THE FRAGMENTED NATURE OF THE PROJECT MANAGEMENT FIELD

Research in project management is in a state of rapid growth, but with some disorganization. Significant differences among the papers within the five streams of project management research are identified and analysed. In general, researchers approach project management from either a social or a technical point of view and do not combine these two interdependent components into an integrated theory of project management.

Introduction

Project management in practice still remains a problematic endeavour with many projects suffering from late delivery, cost overruns, and dissatisfied customers (PMI, 2004; Shenhar & Dvir, 2007; White & Fortune, 2002). Project management is becoming even more complex with hundreds, sometimes thousands, of interrelated tasks requiring effective control. Additionally, project environments are becoming more difficult to handle and predict, especially with ongoing dramatic technological changes and decreasing product life cycles.

Despite the rapid growth of project management within many private and public organizations in the form of training courses and specialized software, project management is not yet widely known as a formal and established academic discipline similar to that found in marketing, finance and operation research. This problem may be traced to the fact that there is vast literature available on many aspects of project management but only rare attempts at theory building (Shenhar & Dvir, 2007; Snider & Nissen, 2003; Belout, 1998; Pittman, 1994).

The development of project management as a well-recognized field will first depend on more critical assessments of the current state of project management research. Such critical review of the literature will help develop theoretical and empirical research and strengthen recognition of the field. It appears that the project management literature suffers from scanty literature review studies that examine in detail the trends in the field (e.g. Baker & Wilemon, 1977; Crawford, Pollack, & England, 2006; Kioppenborg & Opfer, 2002; Pollack, 2007). In addition, none of the few literature review studies has developed a scheme/method to analyze and evaluate the paradigms, trends, and approaches of the project management field as a whole. Accordingly, to deal with the essential factors of project management in more detail, this paper presents a critical review and analysis of the current literature and identifies the different problems within the different approaches to project management.
Many research studies in project management suffer from three major flaws. First, the project management literature is fragmented by many studies that focus too narrowly on certain aspects of project management at the expense of others. For example, quantitative studies emphasise technical dimensions of the project management process, but overlook its social properties, and vice versa. Lacking a precise holistic view of the project management process can result in a simplistic view of the entire process, and in some cases, generate only sub-optimal project results.

The second shortcoming of the project management literature is that project management theories are still somewhat underdeveloped (Shenhar & Dvir, 2007; Shenhar, 2001; Shenhar, 1998; Shenhar & Dvir, 1996). Indeed, Packendorff (1995) asserts that research literature on the management of projects has failed to establish theoretical explanations for such problems as deviations from plans, costs overruns, and conflicts within or between projects. In addition, much of the project management literature is filled with inconclusive conceptual models and conflicting empirical research results, perhaps because of this very issue, namely the lack of theoretical explanation.

The third flaw is the abundance of ‘inward-looking’ perspectives regarding the analysis of different aspects of project management (Packendorff, 1995; Winter, Andersen, Elvin, & Levene, 2006). Researchers often build their work on previous studies in the field while ignoring potential contributions from other disciplines (Shenhar & Dvir, 2007). A significant number of theories and research with potential value for project management actually lie outside the boundaries of the field and should be examined and integrated accordingly.

In this paper, the project management literature is categorized into five main streams: Technical, social, cookbook, critical success factor, and socio-technical. These categories may not be mutually exclusive; however, they do serve as a broad conceptual foundation from which one can understand how different researchers with different backgrounds do approach project management, using multiple and sometimes incompatible methodologies. The objective of organising the literature by approaches instead of traditional taxonomies (e.g. size, type, industry…) is to understand more clearly what is happening in the field as a whole. In the following sections, each approach is described and critically evaluated.

**Project Management Research Streams**

**Technical Approach**

The first stream of research describes project management as a set of models and techniques derived from the operation research and applied mathematics concepts (McKay & Wiers, 1999; Packendorff, 1995; Pinto, 1998; Söderlund, 2004). Project management is viewed as a set of tools used to plan, organise, monitor, control, and report projects. An example of the technical definitions of project management can be seen in Oisen’s (1971) definition of project management as “the application of a collection of tools and techniques (such as the CPM and matrix organisation) to direct the use of diverse resources toward the accomplishment of a unique, complex, one-time task within time, cost, and quality constraints” (quoted in Atkinson, 1999, p.337). Similarly, Page (1989) defines project management as “a set of formal analytical procedures that are useful in project planning and implementation” (p.494), and Turner (1993) defines project management as “a body of knowledge of tools and techniques” (p.10). These definitions all share the view that the main purpose of project management is to apply quantitative techniques to achieve desired outcomes.
This approach is based on the assumption that better planning and controlling techniques will improve project management performance. In other words, the solution to project management problems is in the development of more efficient algorithms (Sculli & Wong, 1985; Woodworth, 1989). The literature is replete with proposed project management techniques, so, it may be difficult to identify the core techniques that best represent project management. However, many researchers argue that only the most basic techniques are used in the field, including Work Breakdown Structure (WBS), Gantt Charts, PERT/CPM networks, Project Crashing Analysis, and Trade-off Analysis (Packendorff, 1995; Page, 1989).

Many researchers assert that project management research is biased towards technical, quantitative, and hard system approaches (Baker & Wilemon, 1977; Belout, 1998; Turner, 2003). The dominance of the technical approach to project management may be explained by the heavy influence of the construction field (Crawford et al., 2006).

Both scholars and practitioners have long recognised the shortcomings of traditional project management tools and techniques (Pittman, 1994). Many researchers are questioning the assumptions of many traditional project management techniques. Some researchers assert that research in project management tends to view projects and organisations as mechanistic systems and that the machine metaphor dominates the project management literature (Pollack, 2007; Sauer & Reich, 2007). This mechanistic view of project management assumes that machines are more efficient and rational than humans, and thus humans should act as machines (Kendall & Kendall, 1993; Packendorff, 1995). The historical roots of this view can be traced to the beginning of management theory, and especially to Taylor’s Scientific Management approach in which the time and motion study is replaced with linear programming or PERT, and the stop watch is replaced with a computer (Leavitt, 1965). Ultimately, techniques that employ machine-like behavior tend to focus on technical aspects of the system to the exclusion of its social properties (Ackoff, 1981a; Griffith & Dougherty, 2002).

The mechanistic approach is predicated on the notion that the project manager’s role is to develop and strictly adhere to a perfect plan (Dvir, Raz, & Shenhar, 2003). Pollack (2007) argues that the mechanistic view of project management assumes a strong causal connection between management actions and organisational outcomes. Thus, perfect predictions are now possible on the basis of deterministic casual laws (Ackoff, 1979; Jaafari, 2003). For example, Kerzner (2006) states that “if project planning is performed correctly, then it is conceivable that the project manager will work himself out of a job because the project can run itself” (p.17). This view implicitly considers plans to be developed and executed in a “vacuum”, and what may be useful for analytical purposes, it cannot be applied to real projects because it oversimplify the organisational situation (Ayas, 1996; Gabriel, 1984; Jensen, Johannson, & Lofstrom, 2006). Strengthening this conclusion, Pollack (2007) point out that empirical evidence supports the notion that it is impossible to maintain a complete and fully up-to-date plan. Furthermore, Mintzberg, Quinn, & Voyer (1995) stress that organisations deal with dynamic situations in which realised (final) plans are not originally intended (initial) plans, but rather a mix of emergent and intended plans. In this way, it may not come as a surprise that “inadequate planning” is the first reason for project failures in at least 36 studies (Nikander & Eloranta, 1997). By the same token, risk management techniques fail in anticipating real future threats because risk analysis is a static one-time procedure undertaken at the beginning of the project (Nikander & Eloranta, 2001). This may explain why risk management tools are not often used in practice (White & Fortune, 2002). It follows that traditions and assumptions in project planning should be reevaluated since it is insufficient “to prepare perfectly for an imperfectly-predicted future” (Ackoff, 1979, p.100).

A further step that could be taken in comprehending the evolving nature of projects is to develop adaptive plans that will improve project managers’ flexibility to handle their dynamic environments
Most traditional project management techniques are “deviation management” oriented, tasking the project manager with detecting and correcting any significant deviations between planned and actual situations. However, “deviation management” has resulted in actions that are more reactive than proactive (Thamhain, 1987). In many cases, it may be too late to correct problems by the time they are detected. Also, deviations from the plan may not provide adequate information for identifying the causes of the problem (Kerzner, 2006). What is needed are project management techniques that reflect future dynamic situations instead of focusing on historical data (Nikander & Eloranta, 2001; Nikander & Eloranta, 1997).

Another major criticism of most quantitative techniques is that they assume a linear project management process based on the premise that activities can be ordered in the form of sequential interdependencies (Duncan, 1979; Jaafari, 2003; Packendorff, 1995; PMI, 2004; Sonawane, 2004). In reality, most projects—even those of great complexity—are non-linear systems with many reciprocal interdependencies (Duimering et al., 2006). Tasks in a Gantt chart, for example, are assumed to be sequential, meaning that as tasks start, work is assumed to continue until all tasks are completed. Such a representation makes it difficult to represent tasks that need to be “reworked”, or to include even the simplest reciprocal task relationships.

Another major problem with most traditional project management techniques is in the close system representation of project management, which overlooks or underestimates the impact of the environment. White & Fortune (2002) consider that 70% of the side effects of using traditional project management techniques can be linked to a lack of awareness of the changing environment. In a close system, projects function in relatively stable systems, and the primary goal of the project manager is to develop optimal plans and ensure that everything is going according to the plan. However, in real projects (i.e. open systems), interactions occur between the project management system and its environment (where raw materials are imported and finished products or services are exported) but with no control over the environment (Augustine, Payne, & Sencindiver, 2005; Lawler, 1976; Pasmore & Sherwood, 1978). It should be noted that any organisation functions in a continually changing environment (Bavelas, MacGregor, & Safayeni, 1983). These continuous changes can be manifested in rapid and discontinuous changes in demand, competition, and incomplete information (Belout, 1998; McCray, Purvis, & McCray, 2002; Pinto & Slevin, 1987). For organisations to survive, then, a relationship must exist with the larger systems of which they are a part (Scott, 1987), and it must be recognised that any changes in the environment will have direct impacts on the project performance (McKay & Wiers, 1999; McKay, Safayeni, & Buzacott, 1995a; Pasmore & Sherwood, 1978). Moreover, the effects of environmental factors on projects are often nonlinear, further complicating the process of managing projects (Milosevic & Patanakul, 2005).

The continuous increase in project complexity appears to be one of the major driving forces in the continuous development of tools and techniques designed to aid managers in planning, decision making, and controlling project tasks. In general, traditional project management techniques handle complexity through the hierarchical decomposition of tasks (i.e. WBS) into smaller, simpler, and controllable sequences of actions (De Wit & Herroelen, 1990; Duimering et al., 2006; Hegazy, 2002; Plasket, 1986; PMI, 2004; Pinto, 1998). These decomposed chunks of tasks are later reconstructed and integrated to
represent the whole project. The decomposition process is based on the assumption that even though the overall project may be unique, many of its subtasks have been experienced before (Sonawane, 2004). From this point of view, the better the parts are structured, the better the whole (Packendorff, 1995). However, this view fails to consider that even though partial tasks may be predicted accurately, reintegrating interrelated and interdependent subtasks may produce different estimates when compared to the sum of the parts. As stated by Kurt Lewin: “dynamic wholes have properties which are different from the properties of either parts or the sum of their parts” (quoted in Cunningham, 2001, p.91). Ackoff (1979) concurs, asserting that systems are wholes that lose their essential properties when taken apart. Tasks should be explained in terms of their function in the system, and not as independent parts. Ackoff, (1979) further argues that optimal plans in dynamic environments cannot be extracted from decomposition processes since optimal plans depend on how subtasks interact with each other and not on how subtasks act independently. Consequently, the decomposition process can result in abstractions that are loosely related to reality (Ackoff, 1981a; Ackoff, 1979).

A considerable amount of project management research proposes various models and techniques designed to develop optimal plans (e.g. Gerk & Qassim, 2008; Gong, 1997; Rao, Kestur, & Pradhan, 2008; Yang, 2007; Zhang, Li, & Tam, 2006). Such ostensibly optimal plans developed by traditional techniques may not, in fact, be optimal solutions since their underlying models are imperfect representations of the project situation (Ackoff, 1979; Pinto & Slevin, 1987; Posner, 1987). Thus, the optimal solutions from such models are seldom adaptive to changes and therefore their optimality is generally short-lived (if it exists at all) (Ackoff, 1979; McKay et al., 1988). Furthermore, WBS can fall apart when used to plan ambiguous projects (e.g. new product development, R&D, organisational restructuring projects) since it assumes that tasks and goals are clear and well defined in advance (Duimering et al., 2006; Dvir et al., 2003; Kenny, 2003; Packendorff, 1995; Pich, Loch, & Meyer, 2002; Turner & Cochrane, 1993).

The decomposition process in project management assumes that more detailed plans allow more control (Pollack, 2007; Clarke, 1999). For example, Pinto (1998) states that the project plan is a bureaucratic step in the project management process to ensure full control over the project. An overly detailed WBS, however, suffers from two problems. First, updating too many subtasks is a time consuming task that can drown project managers in a sea of details (Clarke, 1999). Mintzberg (1973) states that “one can imagine the analyst working in a large war room surrounded by walls covered with PERT or Gantt Charts. Under this system, the manager continues to supervise his projects, but he is relieved from the difficult job of keeping track of their progress” (p.159). Second, WBS as a tight control system may result in dysfunctional behaviours by project members (Lawler, 1976). Dysfunctional behaviours can occur in cases where people act in ways that will help them appear good on the control system (e.g. WBS) even though those behaviours do not help in achieving the project goals. In short, traditional project management techniques are facing increasing threats of irrelevance unless newer models are developed to handle project complexity (Jaafari, 2003).

Project management software can be seen as a subset of the technical approach since almost all traditional techniques are incorporated in software packages (e.g. Primavera, Microsoft Project). Many researchers believe that the dynamic and heterogeneous nature of project management elements, the interdependence of various participating entities, the complexity of projects, the need for flexibility, and the high degree of coordination required together suggest that information technology has a great potential for managing projects (Doloi & Jaafari, 2002; Fox & Spence, 2005; Fox, 2000; Hegazy, 2002; Hegazy & El-Zamzamy, 1998; Matthews, 1987; Thamhain, 1987). However, most literature about project management software is descriptive in nature with over-enthusiastic and unrealistically optimistic evaluations (De Wit & Herroelen, 1990; Kidd, 1990; Liberatore & Pollack-Johnson, 2003). The literature concentrates on technical reviews and comparisons of specific packages and fails to offer any critical
examinations on the impact of such software on the project management process. Research to date has focused on increasing the level of flexibility and improving ease of use, but little attention has been paid to the conceptual models embedded in the software (Liberatore, Pollack-Johnson, & Smith, 2001). In general, while project management software packages may differ in some advanced features, they generally share the same underlying concepts (Bobrowski, 1989; Davis & Martin, 1985; Liberatore et al., 2001). In other words, although project management software packages have made the use of traditional project management techniques easier and faster, they have not led to conceptual breakthroughs (Page, 1989).

At an abstract level, project management software can be defined as a set of predefined assumptions and preconditions about what projects are and how they should function (Matthews, 1987). Beer (1967) argues that the software is often an automated replacement of the organisation’s existing procedures. One may argue that project management software packages are flexible tools that can cope with unexpected changes in the project management situation. However, the flexibility of any technology is limited to the predefined range of possibilities programmed in them (Duimering, Safayeni, & Purdy, 1993). This is why some researchers view project management software as a static tool adopted to shoot moving targets (Thamhain, 1987). However, since project management software may be perceived as a rigid tool that acts as a constraint, some researchers suggest that their contribution to the project management field may continue to be limited (Matthews, 1987). These limitations in project management software may explain why project managers rank project management software as the tool with most drawbacks, especially with complex projects (White & Fortune, 2002). Overall, project management software supports a structured, analytical, and systematic approach to project problems (Fox & Spence, 2005). Thus, its applicability is most useful for tasks where decisions can be set in advance with minimal perturbation to the project from the environment. Furthermore, the limitations of the project management software become more apparent as the project complexity and uncertainty increases (Kidd, 1990). Thus, the software is most useful for static and stable situations that behave like the programmed models in the software. However, a structured and systematic tool lacks the ability to handle messy and dynamic situations which are commonplace in reality.

Social Approach

It is clear from the previous section that the technical approach to project management is the dominant perspective in the field. However, more attention is taking place on individual and organisational behavioral dimensions of project management processes. Many researches assert that primary problems of project management are not merely technical, but also human (Belout & Gauvreau, 2004; Hegazy, 2002; Packendorff, 1995; Posner, 1987). Despite this view of social aspects of project management, some researchers argue that human issues are still overlooked (Belout, 1998; Laplante, 2003; Metcalf, 1997). This shift towards a more social approach to project management is based on the premise that project outcomes can be enhanced by first changing the behaviours of people involved in the process. The main areas of interest are organisational culture, organisational support, organisational commitment, learning, leadership, decision-making, team building, knowledge building, conflict management, and communication skills (e.g. Bresnen, Edelman, Newell, Scarbrough, & Swan, 2003; Brookes, Morton, Dainty, & Burns, 2006; Jackson & Klobas, 2008; Johns, 1999; Nordqvist, Hovmark, & Zika-Viktorsson, 2004; Wang & Armstrong, 2004; Wong & Cheung, 2008). However, many human side studies have fallen short of their potential since they lack an accurate representation of real project management situations.

Project managers are frequently the focal point of many social approach studies, but many studies have overestimated the project manager’s role where he/she is considered the central project management
contributor in the project management process (e.g. Globerson & Zwikael, 2002; Styhre, 2006; White, 2006; Wright, 1997). For example, Kerzner (2006) states that “if the project manager performs well, the project will be successful” (p.19). Similarly, Dinsmore (1984) asserts that “the project manager is the focal point for a project success” (p.110). Blackburn (2002) offers a succinct review of how more optimistic literature views the project manager: “hero by whose skills and actions the successful project is delivered” (p.199). Dinsmore (1984) offers an instructive reminder that “the stereotyped character called the project manager in the literature may not exist at all … the project manager as cited in professional publications is perhaps only a model or a prototype against which individuals in project management positions can compare themselves” (p.119).

A better understanding of project reality shows that projects are managed by networks of effective interactions involving all related groups and individuals, not merely project managers. Thus, the solution to project management problems is not in increasing the authority of project managers as proposed by some authors (e.g. Dinsmore, 1984), but by ensuring that each member in the project management network is functioning effectively and their interactions are coordinated properly in order to achieve desired project outcomes. This holistic view of project management processes will lead to a deeper understanding of project reality instead of the “one man show” fallacy promulgated by many social studies.

As previously mentioned, the “technical” approach to project management suffers from a myopic focus on technical components of the project system with little consideration for the social context. In the same way, many social studies of project management often lack a clear specification of the larger technical task contexts of a project, which may either constrain or facilitate both role behavior and social relations among project participants. For example, “coordination” between project management members is considered a key factor to any project success (Jha & Iyer, 2007), but is discussed in the literature with little reference to the important and related technical aspects of coordination. Neil (1993) defines coordination as “unifying, harmonizing and integrating different agencies involved in any industry with multiple objectives” (quoted in Jha & Iyer, 2006, p.314). However, if an individual or group in the coordination process does not have the capacity to carry out the task, coordination cannot succeed. Capacity, in this context, is a technical component of the process since it requires technical knowledge, skills, or resources. Seen in this light, coordination is not only “harmony integration”, but also the technical ability to perform the required task.

Conflict management is another popular topic since projects consist of heterogeneous groups acting within time, budget, and resource constraints. Cheung & Chuah (1999) posit that cultural and traditional values play an important role in project managers’ choice of conflict resolution strategies. For example, Chinese project managers are predicted to adopt a “withdrawal” approach to conflicts, because Chinese culture values relationships with others and “being a friend rather than an opponent” (Cheung & Chuah, 1999, p.398). Ma (2007), however, argues that studies on conflict management styles across cultures suffer from two flaws. The first flaw is that most studies are inconsistent in the terms used to classify conflict management styles. The second flaw is that most studies lack actionable knowledge. In other words, these studies fail to answer simple questions such as ‘so what?’ Ultimately, conflict resolution should be examined in the context of organisational situations instead of focusing on just managers’ values.

Psychological variables such as trust have been considered as a major influence in many social studies of project management. Some researchers believe that higher levels of trust among team members will lead to better project performance and facilitate project success (Kadefors, 2004; Munns, 1995; Shek-Pui Wong & Cheung, 2004). In the context of project management, “trust” is “a decision to become dependent on another in return for the possibility of a shared positive outcome” (Munns, 1995, p.19). The
tension here is that projects are limited in terms of time while trust requires a relatively long period of
time to build up and share. Munns (1995) argues that initial opinions among team members in early
project stages will shape the project final outcomes. However, this social discussion of project
management, like that of many other social studies, lacks a clear technical context that constrains and
facilitates social relationships among project participants. In the same way, “trust” concepts in project
management may be challenged by the question “in relation to what?” For example, a project manager
may trust a functional manager’s technical knowledge, but not his/her estimates about the budget of a
specific task.

To conclude, the main focus of research in the human side of project management should be the
way people actually manage projects, as opposed to how people should manage projects (Packendorff,
1995). With no clear understanding of actual project management, little can be safely prescribed to
project managers and teams. There is a need to answer the basic question: what do managers do?
(Mintzberg, 1997). By focusing on projects realities, managers can solve real project problems rather than
imagined ones within ideal situations (McKay, Safayeni, & Buzacott, 1995a).

Cookbooks Approach

The thrust of most project management “cookbooks” is to provide practitioners with a more user-
-friendly reference of project management with less technical jargon. A fair amount of project
management books, which are considered “cookbooks” in this study, approach project management
concepts based on non-technical discussions, personal experiences, and ‘dos and don’ts’ lists. Some
researchers argue that this approach to project management is important since project managers do not
have the luxury of thinking about philosophical backgrounds of project management (Turner, 2003).
Many “cookbook” authors claim that most academic research develops concepts about managing projects
that might be attractive in theory but are dramatically inconsistent with real project management
situations. For example, Kyle (1998) argues that most academic books are “dry textbooks” that do not fit
project managers’ needs in the field, and that tend to complicate simple subjects. Seen in this light,
academic studies are difficult to utilise and are sometimes irrelevant to the field. Clearly there is a gap
between theory and practice in project management, but the question of whether or not these books have
any real value for dealing with actual project management situations remains.

From an academic perspective, the primary weakness of many cookbooks is their lack of
academic creditability. It is common to read a whole book with not even one conceptual framework or
reference (e.g. Heerkens, 2005; Kemp, 2006; Kyle, 1998; Mingus, 2003; Portny, 2006). Most
“cookbooks” have failed to explain how suggested rules and guidelines were developed, and there are
rarely any supporting references to empirical studies. Much of what is written as rules may be considered
subjective, for instance, Newell & Grashina (2004) assert that in the process of constructing a WBS all
elements of the WBS should be relatively the same size (i.e. if a task is broken into four subtasks at one
level, all other tasks at the same level should be broken to four subtasks), but it is unclear what empirical
evidence was used to arrive at this conclusion. Similarly, it is common to read that the minimum time to
plan any project should be five percent of the project duration (Cook, 2005) without any reference to how
such a rule was derived. With no clear conceptual frameworks, some guidelines are even difficult to
follow. For example, Heerkens (2005) states that “as a project manager, one of your jobs is to form the
team into a unified, single-minded unit with a focused project objective” (p.32). The extent to which such
advice is practical or even realistic is a different set of drawbacks altogether.

The cookbook approach oversimplifies project management processes. Filled with universal
rules, “magic formulas”, and “one-size-fits-all” methods to project management, these books show the
basic premise: “no matter how simple or complex the project, however, the process is the same” (Portny, 2006, p.14). A fair number of cookbooks tend to be over-optimistic in describing project management processes and related techniques (e.g. Kemp, 2006; Kliem, 2002; Murray, 2002; Portny, 2006). For example, Portny (2006) claims that “most complex analytical techniques take less than ten minutes to master” (p.2), while Kemp (2006) notes that “estimating is easy, but most people think they’ll never get it right” (p.63), and Newell & Grashina (2004) state that “doing a work breakdown structure is one of the simplest things that you will do as a project manager” (p.32).

In this context, oversimplification pervades the entire project management field. McGhee & McAliney (2007) assert that project management is an easy journey since “we’ll take you through the basic steps, in order, like an easy-to-follow recipe” (p.1). In the introduction to Painless Project Management, McGhee & McAliney (2007) state how “easy” and “simple” project management is. “Painless Project Management makes it simple by cutting through the jargon, formulas, and needless complexity with an easy, step-based approach for managing virtually any project, big or small, from beginning to end”. Kyle (1998) writes that his book “is a demonstration of how simple [project management] really is”, while Tedesco (2006) explains that as a project manager “you will learn new concepts that are easy to adapt to your current management process because they don’t really change the way you do business now; they simply add to it or simplify what you do”.

Clearly, the most influential drivers in cookbooks studies are simplicity and ease, and it follows that many cookbook authors claim that anyone can master project management simply by reading their book. This argument implies that project management can be reduced to a purely cognitive skill, but the reality is that the awareness of such concepts—assuming they are accurate—is not enough to help project managers and teams deal with real project management situations. Management should be taught through practice and feedback (Mintzberg, 1997).

Perhaps one of the most alarming facts here is that many if not all “cookbooks” depend on personal observations devoid of theoretical foundations. Most studies are situation-driven, causing the reader to focus on isolated parts of project management processes instead of focusing on the overall process of project management. Many “cookbook” authors cite their years of experience as evidence of their credibility, but such experience is rarely used to offer justifications for their straight answers to project management problems (Packendorff, 1995). In short, cookbooks may be of some use in describing project situations, but are ultimately weak at drawing correct conclusions about these situations. Seen in this light, cookbooks could bring substantial advantages to the project management field if they report actual project management events instead of proposing “quick and dirty” solutions that contribute little knowledge.

Critical Success Factors Approach

The project management literature is abundant with lists of critical success factors (CSFs) (e.g. Belout, 1998; Belout & Gauvreau, 2004; Cooke-Davies, 2002; Diallo & Thuillier, 2004; Westerveld, 2003). However, many CSF studies fail to define “success” rigorously (Fortune & White, 2006; Pinto & Slevin, 1988; Wateridge, 1998), leading to multiple and often contradictory meanings, interpretations, and concepts for different people. For example, a project may be perceived as a success for a project manager, yet as a failure by clients and vice versa (Belassi & Tukel, 1996; Freeman & Beale, 1992; Wright, 1997).

The dominant success criterion used in the literature is the completion of a project within the constraints of time, cost, and performance (Belout & Gauvreau, 2004; Bobrowski, 1989; Cooke-Davies, 2002; Dvir, Lipovetsky, Shenhar, & Tishler, 2003; Globerson & Zwikael, 2002; Jang & Lee, 1998;
Many researchers consider the triple constraints (i.e., time, cost, and performance) as an objective indicator, in contrast to other subjective factors in the field (Wateridge, 1998). It seems that the widespread acceptance of this definition of success may be traced to the fact that the triple constraint is the easiest one to quantify (Pinto & Slevin, 1988).

However, based on this definition of success, Gardiner & Stewart (2000) claim that almost all projects should be considered failures since projects seldom finish on time and within budget. In addition, adopting the triple constraint for success measurement may be problematic since it results in a local and “operational mindset” instead of a global and organisational view of success (Dvir, Sadeh, & Malach-Pines, 2006).

Can a project that fails to meet an unrealistic rigid budget and schedule be considered a failure? If a project manager overestimates both project time and cost, allowing the project to be finished ‘perfectly’ based on such bad estimates, can this project be considered successful? Arguably, since each project is unique, how can perfectly accurate initial cost and time estimates even be developed? More to the point: how can rough initial estimates and premature plans be the dominant success factors in evaluating projects? Looking only at time, cost, and performance will not identify whether a project was managed correctly or not. It is possible to complete a project on time and within budget but with bad project management practices (or vice versa) (Munns & Bjeirmi, 1996; Shenhar & Dvir, 2007). Success should be linked to both project management processes and outputs to be useful criteria (Atkinson, 1999). In short, success should be viewed as a dynamic concept that depends on the project situation and not on fixed measurements based on the triple constraint. In other words, this definition of “success” is influenced by project outcomes rather than the dynamic processes responsible for the outcomes. Thus, the triple constraint is not the right criterion, or at least not the appropriate sole success criterion.

Some studies in the project management field describe other ways of defining project success. For example, some researchers define project success in terms of financial returns (Diallo & Thuillier, 2004). Other researchers describe project success in terms of users’ satisfaction levels (Lim & Mohamed, 1999; Pinto & Slevin, 1988). From this point of view, including customers in the success model is important since it adds an external dimension to success instead of focusing on internal measurements. Some project success definitions are difficult to quantify or measure (Belout, 1998; Diallo & Thuillier, 2004). For example, some researchers define project success in terms of completing the project without changing the corporate culture or routines (Kerzner, 2006; Munns & Bjeirmi, 1996). In this respect, success can be considered subjective since it is based on individual judgments (Dvir et al., 2003; Hughes, 1986; Jha & Iyer, 2007; Jha & Iyer, 2006). With these multiple definitions of project success, future studies should redefine “success” by considering the uniqueness of a given project management context. Unless an agreed upon definition is developed, project success studies will continue to have limited influence on the project management practice (Pinto & Slevin, 1988).

The premise of this approach is that successful projects behave in the same way and have common characteristics (Diallo & Thuillier, 2004; Dvir et al., 2003; Milosevic & Patanakul, 2005). Research in this area provides checklists of key project success factors generated by project managers and members; each list varies in its objective and scope.

Pinto & Slevin (1987) describes the project success model as follows:

\[ S = f(x_1, x_2, \ldots, x_n) \]

Where

- \( S \) is project success, and
- \( x_i \) is critical success factor \( i \).
Pinto & Slevin (1987) assume that the project success model is based on two assumptions. First, each critical success factor is an independent variable. Second, each $x_i$ positively relates to project success, but with no measurement of the strength of its relationship with project success. These assumptions will be discussed in later parts of this section.

It is worth noting that the confusion about CSFs in project management is widely reported in the literature, which is replete with project success factors (Pinto & Slevin, 1987). There is no consensus among researchers on what factors result in project success (Dvir et al., 2003; Fortune & White, 2006; Jha & Iyer, 2007; Jha & Iyer, 2006). Pinto & Slevin (1988) state that “there are few topics in the field of project management that are so frequently discussed and yet so rarely agreed upon as that of the notion of project success” (p.67). Variance in CSF lists may be explained by the fact that many CSF studies are influenced by the research approach. On the one hand, if the research adopts a technical approach, the success factors will be biased towards the quantitative measures of the project. On the other hand, if the researcher is primarily concerned with the social issues, success factors will be more about qualitative measures of the project.

Undoubtedly, success is the aim of every project team but, unfortunately, success is easier said than done. CSF studies provide little advice on how success factors can be applied and utilised (Clarke, 1999). These CSF studies answer the question: “what to do?” but with no clear answer to the hard question: “how to do it?” (Pinto & Slevin, 1987; Wateridge, 1995). It seems that the main objective of CSF studies is to identify success factors. However, awareness of success factors is not sufficient to enhance project performance. Some researchers argue that CSF studies provide comprehensive descriptions with superficial analysis (Packendorff, 1995). For example, a success factor such as “good communication” (Wateridge, 1995) includes nearly every transmission of information (e.g. email, memo, face-to-face, telephone etc…) with no information regarding the attributes of “good” as they apply to each method of communication. In the same way, success factors such as “to develop realistic cost, schedule, and performance estimates and goals” or “keep changes under control” (Kerzner, 2006, p.354) do not help project managers in developing realistic estimates or even simple control mechanisms. Thus, these lists may be of little practical use to real project situations.

It is important to note that success factors are interrelated and interdependent and thus it is insufficient to list them as independent factors leading to project success (Fortune & White, 2006). Interrelated CSFs are even more prevalent in complex projects with more interrelated tasks (Westerveld, 2003). Thus, it is difficult in the context of complex projects to validate the presumption that a success factor is the true reason behind project success. Strengthening this conclusion, most CSF lists are often anecdotal and based on single-case studies with little empirical evidence (Pinto & Slevin, 1987; Wateridge, 1995). It seems that the project management field is abundant with stereotyped success factors that are accepted at face value. Given the limitation in empirical validation, it is difficult to conclude with any degree of confidence that some factors are definitely related to project success.

To conclude, the CSFs approach contradicts basic project properties. Since projects are composed of “unique” tasks, how can it be assumed that success factors are transferable and applicable to many projects of different types and in varying contexts? (Belassi & Tukel, 1996; Dvir et al., 2006; Jha & Iyer, 2007; Westerveld, 2003) CSF studies should focus on constructing success theories instead of generating more factors (Glass, 1999). These factors need to be reevaluated by both scholars and professionals to determine what is and is not relevant to project success. Until then, the question of what critical factors really lead to project success remains open.

Socio-Technical Approach
Despite the fact that socio-technical interactions are central to the study of project management as a whole, only a few serious studies have tried to capture these complex interactions. The socio-technical approach to project management is promising because it examines the interactions among people, tasks, and technologies simultaneously (Bostrom & Heinen, 1977; Griffith & Dougherty, 2002; Pasmore & Sherwood, 1978; Shani, Grant, Krishnan, & Thompson, 1992).

The socio-technical approach can be traced to the classical study on coal-mining methods done by Trist & Bamforth (1951). The primary objective of this coal-mining study was to show how outcomes of technical systems cannot be understood in isolation, but must include their related social context. The traditional way of mining was based on small groups of miners that worked closely together. Each group was required to work on different types of tasks; control over the work was internally handled by each group. However, this social setting was disrupted with the replacement of the traditional manual method by a new mechanical coal cutter. This new method required employees to perform routine, standardized, undemanding, and isolated jobs. As a result of this technological disruption to the mining social system, productivity decreased, and absenteeism rates increased. The main conclusion to be drawn from this study is that the effectiveness of any technical system depends on how well its social system actually copes with the requirements of the system.

In general, the term “socio-technical” often appears as a “buzz word” and is widely used without any clear definition or methodology (Griffith & Dougherty, 2002; Majchrzak & Borys, 2001). There is still no agreement on the exact definition of socio-technical systems. In this respect, clarifying the basic definition of a socio-technical system may be essential to utilizing that concept within the field of project management. At a basic level, it can be argued that whenever human and technical elements are put to work, socio-technical interactions will always occur, whether intended or not. The technical system may be defined as referring to task requirements and formal procedures and include the necessary technologies to achieve the desired results. On the other hand, the social system may be defined as having task dependencies with their coordination requirements that can lead to the development of group social norms for task performance (Palvia, Sharma, & Conrath, 2001). Social relationships in this context are specified in terms of task requirements and task interdependencies (DeGreene, 1973).

A similar line of thinking developed by Bavelas et al. (1983) and Scott (1987) asserts that any task dependencies will result in associated social structures since social and formal task structures do interrelate in the context of task performance. Thus, a social structure may redesign, recreate, and adjust a formal task structure into the structure actually used by an organization. Needless to say, the technical system of the formal task structure may impose a set of constraints that require adaptation on the part of the social structure. That is, different formal task structures will result in different levels of interdependencies with different social structures (Safayeni, MacGregor, Lee, & Bavelas, 1987). Roethlisberger (1956) in fact suggests that behaviours at work cannot be understood without examining the actual social structure of the task-related groups.

Project management can be viewed as a manifestation of a complex pattern of interrelations and interactions between individuals and groups that are pursuing different parts (i.e. subtasks) of a project. In other words, project management appears to be a function of interactions that occur both within an organisation and between that organisation and its external environment. Thus, to accomplish a project, both the interdependent social and technical systems should be jointly optimised, as proposed by some researchers (Cherns, 1976; Katz & Kahn, 1978; Scott, 1987). Other researchers go as far as asserting that the joint optimization process between the technical and the social system is a complex process since both systems tend to be individually dissimilar (Scott, 1987). In this view, the “means are as important as the ends” (Mumford, 2000). It is argued that joint optimisation is a dynamic process that continues even after a solution is found so as to allow a fit between the social and the technical elements of an organisation.
and include the “fit between the resulting socio-technical structure and the human characteristics of people who enter it” (Katz & Kahn, 1978, p.701). As mentioned, many studies in project management focus on technical components at the expense of the related social systems with only rare attempts to joint optimise both systems. That is, project tasks are designed based on the requirements of the technical system, and then humans are required to fit their social system into those technical requirements (Emery & Marek, 1962). The result is that the capability of the whole system to handle unforeseen and unpredictable events is reduced (Scott, 1987).

The complexity of project management may be traced to the comprised sets of subgroups with divergent interests and views about the formal task structure of a project. In turn, different project management participants may have multiple, even shifting, goals and priorities that compete if they do not actually conflict. In addition, project management depends too often on reciprocal interactions to communicate and coordinate the activities of various participants who are involved in the process. In this respect, a project can succeed only as long as the project participants are able to maintain an effective reciprocal flow of interactions. That is, each group in the project management system should have enough capacity to absorb and handle the variability generated by other groups during the progress of the project.

Overall, the socio-technical approach essentially views project management as interacting subsystems in which projects are delivered by establishing a fit among various groups with different, and possibly competing, expectations and goals. Future research on socio-technical aspects of project management can shed further light on the development of project management theories as a means of understanding the process itself. Such analysis will help determine the nature of interdependent interactions and the effects these interactions have on the project management process and the outcome of the project as a whole. Additional research is needed to refine the concept of socio-technical systems, as that concept applies to project management. Currently the concept is underdeveloped and presents no clear methodology on how to capture and analyze complex interactions successfully.

Summary

One major shortcoming in most project management studies is a tendency to discuss the technical and social aspects of projects independently. This mode of thinking frames the issue as human elements versus technical components. The literature is filled with such statements. For example, “as an industry, we’ve spent an awful lot of time in the mechanism [technical] area. Maybe it’s time for a bit of the organism [human]” (Armour, 2002, p. 20). However, neglecting the interactions between technical and social elements of project management and just examining each element as its own entity often results in sub-optimal project performance (Turner, 2003). A better understanding of the interactions of the interrelated and interdependent technical and social variables of project management is necessary. In this respect, the socio-technical approach to project management appears to be promising. Yet relatively little attention has been paid to the socio-technical interactions that occur in the project management process. Research should focus on developing a theoretical approach to modelling project management and its effectiveness, an approach that views the social and technical components of projects jointly as a network of task-related social interactions that do occur within an organisational context. Table 1 summarizes the main properties—as well as shortcomings—of the five project management approaches.
<table>
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<tr>
<th>Research Approach</th>
<th>Main Properties</th>
<th>Main Shortcomings</th>
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</table>
| Technical Approach | • Applies operation research and applied mathematics concepts  
• Relies on rational and deterministic models  
• Is used to plan, organise, monitor, control, and report projects  
• Assumes solutions to project management problems exist in the development of more efficient algorithms | • Has a myopic focus on technical, quantitative, and hard system components  
• Tends to promote a mechanistic view with many linear assumptions  
• Relies on closed-system representation  
• Most applicable for structured tasks, in which decisions can be set in advance with minimal perturbation from the environment |
| Social Approach | • Focuses on behavioural components—namely, the influence of psychological, social, and organisational variables on project management  
• Assumes solution to project management problems emerge from people’s improved behaviour | • Suffers from a narrow focus on social components  
• Lacks a clear specification of larger technical task contexts  
• Overestimates the project manager’s role |
| Cookbook Approach | • Is based on non-technical discussions, less technical jargon, personal experiences, and ‘do’s and don’ts’ lists | • Lacks academic creditability  
• Oversimplifies and is overly optimistic in describing project management processes  
• Fails to provide explanations on how suggested rules and guidelines were developed or can be implemented |
| Critical Success Factors Approach | • Examines factors that are highly correlated with project success  
• Provides indicators in evaluating project performance  
• Offers suggestions for improving project management | • Fails to define “success” rigorously  
• Lacks agreement regarding which factors result in project success  
• Relies on the presumption that a success factor is the true reason behind project success, which is difficult to validate  
• Offers little advice on how success factors can be applied and utilised  
• Is often anecdotal and based on single-case studies, with little empirical evidence |
| Socio-Technical Approach | • Examines interactions among people, tasks, and technologies simultaneously  
• Views project management as interacting subsystems in which projects are delivered by creating a fit among various related groups  
• Offers one promising and potential solution to the fragmented project management literature by studying project management from a socio-technical perspective | • Is based on an underdeveloped and poorly defined concept  
• Lacks clear methodology for capturing and analysing complex interactions successfully |
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