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Project Management : Simplifying or Exacerbating

Sheheryar Mohsin Qureshi · Chang Wook Kang†

Department of Industrial and Management Engineering, Hanyang University

프로젝트를 위한 프로젝트 관리의 역할

셰헤르야 모신 쿠레쉬 · 강창욱†

한양대학교 산업경영공학과

The purpose of this research is to initiate discussion to simplify existing tools and methods for managing projects which make project management a harder job to perform and a tougher task to handle. Additionally, summarizing the definitions of “project” that have been found from reviewing the relevant literature, it deliberates on revising the duties and responsibilities of project manager and proposes performance expectancy triangle explaining a relationship among accountability, responsibility and authority – the *Tri-butes*. It sheds light on several factors critical to the success of projects. Finally, we propose a function indicating that customer demands or desires greatly affect project complexity.

Keywords : Project Complexity, Simplification, Project Manager, Project Management, Customer Needs or Desires

1. Introduction

Project management has now evolved into a “complete business process” and businesses are managed and regulated through projects [1]. Needless to mention the significance of projects when they need to be executed. They are run to ensure organization’s success i.e. organizations accomplishing projects goals, pleasing their clients and mitigating the risks associated with the interests of stakeholders are the “happy companies” and assure themselves that they are going to stay for a longer time in market with an increasing market share.

For projects to be successful, project management tools, techniques and methodologies are vital to be known. It is believed that every project, by any means, have always undergone these techniques though the subject became formalized in 1960s, not much time ago, with the help of new computing power [2]. We look at the term “project” as a recipe with several ingredients-elements that make up a project-found out from published literature. The idea that is being presented here is that every project actually has two core jobs to perform, whether it be construction of Egyptian Pyramids or launch of Microsoft Windows 8 operating system-firstly acquisition of thorough knowledge of project’s goals and objectives and secondly the awareness of project team members’ skills and skill levels. This “Two-point theory”, explained later, intends to simplify or reduce the complexity the subject has gained over the last few decades.

When a project is discussed, the critical success factors (CSFs) and the “hot topic” of project complexity also come along. For an increased probability of project success, it is essential to have better understanding and quantitative and systematic assessment of CSFs in order to select the appropriate methods to dealing with them [3]. However, still it is believed that the two factors that affect the most are time and cost. A project that is completed on time and within budget is said to be successful, yet even these conditions are not met

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† Corresponding Author : cwkang57@hanyang.ac.kr

sometimes [4]. Regarding the complexity, it is difficult when to declare a project "complex" and harder to have robust agreement of experts and researchers on this issue [5]. Calling a project complex or not, itself has become a complex matter. But for sure, when complexity arrives, it comes in various forms namely technical, environmental, organizational, social, etc. [6]. This study is inclined to catch researchers' attention towards a noble viewpoint that "management is about people and not about tools" [6] and due to this reason, a revision in duties and responsibilities of project manager and his selection criteria and the beginning of an era of simplification are necessitated. Moreover, a major factor that influences project complexity is presented and the relationship is expressed in the form of an exponential function.

2. Project and Project Management

2.1 What "Project" Should be Defined as?

Over years, the term "project" has been a buzzword for researchers, academicians and practitioners. Despite being defined in many ways and seen from different angles, it is noteworthy that the term gives rise to several other angles that need to be incorporated in the previous and current definitions. We try to identify the essential elements that constitute a project from some well-known definitions besides discussing them and strive to define the "project" in a more comprehensive fashion. Kerzner [7] defines the term "project" as :

"Any series of activities and tasks that :
- Have a specific objective to be completed within certain specifications
- Have defined start and end dates
- Have funding limits (if applicable)
- Consume human and nonhuman resources (i.e., money, people, equipment)
- Be multifunctional (i.e., cut across several functional lines)."

Analytically, this definition provides some necessary factors that finally make up a project that needs to be planned, executed and then monitored till it delivers its intended outcome with a committed quality. The important factors identified from the above definition are sequence, goal accomplishment, fulfilling standards, specific start and end points, budget, consumption of resources and being multifunctional. A project must comprise these fundamental elements in order to be recognized as a "project" and once recognized, it would now be managed. Managing projects, in this world of emulation, have become inevitable, even a single task that is a mere part of any process needs to be managed in a way that optimum outcome is achieved.

The Project Management Institute (PMI) [8] defines project as :

- "A temporary endeavor undertaken to create a unique product or service."

PMI considers the project "temporary endeavor." This may imply that an effort which is put to earn value in a project (or to achieve project's goal) will end as soon as the project reaches its maturity. Moreover, this effort should be transformed in creating a unique product or service, meaning that in addition to what Kerzner states, "temporary endeavor" and "creation of unique product or service" are two further identified factors.

Klastorin [9] speaks about project in the following manner :

- "A project can be viewed as a well-defined set of tasks or activities that must all be completed in order to meet the project's goals."

Similar to aforementioned definitions, Klastorin makes it mandatory that the tasks or activities that are considered important for achieving project's goal(s) have to be well-defined. Thus, a "well-defined activities set" is recognized as another addition.

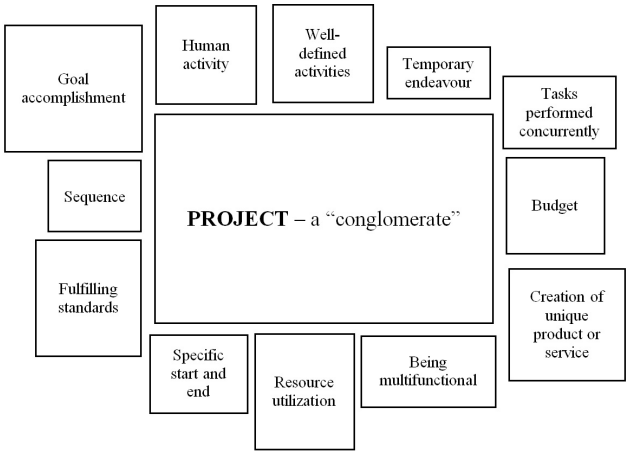
Association for Project Management (APM), UK [10] defines "Project" as :

- "A unique, transient endeavor undertaken to achieve planned objectives."

Similar to an extent what already has been cited regarding the definition of PMI, APM also considers a project to be a "transient endeavor." Many other definitions have come under discussion of researchers who have explained the exact meaning of project and how to manage it, that is the "Project Management." Reiss [11] defines the term as under:

- "A project is a human activity that achieves a clear objective against a time scale."

Interestingly, the author goes on claiming that if one could find a one-line statement that neatly defined "Project", he or she could be on his or her way to stardom in the field of project management [11]. Reiss considers project to be a "human activity", so our list goes on further. Hall [2] indicates another dimension to project's nature that a typical project contains "many tasks that are performed concurrently." This becomes very obvious that a project has been viewed from different angles. <Figure 1> shows how the research that has been carried out for defining project can be compiled for a better summary and illustration. The figure depicts the "recipe with ingredients" constituting a project.



<Figure 1> Project Recipe Showing all the Ingredients that Make up a "Project"

Our analytical remarks are in line with the definition of ISO 21500:2012 [12] which says :

- "A project is a unique set of processes consisting of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective."

The proposed <Figure 1> asserts that

- "A typical project, pertaining to any industry or sector, is nothing but a mixture of several varying factors; a conglomerate of numerous elements, interconnected to perform functions to ultimately satisfy the client whose expectations and needs are the project's goals."

Since a conglomerate is composed of heterogeneous elements, the ingredients of project shown in boxes are of different sizes. This box size refers to the contribution of each ingredient to the project in general, but is considered to be subjective. Sometimes this variation (among factors or ingredients) is due to the nature of the project and at times it is influenced by the complexity involved in a particular project which often prevents the team to achieve projects goals leading to the trade-offs. Both of these elements are discussed later in this paper.

2.2 Project Management and Project Manager

"The subject of management is renowned for its addiction to fads and fashions. Project management is no exception" [5]. Of course, the headache of managing tasks is a complicated and time-consuming assignment and it becomes more tactical when dealing with the teams of humans. Management, besides its traditional definition of planning, organizing, staffing, controlling and directing, has undergone many strategic forms. Methods to manage people and technology have evolved and matured so rapidly that it is difficult to grip every aspect of the subject. If project is a set of interconnected activities, it cannot be left alone to run independently and search for an end on its own. People will put their every effort to initiate, run and end the project successfully so as to deliver the objectives related to it as well as ensuring the client's satisfaction. So, if we analyze, who are doing it and for whom this all is being done, we land at the same result i.e. "people."

Kerzner [7] defines project management as :

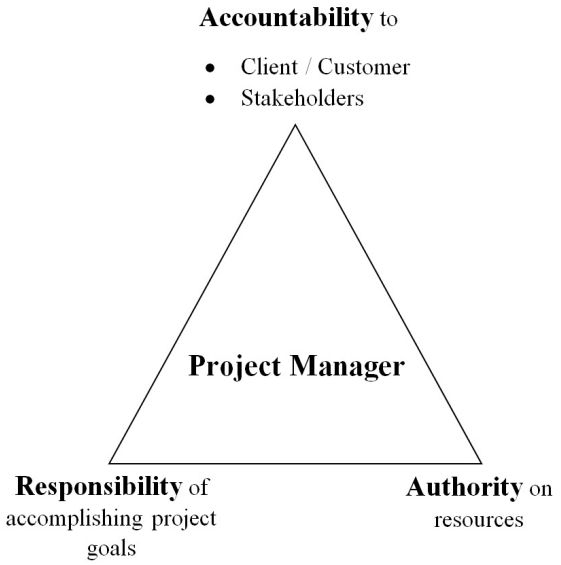
- "Project management is the planning, organizing, directing and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. Furthermore, project management utilizes the systems approach to management by having functional personnel assigned to a specific project."

APM [10] defines project management as :

- "The application of processes, methods, knowledge, skills and experience to achieve the project objectives."

Project management is a subject of interest for those who are, in any way, engaged in some responsibility, accountability and have some authority on resources to perform an assignment. If human relationship with these three parameters is further elaborated, it is observed that every human

has to fulfill some responsibility while being accountable to some authority provided he has some resources and is authorized to consume them according to the implied needs. If such a task is submitted on time with an organized approach, it may not be inappropriate to say that project management philosophy and rationale are applied. A project manager is viewed as the most responsible character on whose shoulders lies the success or failure of project, but what attributes are related to expecting optimum performance from him? <Figure 2> is being proposed in context with this idea. The figure illustrates the linkage among these three attributes -*the Tri-butes*- which are found to be the most influencing factors on project manager's performance.

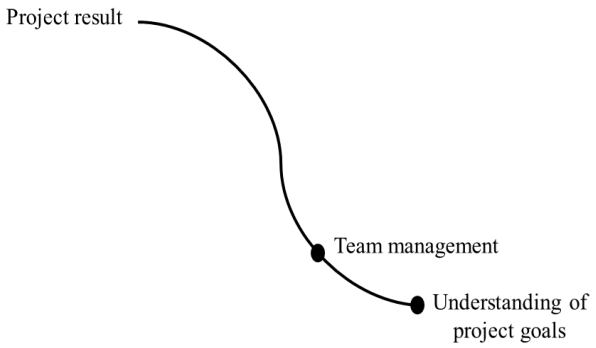


<Figure 2> Performance Expectancy Triangle – the Tri-butes

This proposal goes in agreement with the latest work by [13] who worked on complexity in Engineering R&D projects in their master's degree thesis. Although they did not formally categorize the situations project managers face into the categories depicted in <Figure 2>, the mentioned situations in their thesis can easily be transformed into the three discussed categories.

Managing projects requires two basic elements :

- Knowledge of the end result i.e. the project's goals and the factors affecting it.
- Knowledge of skills and skill levels of project team members; right man for the right task-team management.



<Figure 3> Two-Point Theory

These two points or "Two-point Theory" as depicted in <Figure 3> can be regarded as the summary of the thought being presented in this paper. A project manager carries out different tasks and fulfills many responsibilities at the same time. "He is a businessman, a psychologist, an accountant, a technician, part designer, part nuts-and-bolts. A truly rare combination of skills" [14]. Obviously, a tough criterion, therefore, the statement points to either a project manager who must handle these tasks simultaneously or a project manager who once gets engaged in managing projects eventually be doing all these jobs concurrently, whether or not he is prepared. However, in managing projects, a good choice is to manage people, not the technology. In this era, when we see that project complexity is increased due to various technological issues, technology management has become a part of project management and so this viewpoint seems impractical. But if a project manager is made to wear this hat too, would this justify spending time in building an efficient project team to achieve the target? While managing projects, a clear and in-depth understanding of project's goals and the efficient use of manpower should be considered as vital.

There may be other tasks like trading with line managers, keeping a check on budget overruns and delays and deciding to go for a trade-off, but these should not be considered as a part of project manager's primary job. Selection and formalization of team members have to be appropriate at first and a versatile team must be formed for assisting project manager. In this era of increasing project complexity, time has come when project manager's job description should be revised, his duties and responsibilities must be cut down rather than adding more responsibilities to it since treating humans like machines have never been a wise idea.

However, this goes against the findings of [15] who carries

out a study on the impact of HRM on project success. Their results concur with [16]. Belout and Gauvreau [15] state

- "It is useful to recall that the measurement of the impact of personnel management on the effectiveness of organizations and projects is currently the subject of numerous studies. Among scholars' general conclusions, it is reported that the lack of consensus on a common and coherent definition of effectiveness in HRM has fuelled an argument over the very definition of so-called effective personnel management."

Consequently, this topic needs to be further investigated by conceptual and statistical studies. The viewpoint presented in this paper supplements to the significance of revising the criterion for selecting project manager, project team and team management-who must more appropriately be known as "project leader." <Figure 3> may serve as a fundamental helping tool to revise these criteria.

3. Project Success and Failure

No film is shot for being the biggest flop on the box office. No software is designed with intent to damage your operating system or crash hardware. No airline ever wants passengers to wait longer in the airport lounges. No team will ever try to lengthen the new product development process. Projects are run for being successful. They are never controlled and monitored for being directed towards failure. Projects, their execution and "happy endings" are major concerns for every project actor.

3.1 Project success

Extensive research can be found on determining critical success factors (CSFs) for projects. A very thorough work has been done by [3] who present the CSFs identified in the previous research and then carry out their study for manufacturing companies in Malaysia. They conclude that project success is multidimensional. A comprehensive review results in identifying numerous CSFs, for e.g. but is there any measure of probability of running the project successfully keeping the lengthy list of CSFs in mind? If we say that researchers have come up with certain criteria for project success, have we ever thought how to meet the criteria with ease, comfort and convenience? Is it due to increasing project complexity? Several questions arise whenever overlong lists of project manager duties and responsibilities and CSFs for project success are viewed. Since project management growth is remarkable for the last few decades, we may expect that this rapid growth has invited some prominent "add-ons" thereby increasing the CSFs for projects. But this could have been resulted the other way too.

Keeping efforts in line with CSFs is the way to prevent failures. Atkinson [17] debates over the issue that had been of major concerns to many-if every criterion is known and adequate tools, techniques and methodologies are available, then why do projects still fail? He finally proposes "The Square Route" to replace the conventional "Iron Triangle" indicating that the information system and benefits to organization and stakeholder community must also be taken into account [17]. This is one of the angles that have been discussed. Furthermore, note that "being on time and on budget is not necessarily success" [1]. Perhaps, or for sure, there are some other issues that need to be addressed in a more professional fashion. One of the issues is *simplification*. Simplification of the understanding of project, use of appropriate tool, project management process, duties and responsibilities and selection criteria of project manager should also be considered. In this context, <Figure 3> proposes a simplified but comprehensive view of project manager's role and indicates the essential factors to expect satisfactory performance from project manager.

3.2 Project failure

Project failed because we did not have good project manager? Or project failed because of unawareness of certain unpredictable factors? Or project failed because of the scarcity of required resources? Or project failed because CSFs were not met? We opine that projects fail because of two main reasons: first the goals of project were not understood well; and second project team could not deliver and perform satisfactorily i.e. the team was inefficient. Former is also shown by [18] that benefit to the end-user (accomplishment of one of the project's goals) is the most important dimension that must be taken care of. Whereas [19] conduct the research on project team factors that influence capital project outcomes cost, schedule and operability and proposes a model in which a number of team design factors identified from the various streams of team literature are indicated. This

seems in agreement to the idea presented here that project team and its management take a greater responsibility of running and ending a project successfully. But the criteria that have been defined from various literature published on the topic depict a very tight set of conditions for project manager and lengthy lists of attributes that affect quality and success of projects. Like what we mentioned in the previous sections that simplification is now the key to handle project management successfully, the criteria for success and failure of projects should also be revised.

One factor, among many, that is discussed in detail by [20] is the significance of project planning for preventing project failure. Discussing a fact from PMI Guide to the Project Management Body of Knowledge (PMBOK), [20] state "although planning does not guarantee project success, lack of planning will probably guarantee failure" since planning reduces uncertainty and increases the probability of project success. As mentioned earlier, project team has to be efficient in every aspect; this is one of the tasks for the team to come up with robust project planning so that likelihood of project failure may significantly be reduced.

3.3 Effect of Nature of Projects on Success and Failure

By nature of project, we correspond to the industrial sector to which it belongs. It is obvious that a project of developing computer software is entirely different from a project of designing a vehicle. For e.g. [21] propose a method of consciousness structure analysis which is only applicable to R&D project evaluation. Kim [22] presents an interesting case study of ERP implementation project in the manufacturing industry by studying and analyzing a small and medium sized manufacturing company. We also come across an invaluable study which investigates and analyzes the information system of nuclear power plant construction project, normally referred to as Social Overhead Capital (SOC) projects [23].

Nature of a project is also related to the ultimate goal of project running in the same industry. For instance, in construction of building, several subprojects will exist. Although these subprojects will be interrelated, the goal of every such subproject will be different. For instance, the goal of designing sewerage system will not be the same as the goal of designing vehicle parking area though both are mandatory in the building design and the project will not be completed unless these subprojects are over [24]. talk about critical success processes (CSPs) and concludes that the difference exists among industries while determining CSPs [25]. mention the CSFs for effective implementation of ISO 9001 in small and medium enterprise (SME) service companies whereas [26] investigate for CSFs for World Bank projects and also present the summary of research on CSFs for international development projects. Lee [27] and Brun [28] come up with CSFs for Six Sigma implementation or key success characteristics for a good Six Sigma project. Fan [29] provides an overview of the CSFs for IT project management. Thus it is obvious that nature of project does affect the way a project should be managed and run. Similarly, the criteria of project's success will also be different depending upon the nature of project and project's ultimate goals and objectives will also demand a shift in the style of executing projects. Due to such diversification, numerous CSFs are "industry specific" and directly influence success of project.

Analyses have determined plentiful CSFs in order to end the project successfully. However, nature of projects, as defined in this section earlier, is a significant factor that is responsible for such a long list of studies of CSFs, which invites more complexity in handling projects and sometimes leads to failure. This study encourages to analyze whether tight success criteria and sporadic addition in responsibilities of project manager have been the causes of failure of projects or not.

4. Project Complexity

World is on its way to huge advancements in technology and various applications are busy in making human life simpler and worry-free, but design and manufacture of these applications are themselves quite complex. Complexity has now become a major concern to be addressed. Many have attempted to incorporate the aspect of complexity and project complexity in their work. Most of the review studies focus on the complexity, complex system, complexity with respect to project and complexity with respect to project management. Complexity is that property of a model which makes it difficult to formulate its overall behaviour in a given language, even when given reasonably complete information about its atomic components and their inter-relations [30]. [31] deeply review the concept of complexity and project complexity and propose the definition of project complexity as

"Project complexity is the property of a project which makes it difficult to understand, foresee and keep under control its overall behaviour, even when given reasonably complete information about the project system. Its drivers are factors related to project size, project variety, project interdependence and project context."

In this context, we consider some similar terms to be of the same meaning and similar definition. All these terms are defined in the domain of project complexity. Concepts of "product complexity", "technological novelty", "technical risk", "technical uncertainty" and "project scope" have been used interchangeably to represent similar factors [32]. It is already discussed that the current picture of project management should be simplified now, means to make projects clear and understandable for project team so that execution can be more convenient. In the light of the above definition, complexity makes the project difficult to 1) understand, 2) foresee and 3) keep under control; the best methodology would be the selection of strategy that eventually makes the project simpler. This goes in agreement with [5] who gives an idea of not using complex tools even to handle a complex system and opines that more traditional methods may continue to be appropriate because humans live on a scale where those methods work well.

4.1 Is Complexity Inescapable?

A notable development in the field of project management is the establishment of College of Complex Project Managers (CCPM) and introduction of their competency standard for complex project managers (CSCPM). The objective behind the standard is to make project managers capable of dealing with complex projects effectively. Since this paper aims to find ways to simplify project management activities, a question that always arises is that how can complexity be avoided?

The traditional approach has been towards dealing with complex situations or addressing complexity to achieve desired (or required) results. But what if efforts are made, instead of addressing complexity, to reduce complexity i.e. to simplify a given situation? This notion is all about coming back to basics. Studies now must be conducted to find ways for simplifying project planning, controlling and monitoring instead of investing much to addressing the complex issues. This would be another way to tackle complexity in projects. However, beginning of such an era demands thorough research and sufficient time to study the projects from the mentioned perspective. But such practice has to be taken into account now and must be encouraged.

To strengthen this argument of encouraging simplification besides managing project complexity, we refer to a study based on face-to-face conversations with more than 1,500 chief executive officers (CEOs) worldwide. This study is the fourth edition of biennial Global CEO Study series, led by the IBM Institute for Business Value and IBM Strategy and Change. To better understand the challenges and goals of today's CEOs, the research was carried out by meeting face-to-face with the largest-known sample of these senior executives that is 1,541 CEOs, general managers and senior public sector leaders, who represent different sizes of organizations in 60 countries and 33 industries. The report says:

- "Today's complexity is only expected to rise, and more than half of CEOs doubt their ability to manage it. Seventy- nine percent of CEOs anticipate even greater complexity ahead[33]."

We have already explained that complexity is something that needs much attention and has to be tackled wisely. The above statement from the report in discussion supports this viewpoint, but again what should be done to deal with project complexity?.

In the same report based on the interviews of CEOs, it is mentioned that

- "In response, many CEOs expressed the need to simplify their operating strategies in order to better manage complexity. Standouts were 30 percent more likely than others to be focused on simplification. 'Simplifying our products and processes is our response to the extended complexity in the world' "-one Banking CEO in the Netherlands commented [33].

Furthermore, the report puts forward some recommendations in the same context to deal with complexity. Following are a few of several of them :

- *Simplify whenever possible*
  Simplify interactions with customers. Be ultra-easy for customers to do business with. Eliminate unnecessary complexity so that customer-related policies and procedures, and access to products and services, are effortless from the customer's point of view. Keep the focus on being intuitive.

- *Simplify products and services by masking complexity.* Deliver rich functionality to customers through simple interfaces. Provide deeply valuable products and services that are easy for end users despite the necessary and desirable underlying complexity. Understand which features customers want to influence and when they prefer not to have to make choices.

- *Simplify for the organization and partners.* Be absolutely clear in communicating organizational priorities and what is expected from whom. Eliminate bureaucracy and implement lean processes. Integrate functions to create empowered teams and enable faster decisions.
  Source : [33]

If interested, one may directly refer to this report for more information on the subject.

4.2 What Invites Complexity?

Every single attempt that is put forward to achieve project's success is to satisfy client and stakeholders. The dominant factor in making projects complex is the "customer needs." A long debate and buzzword-customer needs, with respect to project management-cannot be summarized easily. This factor has not been sufficiently examined as far as project management is concerned. The connection of customer needs and requirements with project complexity has been the most neglected relationship. However, it should be stated that this phenomenon is ever-evolving.

From automobiles to space shuttles, calculators to tablet computers and Graham Bell's telephone to smart phones today are all "minor" examples of shift in customer needs which are increasing with the fastest pace ever. The product life cycles are being shortened in the race to fulfill and match consumers' desires. Every feature that is added to an existing product (considering product launch or manufacturing a typical project) makes the product's design and manufacture complex. In order to satisfy increasing or changing customer needs or demands, projects are becoming complex. As mentioned earlier, understanding the goals of the project should be a major concern, the same knowledge will also help to please every stakeholder. Today, projects are meant to deliver value rather than just being completed on time.

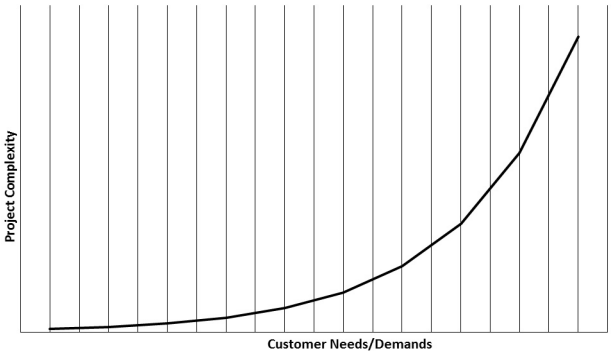
While the increase in customer needs affecting complexity of projects pertaining to any kind of project is evident from published literature, it is established that achieving those customer needs and delivering the required quality is also influenced by complexity or variability of customer needs as acknowledged by [34, 35].

Excessive increase and change in the needs of customer is a clear evidence of competition among business entities. Every move from any business unit has now become a challenge for the other. Much time and money are being spent on strategic planning to have bigger market share. Thus customer needs seem to be directly related to the project complexity rather it is suggested that project complexity rises exponentially when customer needs or demands change or tend to increase. Therefore, for the sake of understanding, based on the previously published literature exploring the relationship between different kinds of projects and complexity of customer needs or desires or satisfaction [36~41], we propose,

$$Project\ complexity = f\ (customer\ needs/demands)$$

Or mathematically,

$$y = f(x) = e^{x}$$



<Figure 4> Proposed Relationship between Project Complexity and Customer Needs/Demands

The propoed relationship as depicted in <Figure 4> indicates that to control or reduce project complexity, customer needs must be taken into account. It is possible that proper "customer education" would be helpful in changing the trend shown. Another related debate is regarding defining the difference between "needs" and "wants or demands or desires" since it is always believed that only a thin line separates the two. Moreover, question like "Are the new marketing strategies transforming customer wants into needs which eventually initiates complex projects and intense competition?" has to be answered, but this should be left for social scientists to explain and falls out of the scope of this analysis.

5. Conclusion

The study revolves around important entities that constitute a project and conventional project management model. Various related topics have been brought under question and suggestive work is put forward. For instance, the study summarizes numerous views resulted from literature review regarding the terms “project” and “project management” and proposes definition for “project” considering it a combination of heterogeneous elements-a conglomerate. Simply stating the basic concept of project management, it is clarified that “performance expectancy triangle” could be a better relationship among the three determined attributes, namely responsibility, authority and accountability. Keeping in view the role of project manager in this scenario, it is observed that the selection criteria as well as defined duties and responsibilities of project manager seem idealistic and a revision is inevitable. It becomes obvious to discuss the significance of CSFs and dig out the causes of failures of projects once the debate on defining project and project management has begun. The analysis demands to revise the criteria of success and failures of projects by proposing “two-point theory” since the changes in technology and customer demands have affected the project management greatly.

A viewpoint is upheld that since management is an art, it should be made simpler to ensure its smooth practice. It is suggested to reconsider the element of complexity in projects that has troubled many heads as it is one of the major factors that affects project success. Analysis indicates a prominent but neglected factor responsible for making projects complex-customer needs/demands-and proposes a relationship between the two. A brief but notable discussion is carried out on the subject of project management and it is concluded that to look into the matter of simplifying the process as well as the fundamentals that establish project management practices. Perhaps, the answer to the question “are we simplifying or exacerbating project management?” lies in the beginning of era of simplification. Further research should be extended in this direction for executing project management processes more comfortably so that project success is ensured in a better fashion.

References

[1] Harold Kerzner, F.P.S., *Value-Driven Project Management*, John Wiley and Sons, Inc. : New York, 2009, p 8-34.

[2] HALL, N.G., Project Management : Recent Developments and Research Opportunities. *Journal of Systems Science and Systems Engineering*, 2012, Vol. 21, No. 2, p 129-143.

[3] Chan, W.K. and S.Z., Yudi Fernando, Critical factors influencing the project success amongst manufacturing companies in Malaysia. *African Journal of Business Management*, 2009, Vol. 3, No. 1, p 16-27.

[4] Kim, J.Y., Kang, C.W., and Hwang, I.K., A practical approach to project scheduling : considering the potential quality loss cost in the time-cost tradeoff problem. *International Journal of Project Management*, 2011, Vol. 30, No. 2, p 264-272.

[5] Stephen Jonathan Whitty, H.M., And then came Complex Project Management (revised). *International Journal of Project Management*, 2009, Vol. 27, No. 3, p 304-310.

[6] Johns, T.G. *The art of Project Management and Complexity*. in *PMI Global Conference Proceedings*, 2008, Denver, Colorado.

[7] Kerzner, H., in *Project Management A Systems Approach to Planning, Scheduling, and Controlling*, 2001, John Wiley and Sons, Inc. : New York, p 2-3.

[8] *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*. 2000, Newtown Square, Pennsylvania : Project Management Institute (PMI), Inc.

[9] Klastorin, T., in *PROJECT MNAGEMENT Tools and Trade-offs*. 2004, John Wiley and Sons, Inc. : New York, p 3.

[10] (APM), A.f.P.M., Available from : http://www.apm.org.uk/content/project.

[11] Reiss, G., in *Project Management Demystified*, 1995, E&FN Spon : London, p 11.

[12] Anton Zandhuis, R.S., *ISO 21500 : Guidance on project management-A Pocket Guide*, 2013, Zaltbommel, Netherlands : Van Haren Publishing.

[13] Pigagaite, G. and Silva, P.P., Complexity in Engineering R&D Projects [master’s thesis] in Department of Production and Quality Engineering. [Trondheim, Norway], Norwegian University of Science and Technology; 2013.

[14] Barber, E., Benchmarking the management of projects : a review of current thinking. *International Journal of Project Management*, 2004, Vol. 22, No. 4, p 301-307.

[15] Adnane Belout, C.G., Factors influencing project success : the impact of human resource management. *International Journal of Project Management*, 2004, Vol.

22, No. 1, p 1-11.

[16] Jeffrey, K. and Pinto, J.E.P., Variations in critical success factors over the stages in the project life cycle. *Journal of Management*, 1988, Vol. 14, No. 1, p 5-18.

[17] Atkinson, R., Project management : cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 1999, Vol. 17, No. 6, p 337-342.

[18] Stan Lipovetsky, A.T., Dov Dvir, and Aaron Shenhar, The relative importance of project success dimensions. *R&D Management*, 1997, Vol. 27, No. 2, p 97-106.

[19] Christina Scott-Young, D.S., Project success and project team management : Evidence from capital projects in the process industries. *Journal of Operations Management*, 2008, Vol. 26, p 749-766.

[20] Dov Dvir, T.R., Aaron J. Shenhar, An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management*, 2003, Vol. 21, No. 2, p 89-95.

[21] Kim, S.-H. and Kim, J.J., Analysis of Consciousness Structure for R&D Project Evaluation. *Journal of the Society of Korea Industrial and Systems Engineering*, 2002, Vol. 25, No. 4, p 61-68.

[22] Kim, J.-T., A Case Study on the Construction e-Collaboration Process Control System of Middle and Small Manufacturing Industry. *Journal of the Society of Korea Industrial and Systems Engineering*, 2009, Vol. 32, No. 2, p. 13-20.

[23] Yoon, E.S. and Lee, H.G., Development of an Information System for SOC Projects. *Journal of the Society of Korea Industrial and Systems Engineering*, 2003, Vol. 26, No. 2, p 46-54.

[24] Ofer Zwikael, S.G., From Critical Success Factors to Critical Success Processes. *International Journal of Production Research*, 2012, Vol. 44, No. 17, p 3433-3449.

[25] Evangelos L. Psomas, C.V.F., and Dimitrios P. Kafetzopoulos, Critical factors for effective implementation of ISO 9001 in SME service companies. *Managing Service Quality*, 2010, Vol. 20, No. 5, p 440-457.

[26] Ika, L.A., Diallo, A., and Thuillier, D., Critical success factors for World Bank projects: An empirical investigation. *International Journal of Project Management*, 2012, Vol. 30, No. 1, p 105-116.

[27] Lee, D.K., The Tendency and Implementation of Six Sigma. *Journal of the Society of Korea Industrial and Systems Engineering*, 2002, Vol. 25, No. 1, p 29-34.

[28] Brun, A., Critical success factors of Six Sigma implementations in Italian companies. *International Journal of Production Economics*, 2011, Vol. 131, No. 1, p 158-164.

[29] Fan, D., *Analysis of Critical Success Factors in IT Project Management*, in *2nd International Conference on Industrial and Information Systems*, 2010, IEEE : Tianjin, China, p 487-490.

[30] Edmonds, B., Syntactic Measures of Complexity [dissertation] in *Department of Philosophy*. [Manchester, UK] : University of Manchester, 1999.

[31] Ludovic-Alexandre Vidal, F.M., *Understanding project complexity : implications on project management,* Kybernetes, 2008, Vol. 37, No. 8, p 1094-1110.

[32] Lebcir, M., *A framework for project complexity in new product development (NPD) projects*, 2006.

[33] Berman, S., *Capitalizing on Complexity*, in *IBM Global Business Services, Somers, USA*. 2010.

[34] Rafiq, M. and Ahmed, P.K., A contingency model for empowering customer-contact services employees. *Management decision*, 1998, Vol. 36, No. 10, p 686-693.

[35] Rafiq, M. and Ahmed, P.K., A customer-oriented framework for empowering service employees. *Journal of Services Marketing*, 1998, Vol. 12, No. 5, p 379-396.

[36] Lin, X. and Germain, R., Antecedents to Customer Involvement in Product Development : Comparing US and Chinese Firms. *European Management Journal*, 2004, Vol. 22, No. 2, p. 244-255.

[37] Kaumba, J., *Customer-perceived value : principles for the formulation of a policy framework to regulate the project management profession in construction in Botswana*, in *Built Environment and Information Technology*, 2012, University of Pretoria : South Africa.

[38] Al-Kaabi, M., Improving project management planning and control in service operations environment [dissertation]. [Leicester, UK] : De Montfort University, 2011.

[39] Gebauer, H., Paiola, M., and Edvardsson, B., Service business development in small and medium capital goods manufacturing companies. *Managing Service Quality*, 2010, Vol. 20, No. 2, p 123-139.

[40] Buzacott, J.A., Service system structure. *International Journal of Production Economics*, 2000, Vol. 68, No. 1, p 15-27.

[41] Crespin-Mazet, F. and Portier, P., The reluctance of construction purchasers towards project partnering. *Journal of Purchasing and Supply Management*, 2010, Vol. 16, No. 4, p 230-238.