

PERFORMANCE ENHANCEMENT OF MULTIDISCIPLINARY R&D TEAMS THROUGH PROJECT MANAGEMENT

Marcel ILIE¹, Augustin SEMENESCU²

Rezumat. *Ultimele doua decenii au fost caracterizate de profunde schimbari si relocari ale resurselor umane si materiale, la scala mondiala, cu implicatii in dinamica companiilor si institutiilor de cercetare. Ca urmare, activitatea de cercetare si dezvoltare (R&D) poate implica resurse umane in diferite locatii geografice. In ciuda beneficiilor, aceste schimbari pot ridica probleme serioase, in particular in termeni de integrare, coordonare si management ale acestor resurse umane, in particular for echipe R&D. Mai mult decat atat exista mai multe provocari asociate cu noua dinamica cum ar fi diferentele culturale, sociale si fundamentale (rutina diferita, proceduri, scopuri si asteptari) care exista intre parteneri si care pot complica managementul proiectelor. Desi cativa factori pot afecta dezvoltarea si executia proiectului, managementul proiectului joaca un rol esential. In acest studiu, analizam fezabilitatea managementului flexibil, in sensul ca ia in considerare practici manageriale deja existente si extrage elementele similare dintre toti membri echipei implicati in R&D.*

Abstract. *The past two decades have been characterized by profound changes and reallocations of human and material resources, worldwide, with implications in the dynamics of the companies and research institutions. Therefore, nowadays, R&D may involve personnel located at various geophysical locations. In spite of their benefits, these changes raised significant challenges, particularly in terms of integrations, coordination and management of human resources, particularly for R&D teams. Moreover, there are several challenges associated with the new dynamics such, cultural, societal, fundamental organization dissimilarities (i.e., different routines, procedures, goals, and expectations) that exist between partners might complicate managing the projects. Although several factors may affect the development and execution of the project, however, the project management plays a vital role. In this research we analyse the feasibility of a flexible management approach in the sense that it takes into account the management practices already existent and extract the similarities among all the partners involved in the R&D effort.*

Keywords: team management, work performance, cohesiveness, team engagement, team effectiveness

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¹PhD, Assistant Professor: Dept. of Mechanical Engineering, Georgia Southern University, Statesboro, GA 30458, USA, e-mail: milie@georgiasouthern.edu

²PhD, Professor, Dept. of Material Sciences, University Politehnica Bucharest, Bucharest, Romania, augustin.semenescu@upb.ro

1. Introduction

The past two decades have been characterized by profound changes and reallocations of human and material resources, worldwide, with implications in the dynamics of the companies and research institutions [1-11]. Therefore, nowadays, R&D may involve personnel located at various geophysical locations. In spite of their benefits, these changes raised significant challenges, particularly in terms of integrations, coordination and management of human resources, particularly for R&D teams [2, 4-7]. Moreover, there are several challenges associated with the new dynamics such, cultural, societal, fundamental organization dissimilarities (i.e., different routines, procedures, goals, and expectations) that exist between partners might complicate managing the projects [11]. Cultural differences also play a key role in the dynamics and effectiveness of a R&D team [10]. Besides these differences there are differences associated with the culture of the R&D team depending on whether the team belongs to corporate or academia. This aspect makes a major difference between the R&D working in the two environment. Therefore, R&D teams working in a corporate environment have always a fixed delivery target and date, while the academic/scientific R&D teams have flexible deadlines. Other factors that influence the dynamics and efficiency of the team are the individual/team's skill and remuneration. Usually remuneration is based on the skills and experience of the individual. Although several factors may affect the development and execution of the project, however, the project management plays a vital role. In this research we analyse the feasibility of a flexible management approach in the sense that it takes into account the management practices already existent and extract the similarities among all the partners involved in the R&D effort.

The successful completion of any new project is defined by the correlation between the project requirements and individual's skills and past work experience [6-9]. However, in most of the cases the real match between an individual's skills and project requirements are found out after the team is launched into the project. This poses significant challenges due to the fact the assumed individual's skills may not be at the level of the project expected requirements. Therefore, there is always uncertainty in the formation, evolution and maturation of the team.

2. Analysis and results

As mentioned earlier, the formation of the team and eventual training of the team's members may pose significant challenges and delays in the execution and successful completion of the project. One way to mitigate some of the uncertainties is to form a team from individuals that have an outstanding portfolio and whose performance and work ethic have been monitored for a while. The

team performance is defined by three main elements, namely skills, commitment and accountability as shown in Figure 1. The individual's skills present different forms such as problem solving skills, technical and functional skills and interpersonal skills. The problem solving skills are key asset of any individual without which one cannot function and perform in a team. For R&D teams the problem solving skills is a must and thus, the more versatile the individual the more successful in problem solving. One issues could be also the fact that individual do not try to expand their set of skills beyond what is written in the job description. This is a very dangerous path on a long term individual's development. The functional skills are also very important since this affects the entire individual's activity in the R&D team. This is also complemented by the interpersonal skills which are key in the well-being and function of the team. One's interpersonal skills affects the dynamics of the team and may be generator of conflicts. Conflicts not only that slows down the dynamics and synergy of the team but also it takes time from the management team to solve these issues.

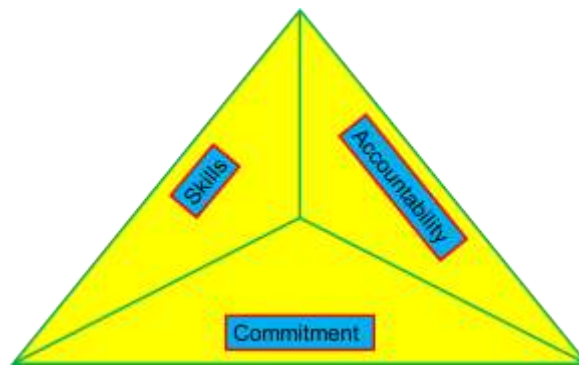


Fig. 1. Elements of team performance

Commitment is an important factor in the dynamics and efficiency of the R&D team. Commitment has several requirements though such as, specific goals, common purpose and meaningful purpose. If these are not well expressed and communicated, the individual may not respond accordingly to the tasks. Establishing the specific goals is an important requirement for any work, especially for R&D research. Establishing clear goals and their deadlines keeps the team motivated and engaged into the project. Without specific goals and deadlines the team would underperform and thus, resulting in a delayed outcome. On the other hand, communicating to the team the common and meaningful purpose of the work, it motivates the team. It is very important for every team member to know that the entire work and effort has a meaningful purpose. It also important to communicate to the entire team the common goal of the project without omitting to emphasize the importance of each member within the team.

Accountability is another important element in the successful completion of the project. The accountability may be individual or small group of people, and it may also be mutual. Accountability should motivate each team's member to perform to the best of their ability. Accountability serves as a motivational element inside the team. Another important factor that affects the team's performance and effectiveness is the synergy of the team. The team's synergy is defined by the goal commitment, a large variety of skills and abilities used for task achievement and sharing of knowledge. Figure 2 presents the five stages of team formation. Thus, from the existing working group, in a company or institution, a new team is formed and assigned a new project. The team is formed based on the skills, previous work experience related to the new project. In the first stage, this is a pseudo-team. The pseudo-team forms the base of future development of the team, and this is a large team. Further selection of team results into a potential team. However, on further iterations of matching the team member's skills, competiveness and commitment results into a smaller team which is the real team.

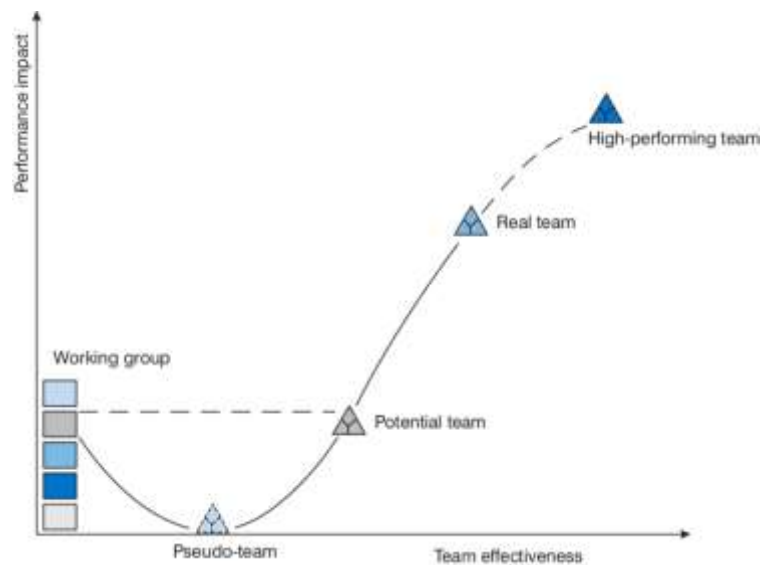


Fig. 2. Team stages

Further developments and experience of the real team leads to the high-performance team. This is the highest stage the team may reach. Figure 3 presents the elements of an effective team, among which the most important are the effective leadership, clear goals and good communications. Figure 4 presents the five stages of team development, namely forming, storming, norming, performing, adjourning.



Fig. 3. Elements of high-performance team

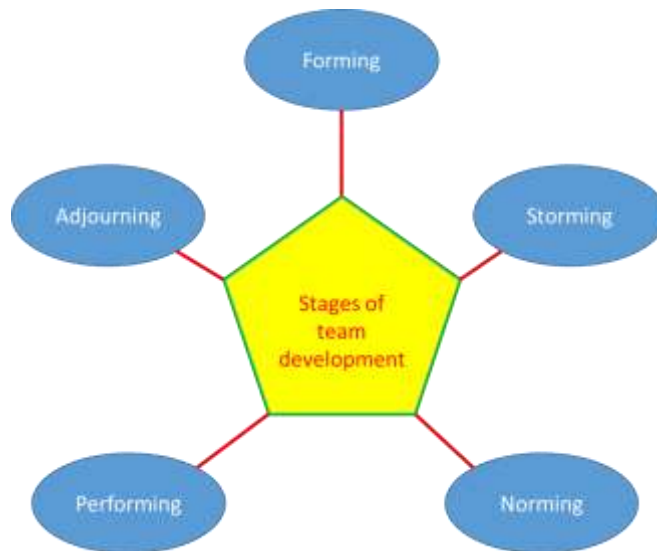


Fig. 4. Stages of team development

During the forming stage, the team members establish inter-personal relationships, and become familiar with the assigned task and create ground rules. The storming stage may be defined by conflicts due to the fact that the group lacks unity and trust. This is due to the individualist nature of human being which resist to form groups, rather they would prefer working in individual framework. The norming stages is characterized by the need of group synergy and at this stage individuals may realize that there is a common goal that needs to be accomplished within the team. This stage may be defined by group harmony. Performing is the last important functional stage of the team. At this stage the team exhibits high synergy and cohesiveness and it is able to perform efficiently.

3. Discussion

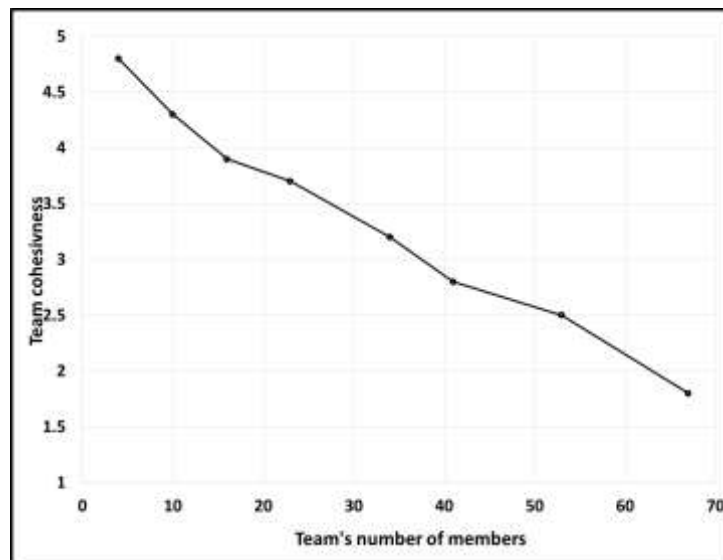


Fig. 5. Cohesiveness of team function of team's members

Figure 5 presents the variation of the cohesiveness with the number of members of the team. The analysis reveals that the team's cohesiveness decays with the increase of the number of team members. Thus, our study shows that smaller teams perform much better than larger teams. Several factors were identified as critical such as, cultural, work ethic, common goal and communications. Figure 6 presents the results regarding various factors affecting the team performance. It is widely acknowledged that individual's age plays a key role in the team performance. Therefore, we performed the study based on individuals from two different age categories, specifically 18-40 and 41-65 years old individuals.

Various factors were used as metrics in this study, as shown in Figure 6. Overall, the younger segment, of team members, shows a better performance and more enthusiasm and engagement. One of the reasons the younger segment performs better is due to its ability to adapt easier to the work environment, while the 40-65 segment becomes more rigid to changes. However, this segment performs better in terms of team spirit. This could be due to two factors, the better understanding of the team work spirit or the need to be in a team from which they can learn new things and become up to date with technology. One interesting result of our analysis shows that the millennia requires more attention and training and reminded the tasks and end goals more often than other age segments.

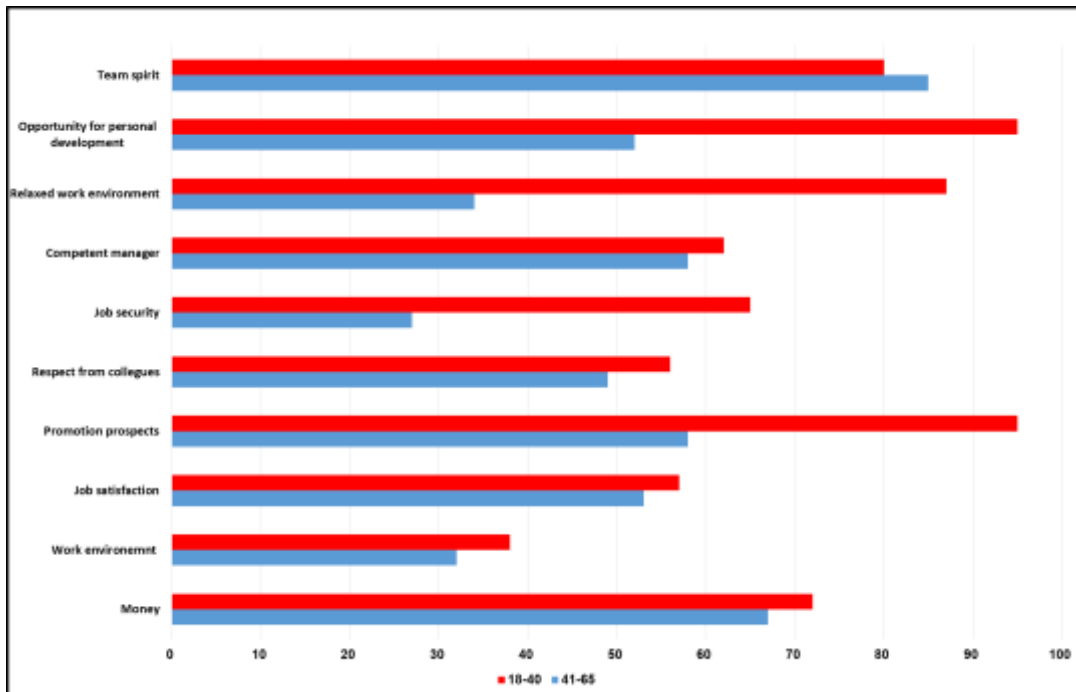


Fig. 6. Team performance

Conclusions

In the present study, the factors affecting the performance of R&D teams are identified. Our study identified five different factors affecting the team performance, namely attendance, helpfulness, efficiency, initiative and quality. The effectiveness of the team follows a top-down approach. Team cohesiveness decreases with the increase of the team members (i.e. the larger the team, the less

effective). There is no recipe for an effective and high performance team. Team effectiveness time depends on the integration of the team's members. Overachievers may compensate for the overall efficiency of the team. However, there must be some form of incentives for them.

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