communicate asynchronously. Informant 001 is confirming the fact of the asynchronous communication importance, “asynchronous communication helps minimize communication blockers for team members who are working in different time zones” (personal communication, 2016-10-19). It means that the communication will be structured in a way, where people are not so interdependent one on another. Different kind of systems would be helping to keep the async in tact. It’s not enough just to use those tools, but it’s also important to have a process where team members can operate individually without having other people around. It means that, for example, they should be able to formulate their thoughts in a very structured and informative way to decrease amount of questions back (each additional circle of communication in virtual environments, for example, between people from different continents adds up a very noticeable amount of delay).

Summary of Theme 1

Theme 1 summarized findings related to successful practices of communication. These sub-themes include:

- 1) Analysis of communication with external stakeholders. How to manage the expectations and keep them connected with the work being done in the project.
- 2) Discussion about how partially collocated teams might harm the team harmony and communication
- 3) Comparison and analysis how to get the advantages of using the asynchronous communication type.

4.2 Theme 2: Successful practices of using tools

4.2.1 Staying connected all the time

The way how team-members communicate is vital. There is no traditional in-person communication, which most of the people were taught about since they were born. Online communication is something which can take time to get used to. As per thoughts of Informant 001, “most people that I worked with were pretty tech savvy, working virtually and so communication

usually isn't an issue, because you could be on, you know, Skype / Email / Slack" (personal communication, 2016-10-19). The communication is not a problem, when you can use many tools for different purposes - one for being formal (Email), another for quick informal messaging (Slack) and for example, another, for voice/video calls (Skype). However, what should be kept in mind is that communication can take place at any time during the day (because the whole team is from the whole world), so being online just during the "work hours" is not enough. Informant 001 noted, "I know I keep emphasizing the time zones and the differences, kind of where people are at, because you almost have to find a way to stay connected even if you are not connected" (personal communication, 2016-10-19). With that said, it's very important, when working in a virtual environment to be able to react and reply flexibly. Whether it's someone from the east pinging you in the morning to find out some very important information before the day ends, or someone from the west messaging you in the evening with a request to get some information, which will be vital during the coming day. The latter situation is usually bring more inefficiency, because it might slow down the progress for that person in the west side of the world

4.2.2 Using bots

With the technological progress evolution, bots are coming in play. They are programmable instances, which help solving day to day problems and decrease the burden of communication. There are different kind of bots, providing different features. Starting from a very primitive ones, for example, a calendar reminder, which evokes before the upcoming event down to a more complex ones, which can be replacing meetings - a bot which is communicating with team members, collecting the most viable information and presenting it in a very well structured way. Informant 002 mentioned, "These tools are getting better and better, for example now the bots are coming to the scene and we started using bots for many applications to receive notifications and understand what was happening while you were being away." (personal communication, 2016-11-02). Using bots will make the daily routine easier and less stressful, especially for project managers who are working across multiple projects and teams. Bots would be managing some of the informational flows and allowing the project manager to spend time on something more important. With time, bots will be even able to take over tasks which are not simply defined step-by-step process, but artificial intelligence required action trees.

4.2.3 Using proper tools in proper situations

It's important to learn, which tools to be used in which situations. Virtual environment attracts different kind of communication and collaboration tools - Email, Instant Messaging (IM) tools, Audio / Video conferencing tools, Task Management tools, Document management tools and etc. Using

these tools incorrectly, for example - defining and negotiating in IM is not credible, when at the same time having casual “watercooler” kind of communication by email is also not very appropriate. Company or an organization has to define a policy defining the processes on communication tool usage. Every new person should understand how to operate with them. Informant 001 confirms on the point above by saying, “Communication tools have their purpose, and their use of it depends on the organizational culture, the project, or team. Some teams emails, slack, basecamp and similar other technologies are appropriate - some prefer something more like Microsoft Sharepoint.” (personal communication, 2016-10-19). Every company (or a project) should have its own approach in communication and having policies with those described saves a lot of time.

Summary of Theme 2

Theme 2 summarized findings related to the way how online tools should be managed. These sub-themes include:

- 1) Discussion of how is it important to have the tools online all the time
- 2) Review of how bots can decrease the repeatable work.
- 3) Discussion of how it’s important to use proper tools in specific situations.

4.3 Theme 3: Project Manager’s individual settings

4.3.1 Personal Environment

The physical environment while working in a virtual environment for project manager is very important and has some influence on the efficiency. Although, being at home is usually called an advantage as oppose to work in the office, there are still advantages of the office, which improve performance. When working at home, there are variety of distractions, which make the project manager’s attention to drift away. According to Informant 001, “So part of it is having dedicated space, how do you replicate the feeling of being in an office. Making sure that you have that space wherever you at, even if you’re at home, hotel or whatever, just making sure that you have the right environment” (personal communication, 2016-10-19). There are different ways how to make the replication of being like in an office:

a. Workspace setting:

It’s sensible to create a workplace, which can be directly associated with work. No other activities should be done over there. The environment should have all required resources to do work without going away from there. Which means that the setting should have comfortable chair, table, lighting, place to write and etc. Informant 001 echoed, “When working from home, in general, having dedicated physical space is important. For instance, having similar equipment and furniture like a table, chair, etc definitely” (personal communication, 2016-10-19).

b. Isolation from the distractions:

A very casual issue when working in non-office environments is that you can easily get distracted. For example to go to the kitchen, lay on the sofa (if the work is done at home). That's why there should be both physical and psychological isolation from these distractions. Make sure it's not easy to get distracted - remove all distraction triggers from the eyesight, create a mental rule not to fall for the distractions and try keeping up with that. One way of getting isolated was proposed by Informant 001, "As a best practice, for example, helps to have a sign on the door that you're working" (personal communication, 2016-10-19). This would help from the external distractions, which can't be controlled.

c. Formal outfit:

This is an optional thing, which sometimes is useful. If a person is working at home, wearing an official outfit might make him or her more concentrated on the work. Having work clothing on while being at home, do not create incentives to get distracted, get on the sofa or take a nap. Formal outfit is constraining from moving too much, which in this situation is an advantage.

Not all of the things above are mandatory, each individual needs to understand what level of formality is needed to re-create the work environment. There are exceptions of course, when someone can even work while sitting on the beach by the sea or by drinking a coffee somewhere in the street with a computer on lap. However in order to do serious, constant and responsible work some stability and formality is required.

4.3.2 Motivation

When working in a virtual environment it's important to be able to self-motivate yourself. Usually, the virtual employee doesn't ever meet the directors, which means that there is no such pressure of being pro-active or efficient. There is no one who can give you a warning in-person or push to work harder. The only way to get pushed by the management is through online tools, which are not as convincing as an in-person serious conversation. Informant 001 said, "You have to really understand what does it mean to work virtually, how to be proactive at almost everything what you do, because there is nobody there watching you, nobody there to count your time" (personal communication, 2016-10-19). It's important to take these points from here:

1. *Project Manager has to be proactive and self-managed*: Even though the role itself, of project manager's, is imposing for the person to be proactive, bigger amount of this effort is required in virtual environment.
2. *Hire highly efficient and motivated team members*: Not only the project manager has to be proactive, but also the team members who are being hired need to be the same. If an employee

is not showing motivation, there is not much what can be done in virtual environment. It's not easy to create enough incentives to trigger the motivation.

Self-motivation, curiosity and responsibility is critical here. Informant 004 emphasized the same, he said, "You need to work independently, motivated yourself. There's is that aspect where you are told what to do, where you are in the office and you have environment and expectations around you." (personal communication, 2016-11-02). Some sort of push and pull communication comparison can be found in this thought. In a virtual environment, project manager has to do much more of push communication in order to show the proactiveness. If other team members start to see that the project manager is not pushing, doesn't show interest in the project or is just busy with other tasks - their motivation will drop and this can be noticeable change in efficiency and quality.

Summary of Theme 3

Theme 3 summarized findings related to the individual project manager's settings. These sub-themes include:

- 1) Analysis of how to structure the personal environment in order to achieve the best results and increase efficiency
- 2) Discussion about how to stimulate the motivation and be ready for challenges related to this topic with other team members.

4.4 Theme 4: Settings project policies

4.4.1 Running projects under time & material mode

It's sensible to use a fruitful advantage of the virtual project environment. Not like in a traditional project environment, almost all hours spent by the team members can be billed to the client. Developers, designers, testers and other project team members, when working in virtual team environment, are only counting the hours of the actual work done. As opposed to the traditional project environment, where they should be paid for the whole day of work, but the actual work is done only during the ~70% of the time. Informant 004 said, "Certainly, it's more expensive in a traditional environment, cause people waste a lot of time. In a virtual environment, generally people try to bill for the hours they are working. You can try doing the same in office, but not all people would be willing to do it. When people are working from home, they don't mind billing only for the actual work, but in office they would still be there, but the time won't be paid." (personal communication, 2016-11-02). As he mentioned, the same strategy can be applied in the office, but either people will start leaving or they would ask a much higher pay rate. Having a non-billed time at home is a totally different thing compared with the same in the office. In case if the amount of billed time while working at home is not high enough, the person can always search for new opportunities to fulfill the gaps. However, this

wouldn't be very convenient to be done when working in an office environment and having a few gaps during the day for other job. There is basically nothing what can be done during those time gaps, the individual wouldn't be able to work for other employer (for example because the gaps are not consistent and long enough) or wouldn't be able to run personal errands.

4.4.2 Being open to new cultures and geographical locations

Working in a virtual environment means working with many different cultures and geographical locations. If a project manager is not comfortable communicating or hiring people from abroad, it means that the project is missing out on one of the most valuable advantages of being virtual. To be open to diverse cultures and geographical locations is an integral part of doing work in virtual environment. Nowadays, globalization is a very commonly spread word. Because of the virtual environment people are starting to work in - the boundaries between different countries, religions and countries are blurring. Those who fail to admit this change will have additional challenges to succeed in this quickly changing world. Informant 004 has noticed, "The world is becoming such a global place, where Internet is ubiquitous, English, computer language and iPhones like, everyone. Cultural navigation which person should go through. Also freelancers, and remote workers have culture of their own which gets in front of the local culture and that's another success factors that you just have to know how to be a virtual worker and be respectful to other cultures. It's just a part of it." (personal communication, 2016-11-02). Nowadays it's enough to learn some general rules of being a freelancer, how to behave on the Internet and speak English in order to be able to work with projects from all over the world. There are no more boundaries, differences between different people.

The above is resulted when looking into this topic from a social perspective and from the way how the world is changing based on our quick paced life. On the other hand, there are also economic reasons why is it worth being open to remove geographical and cultural constraints when setting up a team.

First of the factors is that the pool of people to select from is much broader when you are looking into the worldwide selection as opposed to the local market. When working in an in-person environment, people tend to be searching for a job, which wouldn't be further than 45 minutes of commute. At the same time, when hiring in a virtual environment, the person can be thousands of kilometers away and that wouldn't affect the results.

Secondly, when a project / company is located in a well economically developed country, then the salaries for the local IT Engineers tend to be very high. If the hiring takes place virtually the pay rate can differ drastically. Same level IT Engineer can be found at two or three times cheaper rate in Asia or Eastern Europe. In addition to this point, when hiring virtually, the amount of paperwork and legal burden is decreased highly. For example in NY state, you can't fire an employee after a defined

period of time after getting him hired, which means that if you underestimate the person when conducting the interview, you will be stuck with him for a while longer. This won't happen in virtual environment - these kinds of processes are happening in a very agile way and new contracts can be started and ended at any time.

Informant 004 proved the points above with the following statement - "We can also access specialized talent at a relative low price, using virtual talent and people who really like to work the same way we like to work. In in-person environment you are just dependent on that area and if you just get somebody you are stuck with that person for a year." (personal communication, 2016-11-02).

Summary of Theme 4

Theme 4 summarized findings related to the selected project policies. These sub-themes include:

- 1) Review of how to take advantages of using time & material mode in virtual environment.
- 2) Discussion about the advantages of being open to non constrained cultural and geographical aspects when hiring the team

4.5 Theme 5: Challenges adapting to virtual environment

4.5.1 Transformational challenges

As in any business or an organization, process updates or changes are attracting negativity and criticism. When someone pivots from a traditional to virtual environment, it requires a good amount of time to process it and transform the mindset. This is applied both for the project managers and other team members. For the former - it's more complicated, because this position requires a lot of communication, interaction with people, managing processes and etc.. When the team-members (e.g. developers) would have most part of their day the same as it was in the traditional environment. The mindset has to be transformed pretty drastically and almost all of the specifics, how the work is done (communication with the team, communication with the client, setting goals, tracking results, showing the results, celebrating success, communicating bad news, etc.) should be reconsidered. Informant 001 has noted a few times about the fact that project managers, when transitioning into virtual environment, get confused, "They had a hard time, just not being able to see that person", "I know that when I started working with other folks, which tried to transition, I know from observation it was hard for them to, kind of, get into virtual environment, mindset, primarily I think they just missed having people around" (personal communication, 2016-10-19). The sudden change of environment can make a person do unpredictable decisions, especially when a change is done into something, which is not a comfort zone.

4.5.2 Technological challenges

Technological challenges, even though might appear even working in traditional environment, just can't be faced by a project manager in a virtual environment. The whole work there is done by using the technology and not being able to navigate it can cause irreversible consequences. The technologies (tools) themselves are starting to get user friendlier, however the kind of complexity required in managing projects (especially IT), can drag some people onto a problematic path of uncertainty.

There are also other situations where virtual team members (including project manager) can lack the skill of online communication ethics. In order to be efficient, there should be a strict policy on this topic. Some disorganization can make it into chaos. When working in a traditional environment, the online communication is mostly just a supplement for offline communications, which are the core base. Informant 001 emphasizes on this specific point, that having proper communication streams are vital to communicate the main aspects of the project, "You are relying on communication tools to communicate not just the timelines and milestones, but also the overall impact which they need, and the importance of them doing it without seeing people, so you are relying on text, on email, relying on phone, relying on voice." (personal communication, 2016-10-19).

These specific problem can be noticed with those who have been working in IT field for a very long time, without changing their position or company, in large corporations. Pivoting and transferring the way to communicate and use tools from there is going to be a challenge.

Informant 001 emphasizes on the fact that even experts in their field can face the problems with how to properly use tools and communicate when working in a virtual environment, "Where I found some areas where it might have been a struggle for members of the team is they weren't technologically savvy even if they were great at what they did, being in the virtual team, I found them struggle most in the early stages in terms of using the tools to communicate." (personal communication, 2016-10-19).

4.5.3 Motivational challenges

Not being able to communicate and interact with the people directly create challenges for keeping the motivation up. This problem can appear both for the project manager and the rest of the team members. This is not something what can be easily taught or configured. The problem appear on a deeper level of self consciousness. How does the person see the purpose of his work? What are the reasons he is working exactly there where he is? It's important to understand whether that person sees a goal, vision or longer term perspective in what he does. Informant 004 adds, "You need to work

independently, motivated yourself. There's is that aspect where you are told what to do, where you are in the office and you have environment and expectations around you. That's just a certain kind of person. Overcoming this and switching into a normal kind of work - almost impossible.” (personal communication, 2016-11-02). This is clearly signaling that it's not easy to be converted and having mindset which is not compatible with requirements for the virtual environment won't be efficient. This team member will undergo difficulties and won't produce the actual result he could have achieved while working in a traditional environment. There are kind of people who are motivated by other people sitting in the room. They want to be pushed and supervised, because otherwise their mindset is saying that having no pressure means no need to work hard or that no one would expect the work to be done. This is not the case in virtual environment. The management usually expects the virtual team members to be self-managed as much as possible and be using push communication (instead of pull) where possible.

Another challenge related with motivation and ambition of the project manager is relevant with domain knowledge. This problem is spread both through virtual and traditional environments, but if is more escalated in the former one. Informant 003 says, “I think that some of the PMs just like to sit back and really don't want to understand whatever they are working in. I think it's very important. If we did food for school, it would be important to understand what are the kids needs and try to deliver good organic food, because that shown to be important for the eating.” (personal communication, 2016-11-01). In IT field there are many domains under which company can function - Finance, Medicine, Education, Politics, Consumer Services and etc. It's not easy to find IT project managers with specific domain knowledge the company (project) operates in and that's why this person needs to be very ambitious to learn new domain. Otherwise, working as a project manager without ambition to understand the domain will not allow to see the vision, general goal and the strategy the project is moving towards to.

4.5.4 Project success celebration

In traditional environment, after closing a big project or reaching an important milestone there is usually a some kind of celebration, when the project manager organizes a celebration to show gratitude for the team members who stayed over time in order to achieve the goal. The team members appreciate for being treated that way and when working on the next project or milestone keep that in mind and do their best to help leading the team to the next successful point. However, the situation with virtual environment is different. Informant 003 mentioned this topic, “I think it's much more harder to build team culture in a virtual model, it takes a lot lot longer to do that” and “important to develop delivery skills if you delivering your things virtually you are not there in person you can't go out drinks and celebrate, you need to recreate some feel good moments in the project.” (personal

communication, 2016-11-01). It's being emphasized that it's not easy to build personal and trustworthy relationship between the project manager and the team members.

Without having this kind of relationship the project manager just doesn't know how far could the team member go in order to help the project. It's not clear whether he would do a few very late nights in order to help the milestone to hit the deadline. There is not enough personal communication and responsibility between the parties. A team member (developer) can easily go offline and he will feel safe and untouchable, when in traditional project environment, you can't just disappear - some in-person communications will still take place and responsibility is expected to be on a higher level. It's requires a discussion on how to celebrate with a virtual team members after reaching a goal and how to contribute in connecting with other team members.

Summary of Theme 5

Theme 5 summarized findings related to the challenges when adapting to a virtual environment. These sub-themes include:

- 1) Review of how current employees might be against the transformation and changes.
- 2) Discussion about the tech savviness related issues when transforming
- 3) Review of the social issues appearing, because of the decreased amount of the in-person work time.
- 4) Investigation of issues when trying to celebrate or acknowledge a specific event during the project life-cycle.

4.6 Theme 6: Challenges working with team members from different time zones

4.6.1 General time zone issues

Different time zones and geographical locations are very specific problems in the virtual environment. Virtual environments have this deficiency and there are always struggles how to solve the fact that different team members can only operate during different time intervals. This topic was mentioned by all of the informants, because of it's sensitivity and uniqueness in virtual environment, there are several sub level issues on this general topic.

The fact that people are working in different time zones means that they can only be online at the same time for a very specific and limited period of time. If these two people are working closely together on the same project component and need to have constant communication (either text or voice), then them being in different parts of the world can drag a number of risks. Informant 002 looked into this through the perspective of communication between developers, "Well, time zones is the biggest issue here, right now I have team members and clients spread across 10 hours of time zone differences, so that definitely affects my days in the organization and we need to make sure if you

have some kind of process if you need to check something with the client then discuss with one developer then another, then you need to do it in a proper order, otherwise you will need 24 hours to get everybody online and check with them”(personal communication, 2016-11-02). The main aspect here is that if someone misses the gap when to reply or trigger the communication, then the next closest time when to do that again is in approximately 24 hours. Having in mind the kind of projects we are analyzing (IT), being agile, quick and iterative is very important and losing a day causes serious problems. This issue adds additional burden on a project manager to behave as an international clock and calendar to make sure to connect with all of the affected parties and make them to do the communication or retrieve pending information while the other team member is still available.

4.6.2 Scheduling meetings

The similar issue is happening when scheduling meetings. This activity is much more complicated in virtual environment compared with the traditional one. In traditional environment it's enough to have a few calendars of the team members and compare the same time slots between usually 8:00 AM and 5:00 PM. In virtual environments it's not like that. Informant 003 describes this problem with the following wording, “In in-person environment people are typically always available, you can always run into them and virtual environments is different, you have to know when and who is available when. For example someone is not available very early in the mornings, so you can't text that person. And if someone else requires a call at that time (including that person who is not available in the mornings) - it becomes a challenge. In the office environment, you just say - are you doing that thing?” (personal communication, 2016-11-01). So there is a number of aspects which should be analyzed while doing the scheduling between people spread around the world and connecting virtually:

- a. Time zones - This can make the time difference drag up to 10 or even more hours. Important to note that there are day time saving changes which only appear in part of the countries and even more, the period starts at different time and in some places can have the clocks turned into different directions. This is a very big problem for project managers and other team members who meeting scheduling.
- b. Availability during the day - usually when working in a virtual environment, people are not spending the whole day working. Every person has it's own flexible schedule and it's not easy to connect all of the meeting parties at the same time

Also, challenges can appear, when the policy about some of the meetings (which can't be flexible and usually are aligned with the client schedule) being mandatory is not explained properly before the project starts. There are meetings which require presence of all of the team members, even if it's in the middle of the night - attendance is required.

4.6.3 Time zone related risk mitigation

Sometimes working in a virtual environment under different zones is so complicated and stressful that it can even be mitigated by constraining the geography of resource pools down to a few time zone hours difference. Constraining the pool of selection is generally a bad practice, but in some cases the challenges are make the work deficient in a way that it becomes a disadvantage. Informant 004 made the case that it is happening in the project work being done now, “Time zones are a huge pain, for sure, and we are in fact hiring domestically right now to reduce some of the time zone pain, it really spreaded around” (personal communication, 2016-11-02). Since the hiring, for Informant 004 is happening domestically and he is located in US, the maximum difference between can only be 3 hours, between Eastern and Pacific time zones .

4.6.4 Project manager’s full time availability

The above challenges are mostly related with getting the team members on board, communicating with them and finding the crossing time when some of them are available. From another perspective, there is a challenge for the project manager to be able to communicate with all of the team members efficiently. It can’t be allowed for the project manager not to have connection points with any of the team members, clients or other stakeholders. This is important. Informant 001 describes how it affects life, “And I know I keep emphasizing the time zones and the differences, kind of where people are at, because you almost have to find a way to stay connected even if you are not connected.” (personal communication, 2016-10-19). It means that even when you (as a project manager) are not officially working at that hour and someone from the team reaches out - it’s expected from you not to ignore that and respond back together with a reaction as needed.

Summary of Theme 6

Theme 6 summarized findings related to the challenges related with time zones and adjusting to them. These sub-themes include:

- 1) General discussion about the problems appearing in time zone perspective.
- 2) Discussion about the problems appearing when scheduling meetings between people from different geographical locations.
- 3) Review of how some companies are trying to mitigate that problem, but with causing other issues and constraints.
- 4) Review of additional challenges caused for the project manager when being flexible with different time zones

4.7 Theme 7: Challenges finding reasonable people to join the team

4.7.1 Hiring

Certain challenges appear when doing the research to get more people on the project in virtual environment. Project manager (or the person who is hiring) is constrained by only seeing the digital information about the candidate and can only rely on hearing and seeing him (or her) by using online tools.

When hiring people who pivoted from the traditional project environment, it's going to be a big risk, because it's not easy to determine upfront whether the candidate would handle the virtual environment and rules working there. The same challenge appears in traditional environment as well, just from a slightly different perspective - it's not clear whether the candidate can handle the responsibilities and has enough skills to maintain the good work. Informant 003 emphasizes on the uncertainty when hiring these kind of people, "I don't know if everyone can do this work. I think the person has it or they don't. You really have to spend 3 months time with them to see where they are, because there is a lot of trust and you can't breath over somebody's shoulder and that they are doing the stuff they are supposed to be doing." (personal communication, 2016-11-01). It is said that when hiring people, without references of working in virtual environment, it can be a risk - both a positive and a negative one.

4.7.2 Trust issues

Even when the person is hired, there are several risks attached with that. If the responsibilities of a new team member are very limited and they are constrained with the data reachability or system access - this is not a problem, but the issues start when the hired person needs to work with highly sensible data and systems. Informant 004 is currently struggling with a similar issue, "Questions of trust, right, as you bring people on, you don't know the degree you can trust them, particularly related with operations, bookkeeping, finance, IT where they have access to kill your systems. How do you give the access rights when you just first meet them." (personal communication, 2016-11-02). In IT projects the most sensible roles are of those people who have the direct access to the production environments, password vaults, security permissions. Currently, there is no reliable way to secure the company or project from being cheated by the remote contractor. When a person is hired there are several documents signed like (for example - NDA or a contract itself), however, even if the NDA is violated and the contractor itself is not in the same country, it's very time and resource consuming to take legal actions against him. And that wouldn't even be a wise investment. If the contractor killed

the system or somehow damaged the reputation, project team would usually spend time on rebuilding it rather than chasing the not well behaved team member.

Summary of Theme 7

Theme 7 summarized findings related to the challenges related with finding people to join the virtual team. These sub-themes include:

- 1) Review of the issues when hiring.
- 2) Review of the trust related issues when delegating work with highly sensitive data.

4.8 Theme 8: Recommendations to other practitioners

All informants provided very useful thoughts for project managers who are planning to pivot into virtual management theme. Since most of the interviewees were self taught virtual project managers, who started working in this field when there wasn't even proper theory written, it's easy for them to point out what are the important points when pivoting.

4.8.1 Being proactive

A project manager needs to be resourceful, curious and kind of extrovert in perspective of communicating with the team and showing initiative. Informant 001 is suggesting the following, "Try to be resourceful, even if you are not an expert, try to figure out what people need, cause at the end of the day you want to make sure that the people you work with are successful, you know it's kind of job, when you have no title at least in a virtual environment, where I worked in" (personal communication, 2016-10-19). It's being emphasized that it's not enough just to do the project manager's casual activities, but also to be proactive in making sure that all of the team members are not lacking of any information or help. Even if the project manager can't help with a question/problem the team member is dealing with, it's essential to do everything possible to resolve that. This is, though, a thing which should be done in both traditional and virtual environments, but it requires more attention in the virtual one.

4.8.2 Improve technical skills

Another thing is to start getting used to be more tech savvy. This was mentioned above in other research themes, but the emphasis here is that a project manager needs to start practicing to use more digital tools and find the best ways to operate them quicker and more efficiently. Informant 001 remembers what has she mentioned to one of her students, "There is a technology peace too, this girl I told you about doesn't skype, doesn't tweet, doesn't use social media, and I thought maybe you should start." (personal communication, 2016-10-19). The tools mentioned in this quote are not directly

related with managing the project in virtual environment, but they help to improve the tech savviness and understand the online communication ethics and rules. Informant 002 also emphasized on this point, “Well to use as many tools as possible, because he won’t be able to rely on the face to face communication and by overall looking into people, so as many tools as possible.” (personal communication, 2016-11-02). That’s a general suggestion from experts in the field. It’s better to start playing with these tools now, rather than get blocked by the lack of knowledge after starting the work in virtual environment. There will be a plenty of other things to be worried about, so having a good understanding of tools would help a lot and save some headache.

4.8.3 Have good time management skills

Being proactive when communicating with other team members was mentioned above, however there is another useful approach, which might be affecting the lifestyle of the project manager. Being a project manager in a virtual environment will require to communicate with many people from around the world during different times of the day. Most of the time, the project manager will need to accommodate in order to fit the schedule of other team members for purposes of communications and meetings. Informant 001 emphasized on this point, “On global teams it’s like how do you continue working with your team members so it doesn't feel like you are in different countries, like in the same room. Part of it is just the responsiveness and so I tell the new millennials, try to get that mindset being a consultant no matter what are you doing, in my mind the PMs have the consultancy mindset.” (personal communication, 2016-10-19). So this is a stiffening argument for the first advice in this theme.

Summary of Theme 8

Theme 8 summarized the suggestions done by the informants for the project managers who want to pivot into the virtual environment. These sub-themes include:

- 1) Description of how being proactive is going to help being efficient
- 2) Review of how being tech savvy would save time when starting in virtual environment.
- 3) Review of how important is personal time-management when working in virtual environment

4.9 Other Theme: Measuring Success

No significant statements were observed regarding measurement of success. Which can be lead to a conclusion that virtual management is not having any specific measurement techniques, challenges or advantages compared with the traditional environment. The main emphasis during the communication with the informants was how the process itself is different when working in this

innovative environment and how to prevent from doing mistakes and performing efficiently. The success rate was mostly depending on the project itself and cannot be generalized.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Theoretical research conclusion

As a result of this thesis, analysis of theoretical researches and articles, which are relevant to virtual project management, was conducted. The information found lead to conclusions that the difference between working in traditional and virtual project environments is an important issue. The data was gathered by using the materials written during the last two decades, which means that this topic was started to be researched some time ago already. Even though, it's still quickly progressing nowadays.

5.2 Conclusion of specifics found when analyzing literature

The following specifics and suggestions of virtual project environment were analyzed by using the literature research:

1. Difference with traditional project environment.
2. Project manager's approach and attitude.
 - a. Show high interest in project, participate, show ambitiousnes.
 - b. Practice communication and negotiation skills.
 - c. Monitor each team-member individually in aspect of involvement into the project.
 - d. Be a good communicator and collaborator with your team members. Be able to transfer the information efficiently without losing the interest of the recipient.
3. Problems of using common project management approaches.
 - a. Analyze whether selected project management approach and methodology fits the virtual environment.
 - b. Adapt the selected project management methodology individually for each project as per existing constraints and environment.
4. Problems undertanding project goal and vision.
 - a. Schedule a well prepared kick-off meeting.
 - b. Make sure that each team-member understands the project goal and requirements by making them explain it in their own words.
 - c. Include specific activities described in the analysis part, in order to improve the understanding of the project goal and vision.
5. Time zone differences
 - a. To avoid problems of communcation timing between virtual team members, a very diligent planning and policy is required to be set.

- b. To work around time zones, managers of virtual teams need to think, lead, and communicate differently than a traditional team leader – always to understand the consequences of every request or action in different time-zone
 - c. Rotate meeting times in order to balance the amount of meetings at inconvenient time for each team member.
6. Cultural differences
- a. Create a shared understanding of team goals and objectives.
 - b. Do not assume things — Communicate, Communicate, and Communicate.
 - c. Build trust.
 - d. Accommodate problems occurring when team-members can't operate by using the same language efficiently.
7. Communication
- a. Get to know the team-members personally.
 - b. Be quick in responding and don't keep people waiting for replies.
 - c. Keep team-members up to date with the newest information.
 - d. Use enriched information types when possible.
8. Celebrating project success
- a. Find alternatives how to motivate team-members after reaching important milestone.
 - b. Understand that bonus payments are important, but can't be used as the main celebration material.
9. Technology tools
- a. Analyze and sensibly define the best tools for the virtual environment.
 - b. Train team-memebers and introduce a technology policy on how and which tools to use.

Generally, this topic is very actively developed at the moment. There are many good practices explained and suggested together with recommendations for pivoting project managers. However, there is also a noticeable amount of challenges, which are not yet fully solved and require additional attention, especially for the people who are just starting working in the virtual environment.

There is a great amount of literature discussing how to lead projects, which take place in a traditional environment. This alone, can be a satisfactory guide for leading the projects. However, in order to be really efficient with virtual projects, a more deeper understanding of specifics and its culture is required. The virtual environment, in this quickly changing world, will soon become a new standard. The technology and progress is moving too quickly to miss out the valuable advantages of this environment. In time, solutions for the problems which are not yet resolved will be suggested and

the efficiency of this work environment will be on the highest level. Below will be proposed a general summary for the questions analyzed.

5.3 General research interview conclusion

A total of 5 informants were interviewed. All of the informants are very familiar with both kind of management types and environments. Most of the informants have more than 15 years of professional work experience. This allowed to them to express their opinion and thoughts from different perspectives.

5.4 Best practices gathered when conducting the interviews.

5.4.1 To Communicate with external stakeholders intensively

It's vital to always be in contact with the external stakeholders. This is the job of project manager's who is representing the virtual team to do that. He (or she) needs to be proactive and communicate very closely and often with the stakeholders, specifically with those who are not used to work in a virtual environment.

5.4.2 To avoid having partially virtual teams

It's a better practice to have the whole team either fully collocated or fully virtual. Having the middle option will create problems, inconsistency and communication issues, when the people working in the office wouldn't transfer all of the knowledge or the insight to the ones who are working remotely. Not because they wouldn't like to communicate, but just that a part of the conversations wouldn't be tracked digitally.

5.4.3 To use both synchronous and asynchronous communication

There are situations where synchronous communication is the only and the correct way to be used, but in some specific times it's recommended to use asynchronous communication and tools that help use that. That helps decreasing the amount of time spent waiting for the answers and eliminating blockers.

5.4.4 To plan personal time efficiently

When working in virtual environment, project manager should not be aligned with 8AM-5PM work schedule. His (or her) work will be spread across the whole day and different time zones. There should always be an optimal life/work balance. That's not mandatory, but is required if wanted to be efficient.

5.4.5 To use bots

Analyze current market of tools available for improving the efficiency. Specifically bots - they are changing the way virtual work is done by introducing automation for many of the routine activities. This allows the project manager to multitask more efficiently between the projects without harming any of them

5.4.6 To use proper tools in proper situations

Understand how each tool should be used and find out the exact purpose of it. For example - don't use email for small talks and IM communication tools for agreement on serious contract related items. Once these items are defined it's better to create a policy for new people to help them understand what is the communication protocol used in the company. Most of the time, it should follow the common sense, but there are specifics when one or another tool is preferred.

5.4.7 To prepare personal working environment

The environment project manager is working in can directly affect efficiency and motivation. It's suggested to:

1. Set-up a workspace, which will only be dedicated for work. It can be a room, part of a room, a table, etc.
2. Get isolated from any of the distraction in the location the work is taken place in. This isolation, most of the time, would happen on a psychological level, which can bring difficulties not to break it. Refrigerator, TV, Sofa - These are the isolation requirements.
3. Be dressed in a formal outfit to stimulate working atmosphere and improve motivation. At the same time this factor increases the isolation mentioned in 2)

5.4.8 To be self-motivated and hire people with the same attitude

Self motivation is a factor which is mandatory for the virtual team members. Project manager has to show more ambition and share that with other team members. There will be no-one near the project manager to push, but the expectation are always there. In addition, the same attitude should be required from the other team members. They the same way are working individually and need to be motivated, proactive. Project manager won't be able to stay behind the shoulder and push the employee. Even if the person has very good skills, but lazy and undetermined attitude - in most of the cases it's not worth risking and spending time on forcing him (or her) to change their habits.

5.4.9 To run projects under time & material mode

Though this might be applied in both in traditional and virtual project environments, but the virtual ones has more advantages when being run in time & material mode. It's easier to track hours, calculate the time spent by each contractor and have less worries about the time when the people are idle, because that time is not going to be billed.

5.4.10 To be open to new cultures and geographical locations

Don't be afraid of other cultures and geographical locations. Opening the borders is creating a lot of additional possibilities and opportunities. Virtual contractors nowadays are global, they don't have problems adjusting to a specific time zone, culture or environment. It's easier to find people when the search is done in the whole world against having a small area to search in. People from other locations might have smaller bill rate for the same quality of services as compared with a local one. In addition, when hiring a contractor it is easier to manipulate the contract itself - adjust rate, change workdays, fire. When it's an officially hired employee, there are several restrictions of what and when can be done

5.5 Challenges gathered when conducting the interviews.

5.5.1 Transformational challenges

A pivot of environment from traditional to the virtual is stressing the person a significantly. Especially the project managers who are used to have constant communication and in-person collaboration with other team members. A sudden change of environment is stressing the people and might take a considerable amount of time to adapt. However, sometimes even time is not helping to adjust, which means that person just can't work in a virtual environment.

5.5.2 Technological challenges

Even though the technologies are used on all kind of environments, the amount of intensity of it greatly increases when starting virtual environment work. Digital tools are the main measure of communication and work. Tools which are used for these purposes are getting simpler and simpler, but for someone who is not as technologically savvy it can be a challenge. It can be noticed with older people who, even though, are IT related people, were doing very specific activities, without learning and improving themselves in informational technology field.

5.5.3 Motivational challenges

The fact that in virtual environment team-members can't constantly see each other and motivate, push or keep the pace quick sometimes can bring the personal motivation down. Sometimes

the person just can't work if he is not being pushed or supervised. A high level of autonomy is required. Usually, when a person constantly requires hand holding and supervision, there is no high chance of adapting to a virtual environment and getting work done.

5.5.4 Not having a way to have project success celebration

In traditional environments, there are plenty ways of how to celebrate success on a project or its milestone. It can vary from a full team bar trip to an impressive trip abroad. Challenges of doing the same appear in virtual environment. Team members might feel under valued (even though it's not true) without getting appreciation of doing such hard work. This can result in not being dedicated so much and not stepping an extra mile when it's really needed.

5.5.5 General time zone issues

Most of the time, if the team is really virtual and is globally accepting the team members, it's a high chance that most of them will be from a very different parts of the world and the time zones would be dramatically different. It's a big challenge to be flexible and work in different zones, without causing issues of communication. The fact that people are operating in different time zones is creating an issue of slow communication loop time. Sometimes, if there is an important question blocking further development, it can take 24 hours in order to get an answer. That's the best case scenario, the worse option is that it's not enough to have a single communication loop to resolve the blocker.

5.5.6 Challenges of scheduling meetings when operating in different time zones

There are some specific challenges of being in different time zones. One of those is scheduling meetings. It's already a challenge to schedule meetings between higher amount of people in our quickly moving world. It gets even more complicated, when specific virtual environment related items are kept in mind. Firstly, the time zone itself, which is the biggest problem. Sometimes those can be so different that a usual work time in one place, can be a night in another. When this problem is across multiple people - it's very unlikely to have a comfortable time for every participant. Another thing is that when working in virtual environment, people tend to have flexible working hours and have a different kind of life / work balance. It has to be taken in mind that there is no pre-defined time (most of the time) when the person is working and usually, it has to be qualified before doing the scheduling.

5.5.7 Challenges mitigating the risk for time zone related problems

Sometimes, when the problems with time zones are so serious, it is decided to hire someone from the same geographical location. The challenge here is that, when operating in economically well developed countries - the rate for the contractor will be higher. Another, psychological challenge is

that the project is not using the main advantage of a virtual environment of having an ability to select from world wide professional selection. This means that the project has the challenges which are provided by the virtual environment, but at the same time the advantages of this environment are not used.

5.5.8 Challenges of project manager's full time availability

When working in a virtual project environment with team members from different time zones, one of the most complex challenges is delegated to the project manager. This person needs to be able to operate in time zones which will be comfortable for the team members. It means that sometimes, it's required to be awake in the early morning to have a discussion with a person from east side of the world and then at the same day, it might be required to be available at night, to discuss project related items with a team member from the west side.

5.5.9 Challenges of hiring

Hiring in virtual environment, though, might have simpler red-tape activities, but the process itself is challenging enough.

1. Most of the time the interview is taking place virtually. In hiring, it's easy to evaluate person according to his non verbal communication. This advantage is missed in virtual environment. It's possible to have a video conference, but it would still be not equal to a real in-person
2. It's a big risk to hire someone who has never worked virtually before. Even if the person is saying he can handle this challenge, there is a serious uncertainty.

These issues and risks can be a result of a hire, which is inefficient and not delivering. Since, in order to get a new team member on board takes a noticeable amount of time from different project members, a failed hire is basically a risky investment.

5.5.10 Trust issues

Even when a hired person is performing well and is able to work in virtual environment, there is a dilemma, when is the point when this person can be trusted with very sensitive project information and access to production environments. A person with bad intentions, having this access can not just create problems and headache, but also ruin the project irreversibly. After doing that it's easy to disappear virtually and never to come back. This specifically is applied when hiring for positions which are related with system security, production support and maintenance.

5.6 Recommendations to other practitioners

5.6.1 Be proactive

Always be ambitious and motivated. Be on top of all project related activities and make sure that all other project members have no blockers or pending questions. Even if you can't help your team members to solve his problem - do everything possible to find support. It's vital for other contractors to feel care from the project manager, if not in-person, then at least virtual.

5.6.2 Improve technical skills

Spend extra time studying the tools which are used for management and communication in the project. It's going to be the heart of project management infrastructure. Struggles to understand how to use those will decrease your efficiency.

5.6.3 Have good time management skills

Implement an efficient way how to plan time. Since work is going to be done with people from around the world, it's needed to understand that gaps for personal time will appear during all parts of the day and it's not a good strategy to have an understanding that after 5PM you are free. When working in an international virtual environment, work is happening all the time, just with different intensity.

5.7 Success measures

As per the conducted research, there are no observed differences when measuring success between traditional and virtual management. Most of the differences, as mentioned in the research above is related with the process itself.

5.8 Suggestions for future research

There are topics, which still require additional research and analysis and where not deeply discussed in this paper. Some of the aspects of the virtual project management are yet to be resolved. This might be by implementing more sophisticated technological tools or by changing the way people think or behave.

Verification of hired people process is something what is yet causing uncertainty, there are no proper and easily accessible ways to verify whether a new team member is reliable, to check his paperwork from the country he is from. Especially if it's a very distant country with conservative data control.

Time zones are always going to be a problem. However, it's interesting how would the solutions pivot with time, since more and more people start working in virtual project environments. This is something what can't be physically changed, but some mitigations can be invented.

Even when people work in virtual environments, in bigger projects, they still need to have annual in-person meetings with the executive teams. It's interesting to find out whether the efficiency of the virtual work will improve so much, that no in-person contact will be required at all when working in larger projects.

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ANNEXES

Annex 1

Excerpt from Interview transcription with Informant 001

Researcher: First question, when did you start working in Project Oriented Environment and could you describe the activities you were doing back then

Informant 001: Yeah, uhm, I would say, the first project oriented environment, in late 1996-1997 something like that, over 20 years, let's say about 20 years and some of the activities that I was doing was actually related to the implementation of the first learning management system for a university and so, that was a university endeavour and the team that I was working on, was pretty much a, kind of, project driven to get the tool launched, as well as getting all of the professors and users ready for the new learning management system environment.

Researcher: And I assume in those days, your day was looking differently compared with nowadays. And if you could describe what were the activities you were the most usually doing

Informant 001: Yeah, well I would say definitely the activities were different, back in that first projects, I was a student, right, and I was working, well my scope of work was a little bit different, a lot of what I was doing a support role, trainer role, technical trainer role working with professors, so my day-to-day was different, there were different people who lead the work, the project management team, who would set our milestones and tasks. The most what I would do, was in person, on site, you know, in a university working with faculty and a lot of times there was a lot of face time involved and also email and telephone calls. In terms of a team it was a, so that department was essentially kind of a combination of an information and technical communication support for the university, so we housed a direct team of 20, not including assistants and we had kind of a supporting team which was in a different kind of department, our kind of network and engineering team and there was about 10 of them there. And of course, scattered in departments, the various other technology colleagues that we had, that were positioned in various schools. Total maybe 50, 20 core and the rest 30 disperse across the university system and that's only on the technical side, we also had department which dealt with user training, so we worked closely with education analysts to help onboard professors eventually to start using the learning management tool.

Researcher: Was it usually in work in project environment?

Informant 001: I know that our department was unique, because we worked primarily with a technical group they were already project management oriented in terms of development. It was already kind of part of the culture, but I know when we worked with other departments, that was academic skilled, it wasn't necessarily that same level of project environment understanding. And

during those days I would, I mean, I would call it a traditional, because a lot of it was just in person. It's different now, but it's basically the first project that I worked on,

Researcher: I assume you've been working on these kind of projects since then, it was in this field, right?

Informant 001: Kind of. I would say that, pretty much stayed close to education, not always inside of educational institutions, but always related to the education, so compared to that first project oriented environment you asked about, so what's different now is that I'm working now is mainly global teams, so mainly working with Fortune 100 companies in technology sector and, still very similar. If you look at just a core base project oriented environment, you have kind of similar, uhm, bare-bones, but it's definitely different today, like for instance, uhm, one of the largest groups I had at one point when we had, you know, it was a matrix environment for Fortune 100 company and it was a global technology company, and we had a core team of three people, that was basically driving resources for maybe 66 countries, and so these countries were headed by country directors, and they all had their own umbrella of engineers, program managers, project managers, and other experts whom they managed within their country, so my job was similar in some different context. Their environment was different, I think I only met the team once in that 3 years project, everyone were global, so I worked across different time zones, based primarily in US, and work with our Europe teams in the morning, Asian team in the evening and then Latin America and the US in the day-time. So, it was that kind of environment.

Researcher: When have you started working in these kind of projects, in the virtual ones?

Informant 001: So the beginning, was the one which I told you, in 1996, and I did that traditional on up until, at least full time until 2005. In between I have started doing virtual projects already for part-time, since 2005 all my work have been primarily global.

Researcher: If we get back to the traditional project management, can you rate on scale from 1 to 10 how successful those projects were

Informant 001: In a traditional sense, ok, at least in university setting we rated based on "hey, did we implement what we said that we would implement, by the time that we implemented it and did all of the users adopt, or at least a certain percent of it that we wanted to adopt and then, you know, have we been able to sustain it, beyond three years. So in that case yes, I would say, that it was successful in that regard and then the other end of that in the global projects, I mentioned to you, for Fortune 100, uhm, quarterly it was a bit more rigorous where we had our milestones, tasks, at the same time also score-cards, because we were working, you know, deploying certain goals for the year, that had long term strategy let's say of three years and every year we hit certain milestones, but at the same time, I was responsible for the access of these country directors, that didn't necessarily report to me, in a matrix environment, so it was a bit more complex, where just we were managing the project in a sense

we had milestones, tasks, timelines, identifying risks and all these things, and of course looking into time, costs and scope, but in parallel to that is our kind of sales side of it, it was a two fold measures of success, one part yes - time, costs, scope and all those traditional elements of project management, but in parallel to that, you know is, sales, how successful were the teams we actually served. Even if we deliver something on time within cost, if the business side wasn't successful then it wasn't a success. So that was the difference between those two, and the biggest factor I would say for the complex ones was staying in regular communication with key stakeholders of the milestone owners. (that's virtual). In the traditional project environment, the biggest factors are, the same thing actually, staying in contact with milestone owners, making sure that there was a clear communication of what end result should be.

Researcher: If we jump a little bit ahead and compare traditional and virtual environments. Could you tell a few of the success factors which didn't appear in the virtual environment?

Informant 001: Uhm, in a traditional environment, meeting in person and all of those things were important. In the virtual component it wasn't as, to me, it was fine, cause I've been doing it for the last ten years, just be able to navigate, you can make those meaningful connections virtually as you do those in person, but I think, where I found some areas where it might have been a struggle for members of the team is they weren't technologically savvy even if they were great at what they did, being in the virtual team, I found them struggle most in the early stages in terms of using the tools to communicate. They had a hard time, just not being able to see that person. I only noticed that primarily in the virtual working with US folks.

Researcher: Thank you. How did your day as a manager's changed after you started working in a virtual environment:

Informant 001: Well, in the traditional it was, it felt easier in virtual environment for me, just because most of the time, when I'm on a virtual team, on a global team, and usually for the most part, most people that I worked with were pretty savvy working virtually and so communication usually isn't an issue, because on some kind projects now, I could be on, you know - Skype / Email / Slack etc and it's fine, right. And so, I guess for my day to day environment, for me that's changed in virtual environment, I had to adapt to the people I'm working with, especially if they are from different time zones or, and I know I keep emphasizing the time zones and the differences, kind of where people are at, because you almost have to find a way to stay connected even if you are not connected. Probably it's the biggest piece is working in a virtual environment compared to the traditional one. Because in the traditional one, whenever you are on the university campus, you know people's office is right there and you can just go to the person's office and have a meeting, have a whiteboard, that whiteboard is always filled, you can visit this room anytime and in a virtual environment is like how do you replicate these things without compromising the success of the project.

Researcher: Have you noticed if any new activities appeared when you started working in a virtual environment.

Informant 001: Yes, when, I think, I first transitioned in 2005, it was actually a complete transition, when one day I was driving every day to my place of business and working there, and then all of the sudden, switch gears and I was 100% virtual, and so, you know, new routines, even involved things that wasn't related to work. So part of it is having dedicated space, having kind of how do you replicate the feeling of being in an office. Making sure that you have that space wherever you at, even if you're at home, hotel or whatever, just making sure that you have the right, you know kind of like - environment. On one end, so that was the difference in my routine. What disappeared in my routine though is you feel like there was a lot of time wasted when you were in an in-person, not necessarily wasted, it was just filled with that little chatters and such. But I think I in a sense missed that, because that's sometimes when you make connections with people. So, after work - parties just like that. But I think in a virtual env, You can fill that with chats or something in whatever tools which has been used. That kind of changed the routing a bit, so not having those break conversations instead trying to figure out how to use the tools to help you to create those relationships.

Researcher: if we go back to 2005, how hard was it for you to convert from Trad. to Virtual. YOU have mentioned that you needed to change you activities during the day, but was it complicated or challenging?

Informant 001: For me it wasn't just because you know I mean, at least for me, my mother was an engineer, so she was a computer engineer. We didn't have a living room, we had a server in a living room, so I always grew up with these things, I was already familiar with that, She did a lot of, even in her own software dev stuff, I was familiar with it. Plus a lot of the time she would bring her work home or she would work from the distance. Remember this was back in a day when she was on mainframe, so that env was familiar for me, and when I needed to do the transition, it was familiar for me as well, because my earlier projects in that involved, educational technology. For instance, we were, when we launched first LMS, I had to, I did a lot of the training for faculties. So part of that is getting into mindset of the user, human computer interaction, so I kind of already had that mindset, but you know, I know that when I started working with other folks, which tried to transition, I know from observation it was hard for them to kind of get into virtual env, mindset, primarily I think they just missed having people around, cause I know when I started in 2005 I have actually taken another person with me, just ot start on the same day, she and I worked together in the same time traditional environment, then afterwards I brought her with me, so she was hired too. We lived in the same city, but far away from each other, so she had a hard time with the transition, and I know for the most part it was just getting used to, how do you get connected.

Researcher: and this is probably connected with our next question, where I'd like to ask whether you have noticed how the team members changed back from the days when you work in trad env and now when you work in virtual env. How they became maybe more or less responsible, responsive or detail-oriented

Informant 001: Yeah, in a trad environment again that was in university setting, and I don't know if being in uni settings makes it less or more rigorous, but I know from my exp that, at least the projects then were typical in a sense followed stream line approach to projects, you set your goal, you set your milestones, you do - a,b,c,d after d, we do e,f,g. So it was in that linear format. Up in point until you get to the end. The team had the similar mindset, can we set goal a, and get to goal Z following the straight path. It was always linear in that regard. But what I noticed now in a virtual team, I will use the last three year projects that I had for Fortune 100. It's a bit different, I would say agile, or adoptive, more startup mentality on those, where you know in trad setting it might take a long time for decisions, and again, maybe it's because this was in a university environment, where in a virtual env it was in a private sector. But the team in that virtual setting was a bit more "hey let's sketch this, let's engineer this, figure out this, let's test it". It's different in that regard, so the mindset is a bit different, I don't know if it was more a startup mentality, definitely more of risk takers.

Researcher: If we transition to virtual env only, I'd like to ask like I think we should take like last 5 years (maybe 8 years) for these answers. Generally, the question is what were the biggest obstacles you have faced related with team scope costs of the project:

Informant 001: Uhm, I think the biggest problem, at least from many driving projects perspective, because the team is primarily virtual, you are relying on communication tools to communicate to communicate not just timelines milestones, but also overall impact what they need, and the importance of them is the impact of them and you are doing it without seeing people so you are relying on text, on email relying on phone, relying on voice. And all these kind of communication tools where you can't you know see people facial expressions unless you have the video on. Even then it's different, so I guess the biggest problem would be making sure that whoever we or members of the team is working with, we are all aware that everyone might not nurture these things. I guess communication is key with these virtual teams even with the trad team, but even more in virtual teams, because part of it how do you keep motivation and engagement and how do you celebrate and kind of emphasise key issues in a virtual settings. Those are the key things, really.

Researcher: From more administrative perspective, have you noticed problems with diff. Time zones, cultures.

Informant 001: Absolutely, especially, cause you said last 8 years, in one 4 year project that I worked with, we worked across Latin America, Europe, Middle East, Africa and of course America and North

America, and various folks and so not only we were working with different time zones, there were several cultural differences, there were certain mannerisms, there were certain things that just certain things of doing things was different and so you know again part of that is just making sure that everybody is on the same page, you know in terms of communication. So that way people are heard and communicate with each other well, cause on the end of the day it's impacts business, the project, so we need to make sure everybody is glueing well. And I would say I didn't had those problems before with the traditional projects - yes we had different people, different ethnicities, but in contrast with working with people in different countries - it was different.

Researcher: From perspective of reliability of your team members, Have you noticed any difference between virt and trad env. F.e. in virtual env. People can hide behind their computers .

Informant 001: I always felt that at least the kind of teams that I was working with, the virtual environment was more reliable, than the trad env. I think it's harder for folks virtually, even though, again this is just my own experience, working with other people in a virt env., the might be a perception for people that haven't experienced it everyday that someone can be working, who know what might he be doing, But if you are in a virtual environment and you've been doing that for quite a bit and you are working with Fortune 100 companies, who hire you, because you have that experience, at least in my world, it means that this person is reliable. They can communicate well, they can drive deadlines, they can in a global team and self-manage themselves to hit a goal on their own. Cause it's already known at least for project managers eco-system in a virtual settings, that people who are doing that, have already dealt with those kind of uncertainties of how do you get your mindset into virtual environment. In a traditional setting, I don't know, I think it's like progress in a virtual, you know I have been working in a global setting for so long. I think I am a bit more bias now to people to whose being doing this kind of work to the traditional folks, unless the traditional folks are in the offices working with global teams as well. Cause it's not the same black or white. I think it depends on the culture of the work setting.

Researcher: Do you have a way how to solve those problems of people being from different timzones, cultures, Have you found a way how to mitigate that.

Informant 001: In the last eight years in those fortune 100 companies that I worked with, it was already a culture of the company that we were working with. And they really had to mitigate in that regard, at the end of the day we knew we were working for this entity and they were very score-card oriented, so mitigating irt was not as difficult as it might seem, because at the end of the day we were all hooked on score cards, so no matter what the diff were, our approach to work or culture or ways of doing things, we had that commongoal that made things easier because you know we were driven to succeed so we had that same intensity. Then if we have for instance, example is, I can work with folks with from greater China region, I remember working with that team and my team from India and UK.

And so, I didn't see any diff in their intensity and rigour, quality of work. To me it was fine, the main peaces that was noticeable. Working with different genders. Some genders were more (in my observation), it wa different working with certain genders in Asian countries compared with those in central east and africa. It was for me highly noticeable difference. It didn't affect project, you just need to be mindful of with the team members which are new, so jus they are aware of it.

In those global projects it was always kind of a mutual understanding that fi you are going to work with Asia, have the decency to find the meeting which is the middle ground. It can be 6 PM their time or 6 AM their time, and 6AM/6PM my time. Th eony thing though, which was never neogiatable is when we had headquarters meeting, when it dosn't matter where you were in the world, you had to dialed in. And it happened quaterly. On other ocasions it was a negotiation subject to find the best time for everyone.

Researcher: Question is about if we can compare the success in a virtual environment with the traditional environment. By using the same evaluation we did when evaluating the traditional one.

Informant 001: If I was evaluating it based on cost and scope and those similar elements. I would say that the difference would be similar. But when I'm looking at pace to completion I think the virtual env projects wthat I worked on, tempted to be more on point vs those in the traditional settings. I feel like in higher ed system, they end-up doing what they say they are doing, but I think they is not work so fast. That's just my observation. At the end of the day, the project timelines is hit, is reached, but not within the timelines that was set. Might be off sometimes. The one measure, evaluation, I guess the success perspective ther eis one difference in a virtual env in addition to measuring the success of project timelines scope, there's the other layer that I todl you about in terms of sustainability, so once a project is complete, how sustainable is the success of the projects, that's the one measure that I used, and to me I guess there's an observable difference, in virtual environment - yes they hit their target and such, but it's always questionable because it's never part of th measure of the project.

Researcher: Basically, we have gone through most of the questions and one of the general ones would be a question, if you have any suggestions for projects managers who are converting from traditional into a virtual environment

Informant 001: Actually, I have a good examples of this. One of my students is a full time project maangers, she wworks in a trad work setting, in a building, has her tasks, she manages her stakeholders and those elements. And she does it from 8 to 5. And she is actually trying to figure out what is she going to do after graduation and she wants to go to the private sector, what are the suggestions that I told her - why don't you at least from PM standpoint she seems to be solid, but what thing that I have told her, that it's going to be a quite different shirt, to really understand what does it mean to work virtually, how to be proactive at almost everything what you do, because there is nobody there watching you, nobody there to count your time. And often students would say to me "oh

you respond right a way”, I say it’s just and this happens to with trad people I work with - they tell the same. They say do you ever sleep. Part of it is a rigour which was build in my mind while working with virtual teams all the time for the last 15 years. On global teams it’s like how do you continue working to them so it doesn’t feel like you are in different countries, like in the same room. Part of it is just the responsiveness and so I tell the new millennials, try to get that mindset being a consultant no matter what are you doing, in my mind the PMs have the consultancy mindset. Try to be resourceful, even if you are not an expert, try to figure out what people need, cause at the end of the day you want to make sure that the people you work with are successful, you know it’s kind of job, when you have no title at least in a virtual environment, where I worked in. You have all those directors, engineers and etc. and then you have someone to make sure that everything is working. In a way it’s kind of score-card keeper. In a way it’s like a selfless way of contributing and just to kind this kind of mindset is one of the things that I try to say. There is a technology peace too, this girl I told you about doesn’t skype, doesn’t tweet, doesn’t use social media, and I thought maybe you should start.