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From Project Management to Team Integration: Key Issues in the Management of the Human Resource in Projects

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Abstract

The non-repetitive nature of projects, globalization, the growing number of distributed project teams, and the substantial number of high-tech projects in which the human brain is the most important resource are just few of the forces making human resource management in projects a critical success factor. These conditions challenge not only project team members' ability to collaborate, but also the capacity of the project manager to effectively manage human resources and to facilitate a collaborative work environment. The quantitative aspects of project management, such as scheduling, budgeting, and resource management, are supported by a large array of tools and techniques, many of them based on operations research methodologies and integrated into commercially available software for project management. However, these commercial software packages for project management

offer very little support for the development and management of project teams.

In this monograph we review the project management and organizational behavior literature, focusing on key issues in the management of human resources in projects. We then present a model that relates the use of integrative project management tools and techniques to the development of a shared understanding in teams, and to the occurrence of effective team processes. From a practical point of view, we present team integration — the process by which the goals and work processes of individual team members are assembled into a coordinated whole — as an important success factor.

With the art and science of human resource management in projects growing increasingly important in today's global high-tech environment, we cannot ignore the gap between the needs of project managers and the tools available to support their efforts. Our model offers an approach toward overcoming this gap. We present some recent results of our research that support elements of this model, and also point to a new direction — the use of simulators to develop a shared understanding among project team members and to achieve team integration early in the project initiation phase. The results of our efforts to develop such tool — the Project Team Builder — are reported as well.

Contents

Preface

A project is an ad hoc effort that is performed by a temporary organization [84]. Projects are inherently characterized by high levels of uncertainty and ambiguity, and by varying levels of complexity. Uncertainty and ambiguity arise from the temporary and ad hoc nature of project work, which is often performed by teams of individuals from different occupational backgrounds who may never have worked together before. Particularly in complex projects, work in such cross-functional teams creates human challenges — a function of members' conflicting interests and of differences in terminology, perspectives, and priorities [79]. At different stages of the project, situations may be open to varying interpretations, opening the door to poor coordination and to disagreements and conflict between team members [211]. In addition, high ambiguity and uncertainty can produce stress and tension that may affect staff behavior and interpersonal relationships [9]. The challenge is even greater when team members are geographically distributed and from different cultural and linguistic backgrounds [101, 163].

Many factors contribute to the success or failure of any given project. In light of the challenges described above, in this review we address two critical areas of project management: team development

and team management. These are two of the four components of the human resource management (HRM) knowledge area of the Project Management Body of Knowledge (PMBOK), the other two being human resource (HR) planning and project team assembly (Project Management Institute (PMI), [162]). The PMI's PMBOK® Guide describes the four areas as follows:

1. HR planning: Definitions of roles and responsibilities; design of an organizational structure; development of a staffing plan.
2. Project team assembly: Staffing and role assignments.
3. Team development: Activities aimed at improving the competencies and interaction of team members to enhance project performance.
4. Team management: Performance tracking, assessment and feedback; management of the project; finding solutions to both technical and social problems (e.g., disagreements and conflicts).

The various characteristics of any given project — including its size, duration, and structure in terms of its life cycle phases — influence the project management processes that should be applied [162], not only with regard to the technical aspects of project development, but also the human aspects of the project team and its management. Despite this, most of the literature on HRM in projects deals with HR techniques in isolation, covering issues such as team members recruitments, staff training, reward structure, and addressing their effectiveness in projects and their fit to the project environment. In the current review we focus on the interaction between "hard" project management tools and techniques and "soft" HR issues, to suggest that the implementation of team-oriented processes is a critical success factor in the integration of project teams. Specifically, our theory relates the use of "hard" project management tools and techniques to team-level variables, such as the development of a shared understanding among team members and social team processes of trust development and conflict management.

The rest of this monograph proceeds as follows. In Section 1 we present the context in which project teams function. Specifically,

we discuss factors that influence project success, HR management in projects, and project organizational structures. Section 2 deals with project classification and highlights the issue of team diversity in the context of distributed and cross-functional project teams. Section 3 reviews the main project management tools and techniques available for the project manager.

In Section 4 we address three key issues evolving from the management of teams in the context of projects: team conflict, team trust, and team-shared understanding. We then present a theoretical model relating the use of project management tools to the management of project teams. Our theoretical model suggests that project integration processes are highly important for the development of a shared understanding in teams, and that the latter promotes trust and reduces conflict. This model suggest that the development of a team-shared understanding is the mechanism through which project management tools and techniques help project managers and team members to achieve effective team functioning (see Figure 1).

The PMBOK® Guide [162] — A Guide to the Project Management Body of Knowledge — presents standard terminology and a framework

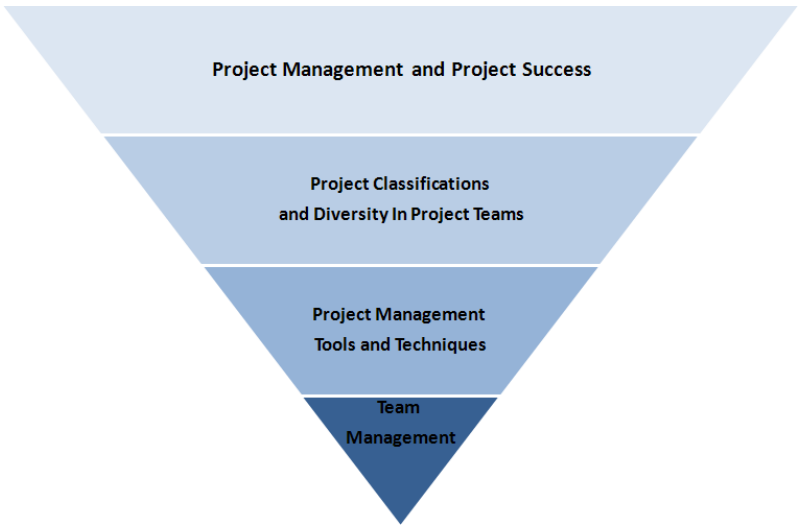

Fig. 1 An illustration of the paper contents flow.

for project management. The guide was first published in 1983 by PMI — the Project Management Institute — as a white paper in order to document and standardize common knowledge in the practice of project management. The PMBOK® Guide has appeared in five editions, the first in 1996 and the most recent in 2013. The knowledge incorporated into the PMBOK® Guide has evolved from accepted good practices of practitioners in the discipline. It describes project management methodologies, management processes, tools, and techniques. The PMBOK has been adopted as an internationally recognized standard (IEEE Std 1490–2011).

We use the PMBOK® Guide as a general framework in our review, and build upon it in developing our theory.

1

Introduction: Project Management and Project Success

The PMBOK® Guide lists ten knowledge areas that are relevant to nearly all projects: Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Human Resources Management, Communications Management, Risk Management, Procurement Management, and Stakeholders Management. In addition, the PMBOK® Guide identifies a set of skills, tools, and techniques which are recognized as good practice for most projects, meaning there is general agreement that their application enhances the probability that the project will be brought to a successful conclusion. However, these processes, tools, and techniques are not uniformly appropriate for all projects, but must be assessed individually in each case [162]. Empirical research supports this notion, showing that while some project management practices, tools, and techniques are common to most projects in most contexts, others vary significantly among different types of projects and among projects in different contexts [14]. The importance of the knowledge areas, too, varies across different stages of team development as well as different industries [237].

Empirical research has documented different factors that are critical to project success, though the importance of different factors varies over phases in the project life cycle [157]. For example, Pinto

and Slevin [158], based on a survey of 418 managers, identified ten critical success factors for project management, with some of these areas more relevant early in the project and others later: (a) a clear statement of the project mission; (b) maintaining top management support; (c) appropriate scheduling and planning; (d) consultation with clients; (e) selecting and managing personnel; (f) ensuring that adequate technology is available to support the project; (g) ensuring that the developing project meets the client's needs; (h) monitoring and feedback; (i) maintaining adequate channels of communication; and (j) ensuring that the project's human resources provide for adequate troubleshooting expertise. In another study, 365 information technology managers rated four factors as most important for project success: user involvement, executive management support, a clear statement of requirements, and proper planning [204].

Another approach was implemented by Dvir et al. [46]. They used multivariate and multidimensional analyses to classify project success factors according to project characteristics. Their work showed that the different factors responsible for project success are dependent on the specific type of project. For example, they found that formal and structured techniques for planning and control are more critical in large projects than in small projects, whereas flexibility in management is more important for small projects.

In a later work, Zwikael and Globerson [238] asserted that the success factors identified thus far were too general and did not provide direct support for a project manager's decision-making. To resolve this problem, they suggested moving away from the idea of critical success factors to critical success *processes*. In an empirical study of 282 project managers, they examined the importance of 16 planning processes. They determined the most critical planning processes to be: (a) the definition of activities to be performed in the project; (b) schedule development; (c) organizational planning; (d) staff acquisition; (e) communications planning; and (f) developing a project plan. Our review follows this line of thought and looks at the effect of project processes on the success of project teams.

As we noted above, research in the area of project management tends to distinguish between improvements in technical processes and

the human element of project work, with one set of management techniques focusing on technical issues and another focusing on human factors, such as conflict management [63]; team building [83, 107]; training [176]; and other HR activities such as HR planning, employee selection, and performance assessment [53]. Such a distinction between technical and human processes may once have been, or may even still be, relevant to managing a workforce in the broad sense. But in this literature review, we hope to show that HRM in projects is unique and requires special consideration. We will argue that the special challenges faced by project teams, and in particular their diversity in terms of the functional areas, backgrounds, perspectives, and even physical locations of team members, mean that for teams to succeed, their human and technical processes must be treated as an integrative whole. Moreover, we suggest that the use of standard project management techniques originally designed to support technical aspects of projects is essential for project HRM, and specifically for the development of a shared understanding and to contribute the development of the social processes required for effective teamwork.

1.1 Human Resource Management in the Context of Project Management

In the past, "soft" human resource issues in project management tended to receive short shrift from researchers in comparison to "hard" technical concerns, as noted by a number of scholars (e.g., [11, 84]). Indeed, Pinto and Prescott [157], examining the effect of several factors on project outcomes, named only "personnel" (referring to the recruitment, selection, and training of personnel for project teams) as merely marginal for project success. Their finding roused researchers in the area of project HRM. Belout [11], responding directly to Pinto and Prescott [157], suggested that project management research focused too heavily on the effects of structure and planning operations (such as budgets, completion dates, and quality) on project success and that projects were being managed as technical systems. Belout suggested that future research should emphasize two fundamental questions: "(1) Is personnel a significant factor for project's success? and

(2) Does the organizational structure and the project life cycles have an intervening effect on the relation among the independent variables and the project's success" [11, p. 25].

Recent years have continued to see growing consideration of "soft" HRM issues in project management research. For example, Pollack [160] reviewed the academic literature on project management in relation to the "hard" versus "soft" paradigms. He argued that a critical reading of the literature confirms strong links between the hard technical paradigm and project management, yet at the same time he identified a growing acceptance of the soft human paradigm.

Huemann et al. [84] similarly recognized a shift from technical to more human-oriented project management, while suggesting that the literature in the field was still limited. They argued that the temporary nature of project work processes and the dynamic nature of the work environment challenge human resource management in project-oriented organizations. Specifically, they suggested that human resource managers in project-oriented companies should be mindful of six points:

1. Projects should be managed using processes and practices supportive of project-oriented work;
2. Managers should consider the temporary nature of projects in the HR configuration;
3. Project-oriented companies have dynamic boundaries and function under dynamic contexts;
4. Uncertainty is high and creates a dynamic environment with more discontinuity;
5. Project-oriented companies execute a portfolio of different projects and staff members may be employed in several projects and in multiple roles;
6. Specific competencies are required from project staff in order to work together successfully.

One aspect of the shift toward a softer HRM approach in project management research is a growing recognition of the importance of team development. For instance, Slevin and Pinto [192] argued that HR policies have been designed primarily to fulfill the needs of line

management activities, and that HR management should be designed more carefully to enhance project team development and staffing.

As the literature grows more mature, researchers are also beginning to shed light on how the HRM needs of projects change over the project's life cycle. For example, Belout and Gauvreau [12] reported on a survey that examined the effect of personnel issues on project success. Their results confirmed their prediction that the relationship between personnel issues and project success varies according to the project's life cycle stage, with a significant relationship between personnel issues and success in the project execution stage, but not in the planning stage.

A mathematical analysis by Georgiadis [59] also supports the effect of project stage on team dynamics. Georgiadis studied team dynamics using a model wherein "the project progresses gradually and stochastically towards its end at a rate that depends on the agents' costly effort, and it generates a payoff when it is completed" [59, p. 2]. For example, in new product development, team members collaborate on the product's design and manufacture such that features are gradually incorporated into the project, which starts generating revenue only after it is released to the market. The analysis showed that the agents' incentives depend on both the composition of the team and the degree of uncertainty associated with the evolution of the project (or in other words, the expected time remaining till the project's completion). The author found that, in general, agents increase their efforts as the project progresses. When team size was considered as well, the findings showed that members of larger teams work harder than those of smaller teams when a project is far from completion. When the project is close to completion, free-riding in larger teams becomes so severe that a larger team may invest less effort than a smaller team.

Finally, another new stream of research considers human resource management in relation to different project types or characteristics, on the one hand, and different industries or settings, on the other. In an example of the first, Zwikael and Unger-Aviram [237] examined HRM in relation to project duration; they found that HRM has a particularly significant impact on success in long projects. In an example of the second, Zwikael [237] analyzed data collected from 783 project

managers representing different industries and countries to evaluate the relative importance of the PMBOK knowledge areas. They found that HR was consistently ranked among the four factors contributing most to project success, after time, risk, and scope. When they measured the extent of actual usage, the importance of HR did not vary across different industries.

In general, the available research suggests that HRM is critical for project success, and in addition, that it has some unique characteristics that differentiate it from HRM in other environments. This is primarily because projects are developed by ad hoc dynamic organizations, creating a need for flexible organizational structures within which individuals and teams can act and cooperate.

1.2 Project Organizational Structures

Organizations may structure project work in different ways, ranging from traditional functional structures to more flexible "matrix" structures. In the functional structure, each employee has a single supervisor, and organization members are grouped according to their professional specialty (production, R&D, finance, etc.). The scope of any individual's participation in the project is usually limited to the boundaries of his or her functional unit. For example, process improvement will be performed within the industrial engineering department. When HR or financial issues arise, they are routed to the relevant function formally through the organizational hierarchy, and the response is delivered down the hierarchy back to the project team. This style of work is slow and rigid, and is broadly regarded as unsuited to the dynamic nature of today's markets [162]. For this reason, most contemporary organizations have adopted some form of matrix structure [53, 162].

A matrix structure is one in which individuals from different functional units or departments are assigned to project teams on an ad hoc basis, and individuals may report to several managers: a department manager and one or more project managers. Sy and D'Annunzio [207] identified three main types of matrix structures: the *functional matrix*, the *balanced matrix*, and the *project matrix*. In the functional matrix, employees remain full members of their functional

unit, and organizational processes ensure cross-functional collaboration under the leadership of project managers. In the balanced matrix — which the authors call the classic matrix form — power and authority are equally balanced between two organizing dimensions, such that project managers are responsible for the project's overall management (what needs to be accomplished and when), while functional managers are responsible for decisions on staffing and how tasks will be accomplished. Finally, in the project matrix, employees are not formally assigned to any particular department, but rather move between functions and projects. In this model project managers have a high level of independence and authority. They hold primary control over the project's resources and management, while functional managers serve the project in a support or advisory role.

As noted in the PMBOK® Guide, different types of matrix structures serve different organizational needs. The third form — called in the guide a "projectized organizational structure" [162] — is more flexible than the balanced and functional matrix types, and allows for smoother communication between functions relevant to the project. However, such a structure may not be suitable for organizations that perform both project and non-project work, and that require a functional hierarchy to meet particular organizational goals. The functional and the balanced matrix types — called "weak" and "strong" matrices, respectively, in the PMBOK® Guide [162] — offer both the orderly composition of a traditional hierarchy and the flexibility of a projectized structure. According to the PMBOK® Guide, with a weak (or functional) matrix the organization continues to rely on a traditional-style hierarchy, and the role of the project manager is more than that of a coordinator than a manager. With a strong (or balanced) matrix projectized organization characteristics are more dominant, and project managers work on the project on a full-time basis with full authority over the project team [162].

The matrix structure can create special challenges for HRM, rooted in the fact that employees may have responsibilities to both the project and their functional areas [53]. In most cases, project team members report to at least two managers, opening the door to potential ambiguity and conflict. Conflict between functional and project managers

may arise over resources, technical questions, personnel assignments, scheduling, authority, or goals [55, 79]. Ambiguity and conflict may also arise in projectized organizations, where employees may work on multiple projects simultaneously [192]. In both projectized and non-projectized organizations, conflict can arise between employees as well as managers, as teams bring together members with diverse backgrounds and perspectives on work, schedules, and goals [55].

Sy and D'Annunzio [207] identify five key challenges inherent in the matrix structure:

1. The potential for misalignment of goals between different dimensions (functions, products, regions, etc.).
2. The potential for ambiguity in team members' roles and responsibilities (e.g., unclear job descriptions and guidelines for roles and responsibilities).
3. The potential for ambiguity regarding authority (e.g., confusion over who has the final authority, unclear areas of accountability).
4. A lack of matrix-oriented performance measurements.
5. The risk that employees and managers will be silo-focused (i.e., will see their membership and loyalty as belonging to a specific unit), opening the door to conflict between managers and reducing trust between employees in different business units.

In sum, both projectized organizations and other types of matrix structures create unique challenges for HRM, due to the potential for conflicting interests in HR allocation and goals, and the need for employees to work in cross-functional teams. In the next section, we look at further challenges to HRM posed by project management.

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