SOFTWARE PROJECT MANAGEMENT IN MULTI-CULTURAL ENVIRONMENT & MANAGING VIRTUAL TEAMS

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ABSTRACT: *Virtual teams are becoming the best preferred organizational form because of advancement in telecommunication technologies in software development industry, which are composed of the employees across the globe with unique skills, which collaborate each other to achieve the organizational task. But it is identified that there exists lot of challenges that these virtual teams can expect to encounter in managing the teams, e.g. to building the sense of collegiality, overcoming the isolation, managing the conflicts, maximizing the communication among the members of virtual teams. Undefined hierarchy, limited visibilities are extra challenges to cope in virtual teams and there exist many others also. This virtual team structure can be made more effective if greater attention is paid to cope the challenges. In this paper, for coping these challenges, some solutions have been purposed using the surveys and it has been determined that which solutions can be used to minimize the challenges.*

1: INTRODUCTION

In this present time, not only in the software industry but in every field is facing unstoppable fact of globalization and which is now becoming a compulsory component in grooming of professionalism and success ratio of any industry.

In the software industry, this concept is far more clear and effective. Globalization in the software industry is because of the development of internet, E-mails and very low budgeted workforce across the globe, especially in Asian countries like India, Pakistan & Malaysia.

The software industry is also getting globalized, as expertise are diversified and high economic countries heir these experts at low cost. In software industry globalization concept is implemented in the form of virtual software team structure. The virtual software team establishes the virtual organization.

In Virtual organizations the virtual team is the group of individuals work for common goals regardless of the having cultural boundaries and geographical locations, connected socially using the state of the art communication technologies like Skype, Skitch, Drop Box, E-mails, E-Lance.

Online software repositories, etc. One important feature of these teams is their temporary nature and providing the opportunity of capturing the best talent without geographical restrictions, which eventually boost up the process of achieving the required objectives.

The Unique and fruitful nature of this approach is tending the world industries to adopt this approach at its best, this approach is engendering a significant impact on the software industry and world's economy as well.

The management of global virtual teams is a difficult task, so in this research paper through research effective management of virtual teams is examined. Factors causing the problems and practice to curtail these problems are also discussed.

2: LITERATURE REVIEW

Virtual team is a newly emerging field and research in this area is still in parturient stage [1], [2] and because of its nature many of its fields are still need to be explored [1]. If any organization is going to implement the virtual team structure then a lot of engineering is still required, and this overhead makes this structure difficult to implement. Any project that involves engineering in it, efficacious cooperation and communication should be assured in its teams, especially the distributed teams [3].

There exists lot of other barriers for virtual team structure to practically implement. So lot of research and engineering is required to explore the ways to minimize the barriers and to enhance the performance of this structure and to make this structure worthwhile [4].

The most obvious or the main reason of a gap between countries having higher economic values to those having relatively less is because of the technology and the work environment but, in recent few years rapid boost in communication technologies, made distributed working environment more suitable, applicable, adaptable and much more effective and efficient [5]. So the most organizations are planning this structure in near future [6], [7]. There could exist rare exceptions otherwise, all the organizations use the concept of the virtual teams to some extent, now we are not in that era where the people work in the visual juxtaposition, now we have left that era [8].

Now one thing is sure the use of distributed working environment would continue to develop [9], [10]. But if any organization gets fail to solve the problems involved in this structure and fails to achieve the maximum then the implementation of this working environment would be a certain risk for that company [11]. As with more popularity, more research is going on to explore the way to implement this to the actual environment.

During the last 10 years enough research has been conducted on this topic. Most of the research work on this topic focuses on the inputs, process and outputs of this working environment.

Literature available on virtual teams till now mostly is based on the comparison on the both working environments, distributed and face to face and this comparison is made on the basis of the distance and communication media and many other things. Virtual teams are complex because of cross boundaries, communication barriers and no defined hierarchy. But the jurisdictions provided by the virtual software teams are instigating many challenges which are discussed below.

- Absence of Collegiality
- Managerial Conflicts
- Undefined Hierarchy
- Limited Visibility
- Communication Barriers
- Isolation

2.1: ABSENCE OF COLLEGIALITY

In virtual teams collegially is the relationship among the colleagues which are united together through the communication media across the globe for the common purpose.

In actual software teams professional meet each other and built relationships to have the strong sense of collegiality but while on the other hand in case of the virtual teams, members have few chances to interact each other because there exist few virtual team meetings and people feel that they do not have time to build relationships. This lack of collegiality often creates problems for the members to express their opinion and to make decisions.

2.2: MANAGERIAL CONFLICTS

Organizations of all sizes nowadays increasingly using the environment of virtual teams, because they can get the labor force across the globe with expert skills, leading toward the performance, efficiency and productivity. Although this team structure has many edges over the face to face teams, but there exists the obstacle like conflict management. When many people across the globe work together, there is a potential of conflict. Theoretically, this structure may have the less conflict but more conflicts can occur in virtual teams rather than face to face teams [12].

Sometimes conflict can be resolved and take you toward the efficiency and productivity and there exists the chances that it may become the concern for management. However lean to conflict management in virtual team structure is integral to improvement in performance, efficiency and productivity.

2.3: UNDEFINED HIERARCHY

In real organizations people know that to whom they are answerable? Who has the authority? Where decisions get made? Who is responsible of what? What are the alliances in the team? Who is going to report whom? People know the whole hierarchy of the team because everyone is in front of eye, but the problem exists in the virtual team structure where people are still people and work is still work but the people can't see each other and doses not even know about the hierarchy, which reduces the efficiency and productivity.

2.4: Limited Visibility

Career development in the distributed team structure is tough job because of the limited visibility of you and your work. In the face to face team structure people get to know you are working and they get inspired by you but in the virtual team structure you and your work is invisible. It is a truth that the people who stay close to the center power of the management

get progress quickly. And for that you have to be visible because you want to be appreciable and you want recognition and career development. The same problem with the management of the team, they find difficulties to estimate the overall progress of the project and they cannot distinguish between the talents because of limited visibility. Some people perform well, but their image and exposure is not good towards the management so they find difficulties in career development.

So certain problem for the management and the team members also. In this paper we will discuss how to curtail this problem.

2.5: COMMUNICATION BARRIERS

In distributed teams, people never actually meet each other, but for the productivity of team effective virtual communication is required between them. In a virtual team structure, often written communication is done where tone is lost so sometime miscommunications occurs. So effective communication in virtual teams is very difficult to achieve [13,14]. It requires the understanding and advantages of the communication tool used. So virtual team members need to choose the appropriate communication media to build the trust via technology and to improve effective communication.

2.6: ISOLATION

In virtual teams, members do not contact with each other often so the feeling of isolation in virtual team's environment is normal. Virtual software teams members can easily feel that they are disconnected and they are not part of the team or organization which leads them to be less likely to contribute to the team which affects the overall effectiveness of the teams. Now the modern research is focusing on curtailing these challenges to lift the gain of this approach. There couldn't put an end to them but these can be curtail through different practice like

- Establishing the team plan
- Controlling the virtual teams and Establish the rules
- Selecting fitting technology for communication
- Having virtual team meetings
- Socializing the team members
- Managing the work load and Clarifying the task

3: FINDINGS & RESULTS

For finding the best appropriate solution to deal with every individual challenge, we designed sophisticated questionnaires that ask about all challenges mentioned above in this paper and then proposing suggestions to deal with specific problem. The audience for the responses was targeted to be the professional coders who are mainly working in different software houses in Pakistan or free lancing. The statistics and results as outcome of the questionnaire are given below.
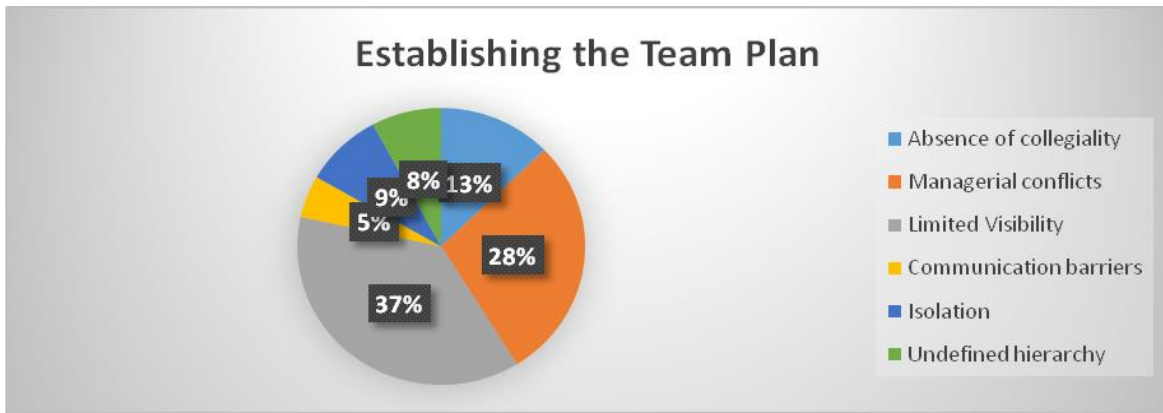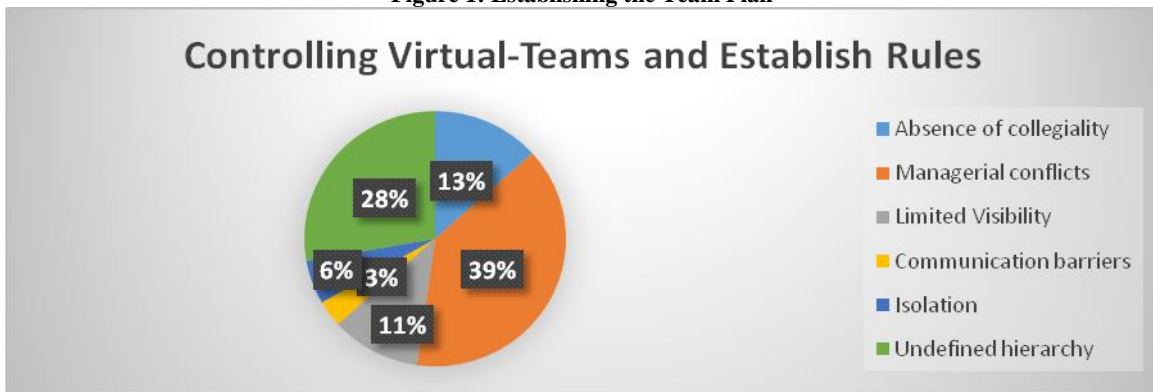
Figure 1: Establishing the Team Plan
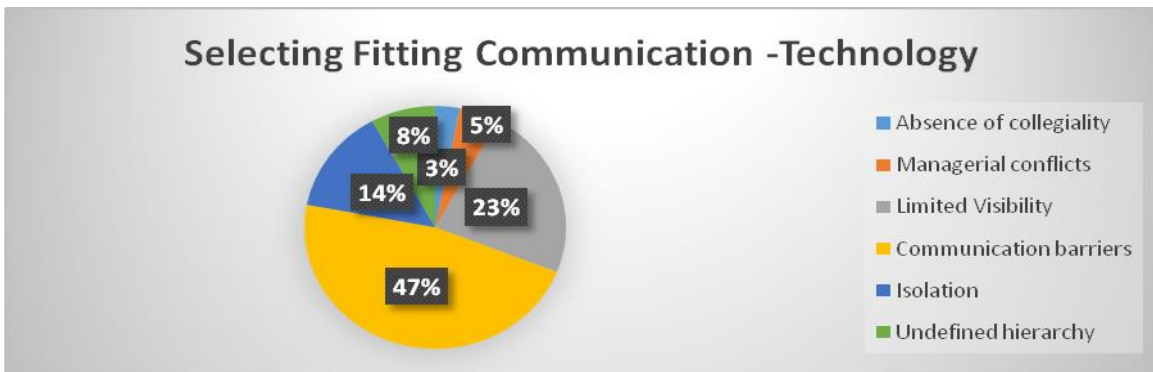

Figure 2: Controlling Virtual-Teams and Establish Rules

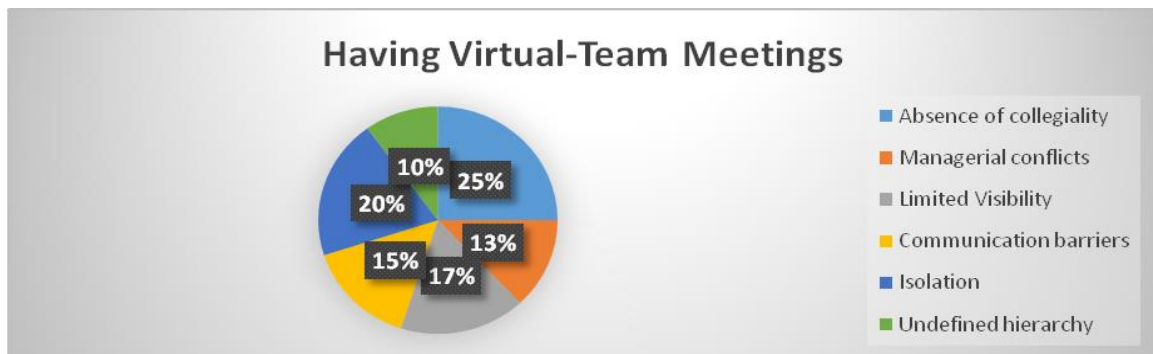**Figure 3: Selecting Fitting Communication Technology**

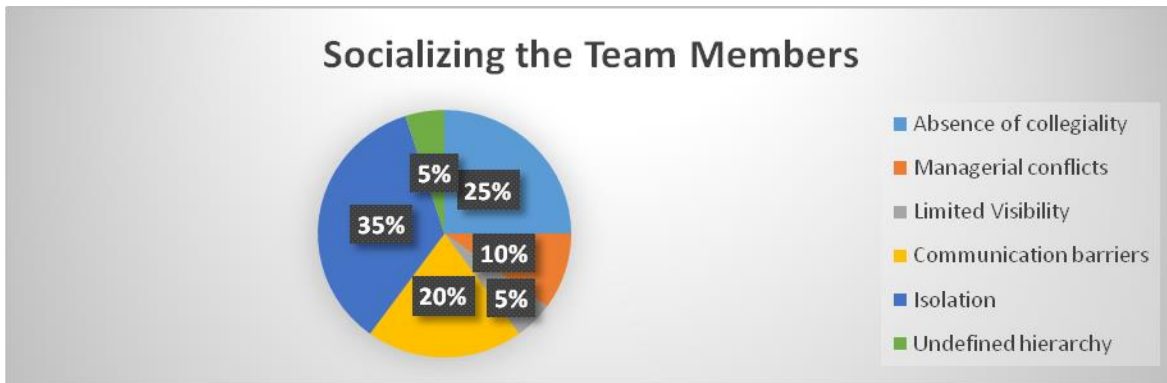**Figure 4: Having Virtual Team Meetings**

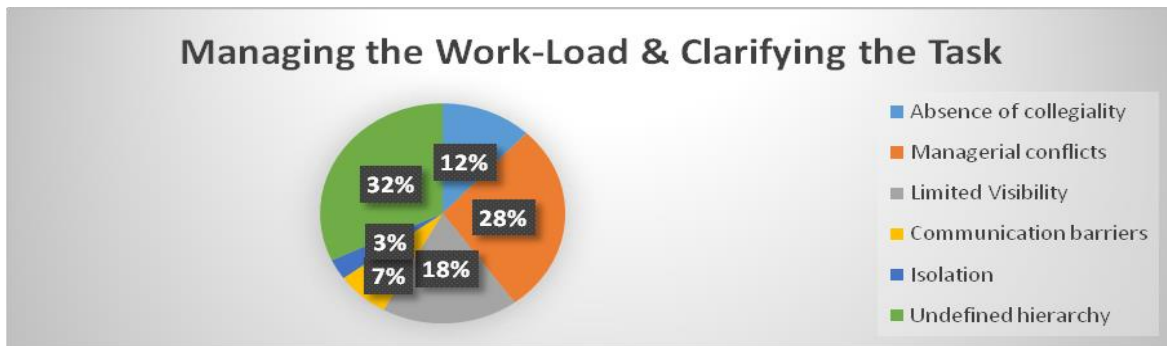**Figure 5: Socializing the Team Members**

Figure 6: Managing the Work Load & Clarifying the Task

Figure 7: Over All Effective Solution

Table 1: Problem Vise Proposed Solution

Solutions	Absence of collegiality	Managerial conflicts	Undefined hierarchy	Limited Visibility	Communication barriers	Isolation
Establishing the team plan	13%	28%	37%	5%	9%	8%
Controlling the virtual teams and Establish the rules	13%	39%	11%	3%	6%	28%
Selecting fitting technology for communication	3%	5%	23%	47%	14%	8%
Having virtual team meetings	25%	13%	17%	15%	20%	10%
Socializing the team members	25%	10%	5%	20%	35%	5%
Managing the work load and Clarifying the task	12%	28%	18%	7%	3%	32%

Table 2. Problem vise proposed solution

Solutions	Overall Effectiveness
Establishing the team plan	17%
Controlling the virtual teams and Establish the rules	24%
Selecting fitting technology for communication	20%
Having virtual team meetings	11%
Socializing the team members	16%
Managing the work load and Clarifying the task	12%

Figure 1: Establishing the team plan is very main factor not only in virtual software teams but also in normal software teams. According to the poll, most effective solution applies in removing the challenge of limited visibility and then removing management conflicts. Better establishment of team plan will clear every individual member working on the project that how every single step will lead the team to ultimate goal. So this step plays a very significant role in enhancing the visibility of every member.

Figure 2: Controlling the virtual teams by establishing the rules is appeared to be most important and most effective solution in removing the challenge of managerial conflicts according to the poll. This is quite obvious that people from different corners around the world working together can face diverse management challenges, so it would be best practice to establish the rules in start of the project to cope with this challenge

Figure 3: Selecting the fitting technology for communication is backbone for a virtual software teams because better communication will help the team to more in touch with other members so that they can better understand the work on the project and also minimizes the wastage of time. So according to the poll, this solution is best suited for removing communication barriers and which then eventually lead team to solve many further challenges and problems.

Figure 4: Having virtual team meetings is the routine practice that can be followed by virtual software team. According to the poll this practice partially solves many of the challenges and most significant challenges that can be solved by this practice is mainly removing absence of collegiality and isolation. Because of these meetings colleagues can have social interaction through which they can may trust on each other and can may have chance to know each other both technically and personally so that all factors ultimately will increase collegiality.

Figure 5: Socializing the team member is also solution that mainly focuses on interaction of team members with each other because this is compulsory head for making an efficient and effective software product. So according to the poll, this solution will lead us to tackle with the isolation of the members of virtual software teams.

Figure 6: Managing the work and clarifying the task is a solution that helps to involve every team member equally and thoroughly in to the project so that the work is equally divided in members according to their area of specialization. According to the poll most effective solution applies in

coping with the challenge of undefined hierarchy. Once the task and area of control is clear to a member then he/she will have no ambiguity about the hierarchal position in that particular virtual team.

4: CONCLUSION
After going through all the results given above which were obtained in response of the questionnaire (table. 1), now we can propose best solution for every individual challenge and also to sort the solutions according to their overall effectiveness in coping with the virtual team challenges.

1. Establishing the team plan is the best suited proposed solution for minimizing challenge of limited visibility.
2. Controlling the virtual teams and Establish the rules is the best suited proposed solution for the challenge of Managerial conflicts.
3. Selecting fitting technology for communication is the best suited proposed solution for the challenge of Communication barriers.
4. Having virtual team meetings is the best suited proposed solution for the challenge of Absence of collegiality.
5. Socializing the team members is the best suited proposed solution for the challenge of Isolation.
6. Managing the workload and clarifying the task is the best suited proposed solution for the challenge of undefined hierarchy.

So the above mentioned six points are the solutions for solving the individual challenge as mentioned in table.1.
Now overall estimation is also calculated and according the data given above if we arrange the solutions in non-increasing order of their effectiveness then the list will be as following.

1.   Controlling the virtual teams and establishing the rules.
2.   Selecting fitting technology for communication.
3.   Establishing the team plan.
4.   Socializing the team members.
5.   Managing the work load and Clarifying the task.
6.   Having virtual team meetings.

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