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REASSESSING PROJECT MANAGEMENT: A SCIENCE OR AN ART?

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ABSTRACT
Project management is not a one dimensional construct. It means different things to different people. For some, it is a science. For others, it is an art. For still others, it is both. This debate has been going on in the project management community for quite some time. As a result, there is inconsistency in the way the discipline is taught, described, housed and classified and categorized by different academics, practitioners, institutions, and publishers respectively. Therefore, instead of taking a one-dimensional approach in answering the question of whether project management is a science or an art, this paper approaches the topic from a multi-dimensional perspective. Even though much has been written and discussed about the topic, this approach is lacking in the literature. By identifying a variety of sources on the topic; reviewing, analyzing, and synthesizing the various perspectives; and based on the various perspectives; the author was able to summarize the various viewpoints and then offered a more appropriate description and classification scheme. This is the approach that has been lacking in the literature until now. From the perspective of team members, academics, and students, project management is a science or more of a science. From the perspective of practicing project managers and consultants, managing projects is an art or more of an art. However, this paper recommends that whether project management is described or classified as a science or an art should depend on the individual's role or the learning emphasis in a given context. If the role or learning focus primarily involves technical aspects, then, project management should be described or classified as a science. On the other hand, if the role or learning focus primarily involves sociocultural aspects, then project management should be described or classified as an art.

KEY WORDS: Technical Dimension, Sociocultural Dimension, Academics, Practitioners

INTRODUCTION

Project management means different things to different people. For some, it is a science, for others, it is an art, and for still others, it is both an art and a science. The project management community has been engaged in the debate about the inconsistency regarding the classification of project management for quite some time. As such, this topic is of intrinsic value to the author. Besides, the question about whether project management is a science or an art had always fascinated the intellectual curiosity of the author. Therefore, the purpose of this paper is threefold: (1) to identify and review a variety of sources discussing this topic, (2) to analyze and synthesize the perspectives from the various sources, and (3) to offer an explanation of where the majority of the viewpoints come down on and makerecommendations for a more appropriate classification scheme of the discipline and profession. By so doing, the author hopes to add his voice to the ongoing debate. The purpose of the paper is achieved by asking and discussing one simple question: Is project management an art or a science? Much has been written and discussed about this notion. Yet, the approach suggested in this paper is lacking in the literature. The lack of adequate discussion of the topic from the approach suggested in this paper excited the intellectual curiosity of the author. Hence this study is undertaken to fill that void.

Project management has existed since before the days of the great pyramids. However, its use has virtually exploded since the mid-1990s (Meredith & Mantel, 2012). They stated that businesses regularly use project management to accomplish unique outcomes with limited resources under critical constraints. This is more common in the service sector of the economy. Meredith and Mantel pointed out that advertising campaigns, voter registration drives, political campaigns, a family annual summer vacation, and even management seminars on the subject of project management are organized as projects. The use of projects as a way of accomplishing organizational change is cited as a relatively new growth area. It is stated that there is a rapid increase in the number of firms that use projects as the preferred way of accomplishing almost everything they undertake. In this respect, Mantel, Meredith, Shafer, and Sutton (2008) stated that "Over the past several decades, more and more work has been accomplished through the use of project management." This sentiment is echoed by the UK's Office of Government Commerce (OGC), the official publisher ofPRINCE2 project management methodology. OGC (2009) expressed that "It is often stated that the one constant in the modern world is change. Whether that change is driven from a strategic perspective, forms part of a programme of transformational change, or is in response to an operational imperative, the delivery mechanism for change remains the same, and that is project management."

As project management practice grows, so has its literature (Meredith and Mantel, 2012). As stated earlier, project management has existed since before the days of the great pyramids. Yet, there is no consistent description and classification of the field, discipline, and profession.

For example, Prof. Karen Higgins (2009) of the Drucker School in a YouTube video discusses how she teaches project management as both a science that uses standard tools and processes, and an art that deals with motivating and leading teams of people towards a common goal. The results of a poll conducted on LinkedIn discussion forum dedicated for project managers highlight the confusion, frustration, and complexity in the project management community concerning the question of whether project management is a science or an art. Some stated that project management is an art; others stated that it is a science; and still others expressed that it is both a science and an art. Their opinion about whether project management is a science, an art, or both varies from one respondent to another. This confusion is reflected among members of the project management communities and others including institutions, students, academics, practitioners, librarians, book vendors, and publishers. For example, some institutions offer MSc in project management, others offer MBA in project management. Some institutions house the program in their engineering department, others house it in their Business department, and still others house it in their information system (IS) and information technology (IT) department. These practices are reflected in the way in which materials on the discipline is stocked and catalogued in libraries andbookstores, and categorized and classified by publishers. If all these constituencies are inconsistent in their description, categorization, and classification of the discipline, who should not be? In order to understand why there is this much inconsistency, one needs to put the topic in context. Therefore, the rest of the paper is divided into three sections. First, a brief history of project management is provided in order to contextualize the topic. Second, different perspectives on the topic are identified, analyzed, and synthesized. Third, the various perspectives are summarized and explained, and finally, suggestions offered for a more appropriate description and classification scheme.

A BRIEF HISTORY OF PROJECT MANAGEMENT

Humans have managed projects since the start of civilization. This section is aimed at putting the topic in context. This will enable us to better appreciate why there is much inconsistency among different members of the project management community and others concerning the description and classification of project management.The information in this section is primarily from Harvey Maylor (2010), Rory Burke (2009), and Dennis Lock (2007).All three authors show the progression of ideas in project management – from before the 1950s to the present. Maylor (2010) categorized the progression into three generations. In his typology, pre-1950s to 1980s is categorized as the first generation project management; the 1990s is the second generation; and the 2000s is the third generation. Similarly, Lock (2007) presents his progression from the prehistory period to the present day. The following structure models Lock's presentation.

Projects from prehistory to Victorian times (before 1900)

Although the history of project management is often associated with the construction of the massive Egyptian Pyramids and the Great Wall of China (Burke, 2009),

modern day project management is associated with Henry Gantt's development of the barchart (early 1900s), and project management techniques which were specifically developed for the military and aerospace projects of the 1950s and 1960s in America and Britain (Burke). According to Lock (2007), projects in ancient times left impressive legacies on our architectural and industrial culture. However, with the exception of a few notable philanthropic employers, concern for the welfare and safety of workers was generally lacking and many early project workers actually lost their lives through injuries, disease, and sheer physical exhaustion. People were often regarded as a cheap and expendable resource.

1900 to 1949

Furthermore, rapid industrialization and the demands of munitions production inworld war 1 saw the emergence of management scientists and industrial engineers such as Elton Mayor and Frederick Winslow Taylor, who studied people and productivity in factories (Kanigel, 1997). In the same time period, Henry Gantt who worked for Taylor, developed his now-famous charts which are still popular and used universally today. Henry Gantt (1861 – 1919) designed the barchart as a visual aid for planning and controlling his shipbuilding projects. In recognition,the planningbarcharts are often called after his name – Gantt charts (Burke, 2009).

1950 to 1969

Burke (2009) further stated that nearly all of the special project management techniques we use today were developed during the 1950s and 1960s by the US defence-aerospace industry (DoD and NASA). This includes program evaluation and review technique (PERT), earned value (EV), configuration management, value engineering, and work breakdown structures (WBS). The construction industry also made its contribution to the development of the critical path method (CPM) using network diagrams and resource smoothing. Shortly, the manufacturing industry came to recognize the benefits of these new methods. In 1967, International Project Management Association (IPMA) was founded as a networking group and since then has taken a greater coordinating role between 40 national professional bodies from around the world. According to Maylor (2010), during this period, the development of standards for PM processes in the US and Europe began to take hold. Leading the development of such standards have been the major professional associations - specifically the Project Management Institute (PMI) in the US and the Association for Project Management (APM) in the UK. The emergence of PM as a recognized profession with definable knowledge requirement to enter the profession began.

1970 to 1979

Further, Lock (2007) stated that this period saw rapid growth in information technology (IT). Industrial project management continued as before, but with more project management software available and wider recognition of the role. However, the spread of IT brought another, different kind of project manager on the scene. These were the IT project managers: people who had no project planning or scheduling experience and no interest or desire

to learn those methods. They possessed instead the technical and mental skills needed to lead teams developing IT project. Lock continued, these IT project managers were usually senior systems analysts, and one of their characteristics was their scarcity. High demand for their services led them to make frequent career jumps, moving rapidly up a generous salary scale.

1980 to 1989

Interest in project management continued to increase. However, project managers are far less dependent upon IT experts. They now had their own desktop computers that could run most project management software. That means they had to become computer literate. As a result, interest in project management as a formalized means to manage large-scale engineering and construction projects continued. Furthermore, Lock (2007) maintained that software that could run activity-on-arrow [AOA] networks became obsolete. All planners have since had to use activity-on-node [AON] precedence diagramming method (PDM) in their computers and adapt to the relatively small area of network visible on the small screen. However, processing times were cut dramatically, so that schedules could be up and running much faster for new projects. Schedules could now be updated almost immediately from the planner's own keyboard to cope with progress information and project changes, Lock postulates.

1990 to the present day

As the professional project management associations (PMI – PMBOK® Guide, 2008; APM – APM Body of Knowledge, 2006) publish their bodies of knowledge, and the role of standards became increasingly recognized in many industries and the profession as a whole, more work undertaken called projects go beyond engineering and construction. During this period, practically all software suppliers recognized the need to make their products compatible with Microsoft Windows. Microsoft also introduced Microsoft Project (MSP) into its Office suite of programs. The MSP is especially popular with students who appreciate its user-friendly features. However, many professionals continue to use programs at the high end of the software market, preferring their greater power, versatility, and adaptability for particular project conditions.

Project management is no longer considered as two separate branches (one for industrial projects and another for IT projects). Lock (2007) posits that there is wider and welcome acceptance that managing company changes as projects can bring faster and better results. However, Kerzner (2006) observed that the acceptance of project management has not been easy. Many executives are not willing to accept change and are inflexible when it comes to adapting to a different environment. He added that the project management approach requires a departure from the traditional business organizational form, which is basically vertical and which emphasizes a strong superior-subordinate relationship.Next, a variety of sources on the topic in question are identified and reviewed, the different perspectives of the authors on the question of whether project management is an art, a science, or both are analyzed, and then the different perspectives and viewpoints are synthesized.

Materials and Methods

Project management means different things to different people. One principal characteristic of projects is their novelty. Different types of projects (for example, civil engineering, petrochemical, construction, mining, drilling, manufacturing, IT/IS, and pure scientific research) require different application areas. Besides, their requirements are different and they face different sets of constraints. Nevertheless, project management has matured to a level where we should have a common description, categorization, and classification of the discipline. But that is not the case. For some, project management is an art; for others, it is a science; and for still others, it is both.

Meredith and Mantel (2012) cited different approaches to learning project management. Among them are behavioral, technical, and functional approaches. They, however, used a managerial perspective in their presentation. For Larson and Gray (2011), the project management process consists of technical and sociocultural dimensions. Larson's and Gray's model captures the spirit of the topic of this study. Therefore, the remainder of this section will structure the review into three subheadings for analysis and synthesis. The technical dimension is the science of project management. The sociocultural dimension is the art of project management. The third subheading is an integration of both dimensions (i.e., science and art).

Project Management as a Science (the technical dimension)

According to Larson and Gray (2011), between the two dimensions within the actual execution of project, the first is the technical side of the management process. This dimension consists of the formal, disciplined, purely logical parts of the process. They posit that the technical dimension includes planning, scheduling, and controlling projects. This means a clear scope statement should be written to link the project and customer and to facilitate planning and controlling the project. Erik Demeulemeestersnd Willy Herroelen (2002) project management basically involves the planning, scheduling, and control of project activities to achieve performance, cost, and time objectives for a given scope of work, while using resources efficiently and effectively. Clements and Gido (2012) state that the project scope defines what needs to be done [to complete the project]. It is all the work that must be done to produce all the project deliverables, satisfy the sponsor or customer that all the work and deliverables meet the requirements or acceptance criteria, and accomplish the project objective. The very definition of project management as "The application of knowledge, skills, tools, and techniques to project activities to meet project requirements" (PMI, 2008) emphasizes the science aspect of discipline. Project management is also defined as "The allocation, tracking, and utilization of resources to achieve a particular objective within a specified period of time" (Bliss, 2006). Again, the emphasis is on the science of the process.

Jessica Fraser (2011) asserts that a project must have definite start and a finish. That project scheduling has to manage the difference between the two points in time, thereby managing the duration of time between the start date and the completion date of the project. She further states that the project schedule helps the project manager, the project team, and all the stakeholders involved to know what needs to be done and by which resources at a specific point in time. For Demeulemeester and Herroelen (2002), scheduling involves the laying out of the actual activities of the project in the time order in which they have to be performed. Here, the actual resources needed at each stage in the project are calculated, along with the expected completion time of each of the activities.

Project management as an Art (the sociocultural dimension)

Larson and Gray (2011) delineated the second and opposing dimension within the actual execution of projects as the sociocultural dimension. They stated that in contrast to the orderly world of project planning, this dimension involves the much messier, often contradictory and paradoxical world of implementation. This side, they continued, centers on creating a temporary social system within which a larger organizational environment that combines the talents of a divergent set of professionals working to complete the project. In a nationwide survey sponsord by RHI consulting and conducted in 1999, 27 percent of chief information officers (CIOs) cited strong interpersonal skills as the single most important quality for reaching management levels. In this survey, advanced technical skills came in second, receiving 23 percent of the response (Nellenbach, 1999). The project manager is responsible for managing stakeholders expectations, motivate team members, negotiate for resources, manage up management relationships, and influence decisions concerning request for scope changes. All these require soft skills.

For Matt Klein (2006), the art of leading the people in the project is far more important than the science of the technical tools of the trade. This is supported by Kate Belzer (2001) who believed that project management is more art than science. She emphasized that a clear understanding and effective application of soft skills enhance the success of a project exponentially. She added that a project manager must communicate effectively, work within the organization's culture, motivate the team, manage stakeholder expectations, understand business objectives, solve problems effectively, and make clear and knowledgeable decisions. Obviously, she focused primarily on the role of the project manager. She paid less attention to the hard skills required in the role of the team members.

Project Management as Both Art and Science(the technical and sociocultural dimensions)

From the above information, it is clear that a successful project should be well trained in both the technical and sociocultural sides of managing projects. In this respect, both Larson and Gray (2011) and Meredith and Mantel (2012) presentations have something in common. They both recognize the importance of possessing both soft and hard skills in order to be an effective project manager.

However, there is a bit of difference in their approaches. Meredith and Mantel take on a more managerial perspective. This approach addresses project management from the perspective of what the project manager will encounter. Therefore, the role of the project manager is the main focus. Larson and Gray (2011) on the other hand, take on a more balanced approach between the role of the project manager and the project team members. This is reflected in their presentation of the two dimensions within the actual execution of projects. They call these dimensions the technical and sociocultural dimensions. Larson and Gray stated that some suggest that the technical dimension represents the "science" of project management while the sociocultural dimension represents the "art" of managing a project. To be successful, however, a manager must be a master of both.

In Larson and Gray, the technical dimension is the equivalent of process focus (technical) in Meredith and Mantel. In Larson and Gray, the sociocultural dimension is the equivalent of behavioral approach in Meredith and Mantel. Therefore, the technical dimension or the process focus is the science component of project management. The sociocultural dimension or the behavioral approach is the art component of managing projects. Again, they have these in common. In a LinkedIn survey in 2011, one of the respondents articulated an interesting position. He agreed with a majority of the respondents who expressed that project management is both art and science. However, he further stated that how much of a project is people-centric (art) is going to vary by project, by corporate culture, and by project team. He added that some projects will be more art, and others will be more science.

Michael Vinje and Michelle Burke (n.d.) agree that project management is both art and science. They stated that science aspects of project management include planning, estimating, measuring, and controlling the work. The art side of project management, they contend, includes leading, enabling, motivating, and communicating. Jayadev Menon (2010) put forth a passionate argument in favor of project management being an art. He stated that leadership is the quality that makes it all possible, is again an aspect of human creativity – one more reason to say that project management is an art. However, he also stated that the scientific nature of project management ensures that products or services created meet the technical and practical requirements, while the aesthetic aspects ensure that something unique, a thing of beauty, emerges from the efforts.

RESULTS, RECOMMENDATIONS, AND CONCLUSION

RESULTS

Projects are unique endeavors by nature. No two projects are exactly alike in all respects (commercial, administrative, or physical aspects). Projects are fraught with risks and uncertainty; they face different resource constraints, require different outcomes, and are performed in different environments. Considering the history of project management, it is not surprising why there is still inconsistent description, categorization, and classification of the discipline. Project management did not start as a business practice. It started as a technical practice with the defense and aerospace industries. Later, the construction,

engineering, manufacturing, and IT industries joined in. These constituencies have different requirements, different applications, and different approaches to project management. Therefore, how the discipline is described, categorized, and classified depends on their frame of reference, based on their context. Even in the late 1980s when project management software became popular, productivity did not match the growth in technology as quickly as one might have expected because managers became interested in the technology itself than in the work that it was intended to manage (Lock, 2007). The LinkedIn survey of 2011 on the question concerning whether project management is an art or a science reveals that majority of the respondents think project management is an art more than a science. These respondents are biased in favor of art because most of them are project managers. If the survey had involved more team members, perhaps, the result might have been different. In this case, a majority of the respondents would have expressed that project management is a science more than an art. The different constituents responses are influence and shaped by their experiences and roles they play in projects.

CONCLUSION
Project is both a science and an art. The question to be askedhowever, is therefore, a matter of the degree to which the practice is either a science or an art. The answer to this question depends on a number of factors: the role of the individual on the project, the experience of the people or personsconcerned, the context in which the project is carried out, the application area involved, and possibly the industry. Nevertheless, for most project managers, project management is an art; for most project team members, project management is a science. The project manager is more involved motivating and leading the project team toward a common goal. Nonetheless, good project managers must learn to balance their attention to both the technical and sociocultural aspects of managing projects. In this respect, project managers are cautioned against becoming preoccupied with the science – using software (planning, scheduling, and controlling) of project management. That is managing a project from a distance. On the other hand, project management are also cautioned against managing projects by the "seat of their pants," relying heavily on team dynamics and organizational politics to complete a project. It should be remembered that project management is not a one-dimensional construct. Almost all project management practices involve a blend of art and science.

RECOMMENDATIONS
There is a diversity of descriptions, categorizations, and classifications of project management. For some, project management is an art, for others, it is a science, and for still others, it is both an art and a science. Therefore, based on the various perspectives, this paper recommends that whether project management is described or classified as a science or an art should depend on the individual's or person's role or the learning emphasis in the specific context. If the role or learning focus primarily involves scoping, WBS construction, scheduling, resource allocation, budget development, status reporting, and risk management, then, project management should be

described or classified as a science. On the other hand, if the role or learning focus primarily involves, leadership, team motivation, negotiation, politics, and communicating with external stakeholders, then project management should be described or classified as an art. Besides, it should be realized that no project management context can be entirely technical or aesthetic. Almost all project management practices involve a blend of art and science.

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