

# Construction Projects are generally highly complex and usually present a difficult series of challenges to those who manage them.

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**Abstract:** This paper examined the key challenges that are being encountered by the construction industry and the construction project managers. In addition, the key skills that are necessary for the contemporary construction project managers have been highlighted in the paper as well. Construction projects are known for being complex and unique in nature. In order to be able to manage the uncertainty and risks involved in the projects, effective project management skills are required. The paper concluded that the leadership, communication, team work, problem solving skills are especially important for effective management of the project and to become an effective construction project manager.

**Keywords:** Construction project, Project characteristic, complex, project managers, Challenges, leadership, problem solving, and team work.

## Chapter One:

**1.1 Introduction:** Construction industry has become highly complex due to many reasons including the need for meeting the requirements of the clients involved in the construction project in an efficient manner. Wood [1] says the construction projects have often been referred for being highly complex however there is no specific explanation of definition that can be provided for the complexity in the construction industry projects. Considering the historic performance of the construction industry, the project success in terms of the overall costs and run over time, the quality of the work has been considered to be highly poor. Often the poor performance in the construction projects has been attributed to the design and construction process being highly complex. Complexity has been often used as a common term when discussing about the construction projects.

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Since the construction projects are made up interconnecting parts and parties, complexity is very common. Mills [2] opined that construction industry is highly dynamics and involves risks and challenges that affect the reputation of the construction companies. In the work carried out by [3] it was found that construction industry faces challenges and problems everywhere. The nature of the construction industry attracts problems due to specific requirements.

Construction industry and the projects have been facing many problems. Day [4] pointed out to the

slow growth that was being by the construction market and the rapid recovery that is being made by the construction market. However, many construction companies have not been able to find a successful place in the market and finding it difficult to be successful. It was determined that construction companies and projects have been facing the issues like undercapitalisation. The author highlighted that the operating money is vital for the success of the projects. Often the capital required for completing the construction project gets underestimated and project companies can tend to go into the panic mode due to the unavailability of the cash. Construction projects to be successful needs good paying clients as poor paying clients can cause many problems in the industry. The success of the construction project will depend on the understanding of the cash issues and the manpower. The author insisted that construction companies should not underestimate the cash flow and overestimate the capabilities.

Sherratt and Farrell [5] says the construction project often face many challenges especially associated with the people. The construction project managers often face multitude of challenges and problems through the different phases of construction projects. In this report the researcher will be focusing on examining the key challenges that are involved in the construction project and the challenges that are faced by the people who are managing the construction projects. In addition, the report highlights the skills that are necessary for being successful contemporary construction project manager.

### **1.2 Brief history of project management:**

In middle of 18th century, categories of project separation started by English Engineer. The division was organizationally and contractually. Again in the middle of 19th to middle of 20th century, the building construction market was enlarged in terms of scope and variety of work

like - dams, building, and tunnels. In 1940, the actual implementation of project management was done in Manhattan project. [6, p. 5]

### **1.3 Aim of this paper:**

To demonstrate that, the construction projects are not impossible to finish successfully within budget and stipulated time with the successful application of project management recipe's.

### **1.4 Objectives of the paper:**

To complete the project from its contract signing to handing over through proper planning and implementation according to its schedules including all quality norms using necessary competencies and key skills of project manager as well as implementation of project management.

## **Chapter Two:**

Key challenges involved in the construction project

### **2.1 Characteristics of projects:**

If we assume that, project is a house, then Project management is key of the house. With this key, it is the only way to enter into the house with safes and secured. All projects characters are different, but the basis project management techniques are almost same for different projects.

As per Walker (2007), a strong designed organization structure is necessary to make effective delivery of a project.

To get the successful result of completion and proper delivery, a designated approach is to be required. Project management is a medium to achieve the projection to reality. Planning is an important part of project management. Realistic plan is the driver of project management.

*'We never seem to have time to plan our projects, but we always have to time to do them twice.'* [7, p. 4]

During tendering or awarding time, though there is scope matrix, but eventually this is very difficult to understand the project behaviour. The following different characteristics are observed in project.

### 1. Uncertainty-

**Time:** - start and finish time is one of major part of project. But major case of project we are not able to finish within the budget. In case of UK approximately 50% projects are in within the time framed completion.

**Budget:** - Budget is also one of the key part of project. It is very difficult to complete a project within approved budget. Client demand (not considered in execution budget) is one of main reason of budget increasing.

**Risk:** - Some of external risk (like underground constraints, change of climate, change of govt. health and safety policy etc.) is main factor to delay the project delivery.

**Labour union:** - some time labour strike or increasing of labour rate, is one factor of project delay.

**Technological:** - Upgraded technology always cost oriented and application of the same may be budget of project can be increased.

### 2. Quality Management: -

**Field Quality Plan:** - during project starting, detailed review of FQP is very important. Sometime client amends the FQP and execution of project schedule extended unexpectedly.

**Manufacturing Quality Plan:** - Sometime client amend the FQP and execution of project schedule extended unexpectedly.

### 3. Design Engineering: -

Improper Design & Engineering some time play the major factor of delay project delivery.

### 4. Vendors factor: -

In every project, vendors/ contractors play the key role for completion in time.

### 5. Political pressure: -

Sometime unexpected political pressure may be the reason of delay for Completion of the project.

## 2.2. Key challenges involved in the construction project

Projects managers have a highly complex job of balancing the elements that are involved in the complex project. Construction project like any other projects are associated with challenges. Some of the most common challenges that are encountered in the construction project are as follows [7, p. 4]

- Having an undefined goal is always a challenge in a construction project. Lack of clear and defined goals can lead to the entire project and the project team to suffer. A project cannot succeed in lack of support from the management or having an undefined goal. It is necessary to have the goals clearly communicated to ensure success of the project.
- A construction project required skilled people to contribute towards the project success. It is important for the companies to determine the skills and competencies that are necessary in the workers to be able to work in the project team. Lack of skills affects the quality of the overall work delivered by the workers. Often construction projects encounter lack of accountability wherein the team members fail to take the responsibility of mistakes and success in the construction projects.
- Poor communication has always been a challenge in the construction project as for the success of the project the team

needs to be communicated by the goals and needs to get required directions from the management. [8]

According to the article focused on the construction industry challenges in the year 2016 [9], it was highlighted that the economic slowdown also affected the growth in the construction industry however the industry has started to recover slowly and this growth can be expected to be continuous. It was important for the construction companies to determine the potential challenges that can be encountered in the future and address these issues in advance to ensure that the business is growing constantly. Supporting the data given by [10] monetary issues have been once again attributed as the biggest issue in the construction projects. One of them major reasons for any construction project to get stalled is the lack of sufficient funding. For any project presence of sufficient capital is critical. It is often important for the companies to be cautious of the undercapitalisation as it can lead to unforeseen problems that make cause them to take bad decisions. Another challenge that is affecting the construction projects has been the need for coping with the weather conditions. The companies cannot be made responsible for adverse weather conditions, especially if the project is being carried out in areas with prolonged snows and heavy rains. These weather conditions can lead to delays in the construction projects, cost overrun and missing out on the deadlines. Construction companies need to ensure that they are following the current building projects trends in the market. Following the market trend will allow the construction companies to build projects in the areas that will be beneficial to the business.

### **Chapter Three:**

#### **3.1 Challenges encountered by the project managers**

Muir (2005) pointed out that there are numerous challenges that are faced by the construction managers today. Some of these challenges might be new to the industry but the others have been seen from centuries. Some of these challenges are as a result of the construction operations of the company whereas other is indirect and peripheral activities. Some of the issues that are construction based as in the workforce considerations, safety and time constraints and the nature of the work. On the other hand, construction managers also face many non-construction challenges that include legal issues linked with the landscape, government regulations, socio political pressures and the environmental concerns. The author pointed out that managers need to understand the demand realities in the construction project in terms of control and planning of the project. There are many serious challenges and problems that are encountered by the construction project managers. These challenges are however motivating the construction industry to look for new approaches in designing, building, operating and maintenance of the building and infrastructure. With increasing tighter budgets in today's economy, the demand around the construction projects has got intensified ever than before. For this the project managers are required to possess specialised skills that will add extreme value to the project and help in the management and control of the variables that affect the timely completion and delivery of the construction project [11].

A more clear view has been expressed by Halpin and Woodhead [12]. The authors say that the job of the construction managers is to efficiently and economically apply the required resources to the construction facility to deliver an acceptable quality project in the required time frame and within the specified budget. The construction manager is provided with all the required

resources like equipment, labour and materials and expected to build the demanded facility that meet the client's specification and is consistent with the outline and framework of the project. The construction managers face the challenges in terms of applying these resources of workers, equipment and materials in the limited fund and time available to them. Though this is a challenge for the construction managers, it is also the essence of the construction industry. According to the work of [13] the dynamic nature of the parties involved in the construction project, the complexity of the construction projects and the continuous changes and demand for improvement and efficient delivery of the projects puts pressure on the construction managers which lead to creation of numerous management challenge. The authors supported the earlier view and indicated that considering the nature of the construction industry, it is difficult to manage and present challenges to the construction projects. These challenges can include the unique and complex nature of the project, the workforce, ingrained culture, the working conditions involved in the construction project and the suppliers apart from the changes in the government policies and regulatory bodies. [14]

Bennett [15] in his article pointed out to the challenges that are encountered by the project managers. It is important for the construction companies to focus on their effects towards executing the construction projects. It is important for the construction managers to anticipate the impact of challenges on the completion of the project. Often construction managers face challenges when they misalign the company's objectives and the project objective. Often gaps in the vision and objectives of the project lead to delay in the completion and quality of the project. With the changes in the business objectives, the projects need to evolve and drift. Without direction, projects and its

deliverable fail to meet the expectations leading to increased pressure on the project managers. Construction managers are also expected to face late or delayed projects. Another article that highlights the common challenges that are encountered by the project managers is available on. Considering the challenges that are encountered in the construction projects, it is important for the construction project managers possess the required qualities to be able to plan the project effectively and assemble the right workforce to complete the project. Decentralisation, infighting, lack of accountability, resources allocation, creeping scope and shifting deadlines are the challenges to the project managers. Muir [16] has listed out the challenges that are encountered by the construction project managers:

- Nature of the project work- The nature of construction project is considered to be complex due to the involvement of interdependent activities that needs to be effectively organised. Construction project differ in many aspects as in the project can be unique, seasonal, can involve the team work to work in remote sites which lead to accessibility problems, automation might not be easily applicable and costs vary depending the construction sites. Construction managers have to ensure that communication is maintained to avoid any interruption in the construction services.
- Work force- People are the greatest resource for the construction organisation. These projects depend on the skills and the knowledge of the people and necessary for planning and executing the construction work. The authors also indicated that construction industry has often been considered as

the least desirable industry in which people want to work. Construction by nature is dirty, dangerous and hard work. Construction managers have the pressure of providing the solutions to enhance the safety and productivity among the workers. Managers have the pressure of providing the necessary training to maximise the long term performance of the workforce.

- Safety- It is one of the biggest concerns for the construction managers due to the construction projects being inherently dangerous, highly associated with risks and hazard. The costs involved in the accidents and human suffering have increased the toll of construction accidents.
- Time constraints- The construction managers are faced with the challenge of completing the high volumes of the work in a given tight time frames with the use of finite resources. They have the pressure of planning the operations comprehensively and in an efficient manner.

#### **Chapter Four:**

Skills necessary for being successful contemporary construction project manager.

Jha [17] say the project manager is the person who is responsible for managing the project with the requirement of accountability for achieving the project objectives in the allocated resources. The project manager is the leader for directing the specific project towards the success. The role of the project manager is vital for the success of a construction project. They have cited the work of Kat and Kahn (1978) and pointed out the effective project managers needs to possess essentially three skills as in the relationship skills,

technical skills and the conceptual skills. The technical skills of the project managers include their ability to apply all the knowledge available and given in the field as in the finance and engineering. The human relationships skills of the project managers involved their ability to communicate their vision efficiently and to maintain a harmony in the working group. The ability of the project managers to motivate the construction team also falls in the human relationship skills. The conceptual skills of the managers allow them to perceive the project as a whole system and consider the global perspective. Kelly and Male [18] suggested that project managers have to concentrate to get the necessary work carried out by others. The managers need different skills to deal with various aspects and challenges involved in the construction projects.

Construction companies are looking for project members who have an in-depth knowledge of the construction industry apart from having a strong decision making and leadership skills. They need to have an experience in dealing with finances and budget management to save time and be able to complete the project on time and within the required budget. The project managers are required to know the types of construction equipment that is necessary for the completing the project and the manner in which they need to acquire this equipment. In addition, the successful construction project managers should be able to coordinate and be able to oversee the entire project and project team from start to the finish of the construction projects. The construction project managers should have the ability to use wide variety of skills and their experiences to lead the team and be able to effectively oversee the construction projects. The most basic requirement for the project managers is to have a good educational background of the construction industry apart from this having the

right and necessary experience for being a project manager.

Successful and great construction project require the countless efforts from the skilled workers and a great leadership from the construction manager. He listed out the five main skills that need to be possessed by the construction project managers be a great leaders and they include. [19]

#### **4.1 Effective communications skills**

It is important for the construction project managers to be able to clearly and effectively communicate. Communication lies at the heart of any company or the construction project and construction project managers are required to understand the effective communicate through the construction project. Lack of communication can lead to even skilled workers to be unable to perform despite having the best of the abilities. The success of the project can get completely derailed in lack of poor communication skills. It is important for the construction project manager to be able to translate the project details into smaller activities and tasks.

[20]

#### **4.2 Need for delegation of the tasks**

Project manager's needs to have the skill of delegating the tasks involved in construction project. Construction project should not be considered as a single person event despite one or two people might have contributed significantly towards the successful outcome of the project. It is important for the construction project managers to be able to delegate the tasks among the skilled workers through the phases of the project time. It is important for the project managers to determine the workers who are capable of working specific activities in smaller portions of the overall projects.

#### **4.3 Reassessment of the current status of the project and prioritise activities involved in the project**

Throughout the construction project, there can be various discrepancies in terms of resources that are available when compared to the needed resources. These discrepancies also involve workforce and physical resources and this requires project managers to be able to frequently reassess the status of the construction project and be able to prioritise the task appropriately. For instance, due to a sudden change in the weather conditions could lead to failure of the roofing activities which will require the project managers to reassign the tasks.

#### **4.4 Problem solving skills**

It has been determined that every construction project comes with challenges, risk and problems that are hidden in the background. It is not possible for the construction company or the project team to be able to identify every possible problem and therefore it is important for the construction project managers to possess the necessary and advanced problem solving skills. This skill allows the project team to be able to adapt and grow along with the project. Problem solving skills are vital for re-evaluation of the progress results which might require changes in the project deadlines.

#### **4.5 Understanding the importance of teamwork**

Although the outcome of the construction project will depend on the skills and competencies of the construction project managers, the end result of the project will depend on the cooperation between the workers and coordination of the team members. A successful construction project manager understands the importance of teamwork and builds an environment of trust and appreciation.

#### 4.6 Leadership skills

Jackson [21] says leadership skills are as important as any other skills for the project managers in the construction industry. Effective leadership allows the managers to be able to establish a good working relationship with different people involved in the construction projects. Richman [22] says leadership is goal focused. Leadership skills are essential for the project managers as it is important for the managers to be able to influence the behaviour and attitude of others. In addition, this skill is vital for the achievement of the project goals and therefore it becomes the predominant contributor to the success of the construction project. Norton [23] says the project managers need to have the ability to motivate the team to create team objectives. Leadership helps the project managers to empower the team in the construction projects.[24]

Required skills and competencies for a successful project manager.

Successful project means, the project completed with the stipulated time within the approved budget followed by all quality norms. There are three major factor of successful project.

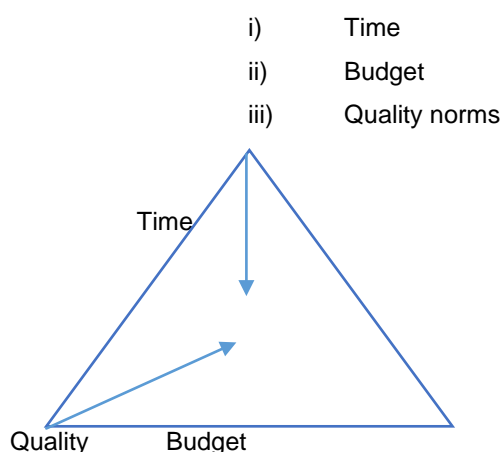


Figure 1. Key factors for successful project, [25, p. 19]

#### 5.1 Reasons for failure of projects:

The continuous changes of various phase are the nature of construction industries. Because of development, it is also necessary. In terms of technology development, the construction industries are continuously changing the resources utilization technique. Immediate and quick adoption of the change is little bit of difficult for many organizations. The high rate of failures that occur in the construction projects due to be unrealistic budget and schedule and time management. Construction process is not as ordered and predictable as its uncertain behaviour in terms of back log, critical path, site constraints. Because of the cited constraints, planned schedule always need to be modified according to the situation. So the construction projects are pour in plan failure, delays and cost overruns more than in successes. Improper Manpower distribution/resources allocation sometimes may be a factor for failure. The concept was developed in late twentieth century; thereafter employee motivation and job satisfaction came under focus instead of mere rational administration. [26]

#### 5.2 Remedial measures to prevent project failure:

Proper application of work break down structure is one of key of success to prevent the project failure. Proper allocation is ve Successful project effective resources prevent the project failure. Well-st nal responsibility matrix also a key to prevent the project failure. Simple and effective divisional matrix structure is as follows.

#### Chapter Five:



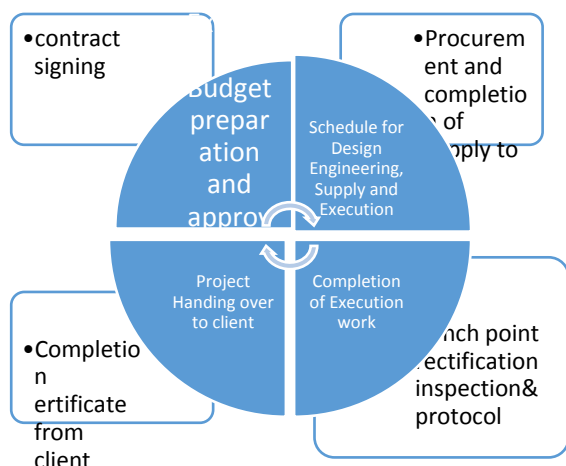


Figure 2. Activity –On-Node [27, p. 17]

To prevent the failure ratio, organisation have to have a feasible target and realistic schedule. Smart objectives are one of comprehensive technique to achieve the goal with the stipulated time and cost. SMART objectives can be defined as below.

**S- Specific.**  
Implementation of project management for a specific project, with the specific organization structure.

**M- Measurable.**  
Project progress monitoring to be done by the project director by Project Director/Project officer, regular basis

**A- Agreed by all involved.**  
Project management team has to discuss and demonstrate with execution team, design team, regular basis to avoid any miscommunication.

**R- Realistic.**  
Making a realistic Project plan / production plan is one of key of successful completion.

**T- Timed,** or delivered within a time frame.

Implementation of proper production / manufacturing / construction plan is very important. Final time for completion of a project can be calculated with consideration of internal and external risk in schedule. Time management plays an important role for successful completion of manufacturing or supply within the time frame and budget.[28]

### 5.3 Analysis of project success or failure factors:

The success of project means, the execution budget is less than sales budget. And of course with the all quality norms with the stipulated time.

The three main factor of successful project as per followings:

- Project completed within the approved budget
- Project completed within the approved time schedule
- Project completed in compliance with approved quality norms and within the performance guarantee.

To achieve the above goal, the following factors to be maintained.

Factors necessary for achieving these three objectives include the following:

- Appropriate Identification of project for participation.
- Implementation of smart project strategy
- Detail risk analysis.
- Proper man power distribution.
- Application of Program Evaluation Review Technique (PERT)
- Strong cash flow.

➤ Suitable operation strategy.

These are the important factors of project management.

Difficulties are in the projects and project management. Difficulties in terms of time, quality and budget. Most of the time clients, suppliers and main contractors are difficult to manage.

Repeated changes of scope, improper resources, improper accountability, poor planning and coordination also the reason of delay.

Project management success is also oriented to corporate success. Good leadership, individual smart effort and critical path analysis and quick decision making abilities are assets of an organisation. These can be lead project management towards the success.

"An apt definition of a successful project is that it should satisfy all the

Stakeholders. This is an ideal that might be difficult to achieve because stakeholders

Often view a project from different perspectives but it is a worthwhile goal".

[29, p. 185][25, p. 06]

## Chapter Six:

### Conclusion:

Construction project has always been known for encountering problems and challenges that affects the completion and quality of the final work that is delivered to the client. These problems can link with time management, regulations and policies or workforce related.

### References

- [1] H. Wood, Project Complexity in Construction, 1 ed., Brighton, 2010.
- [2] A. Mills, "A systematic approach to risk management for construction," vol. 19, no. 5, pp. 245-252, 2001.
- [3] Ofori, "Challenges of Construction Industries in Developing Countries: Lessons from Various Countries," SINGAPORE, <https://www.irbnet.de/daten/iconda/CIB8937.pdf> , n.d.

However, a successful and efficient project manager who has the necessary skills will be able to manage these challenges in an effective manner to ensure timely and completion of the project based on the necessary requirements and also maintaining the quality of the overall outcome of the work. The effective project management requires the project managers to have the ability to be able to deal with the uncertainty involved in the project. The experience and the knowledge of the project manager are vital for determining the potential outcomes of the project. Efficient project managers tried to create a balance between the level of control they need to have the project and the risk that goes undetected. Therefore, efficient project manager is crucial for the project success. therefore, agree that effective construction projects are required to possess certain skills in order to be able to deal effectively deal with all the factors that create problem in terms of management of the project.

During considering the complexity of the projects and the challenges offered by them, the paper has been conducted to find out the proper skills to compete the complexities and challenges.

Based on the study it is recommended that future research in the area of relationship between project manager's skill and challenges needed to manage contemporary construction projects. Therefore, the findings of this research are presented as preliminary rather than conclusive.

- [4] L. Day, "5 Challenges the Construction Industry Is Facing Right Now," 2015. [Online]. Available: <http://www.isqft.com/start/blog-5-challenges-construction-industry-facing-right-now/>. [Accessed 26 June 2016].
- [5] F. Sherratt and P. Farrell, Introduction to construction management, 2015.
- [6] P. W. Morris, The Management of projects, 1st ed., London: Thomas Telford Services Ltd, 1994, pp. 5,6,7.
- [7] R. Turner, The Hand book of project - based management, 4th ed., McGraw-Hill Education, 2014, p. 4.
- [8] D. Lock, Project Management, EIGHT ed., Hampshire: Gower Publishing Limited, 2003.
- [9] P. Contractor, "Construction Industry Challenges in 2016," PDH Contractor Academy, 2016. [Online]. Available: <https://pdhcontractors.com/uncategorized/construction-industry-challenges-in-2016/>. [Accessed 27 June 2016].
- [10] U. Alliance, "Top 10 Project Management Challenges," 2016. [Online]. Available: <http://www.villanovau.com/resources/project-management/top-10-challenges/#.V3Aah-zbvIU>. [Accessed 26 June 2016].
- [11] CIOB, Code Of Practice for Project Management for construction and development, FIFTH ed., West Sussex: John Wiley & Sons, Ltd, 2014.
- [12] D. Halpin and R. Woodhead, Construction management, New York: Wiley, 2010.
- [13] P. Okoye, C. Ngwu and S. Ugochukwu, "EVALUATION OF MANAGEMENT CHALLENGES FACING CONSTRUCTION PRACTICE IN NIGERIA," vol. 4, no. 1, 2015.
- [14] H. Kerzner, PROJECT MANAGEMENT A Systems Approach to Planning, Scheduling, and Controlling, NINTH ed., New Jersey: John Wiley & Sons, 2006.
- [15] H. Bennett, "10 Typical Project Management Challenges Faced By Businesses," 2014. [Online]. Available: <http://www.keyedin.com/keyedinprojects/article/10-typical-project-management-challenges-faced-by-businesses>. [Accessed 27 June 2016].
- [16] B. Muir, Challenges Facing Today's Construction Manager, 2005.
- [17] K. Jha, Construction project management, New Delhi: Dorling Kindersley, 2011.
- [18] J. Kelly and S. Male, Value management in design and construction, London: E & FN Spon, 1993.
- [19] S. Naoum, People and Organizational Management in Construction, Second ed., London: ICE Publishing, 2011.
- [20] H. Kerzner, Project management A Systems Approach to Planning, Scheduling, and Controlling, NINTH ed., New Jersey: John Wiley & Sons, 2006.
- [21] B. Jackson, Construction Management JumpStart: The Best First Step Toward a Career in Construction Management, John Wiley and Sons, 2010.

- [22] L. Richman, *Improving Your Project Management Skills*, AMACOM Div American Mgmt Assn, 2006.
- [23] A. Norton, *CIMA Official Learning System Integrated Management*, Elsevier, 2008.
- [24] R. Muller and R. Ternner, "The Influence of Project Managers on Project Success Criteria and Project Success by Type of Project," *European Management Journal*, vol. 25, no. 4, pp. 298-309, 2007.
- [25] D. Lock, *The Essentials of Project Management*, Third ed., Aldershot, England: Gower Publishing Limited, 2007, p. 06.
- [26] C. E. Hartel, *Human Resource Management*, 1st ed., Pearson Education Australia, 2007.
- [27] B. Rory, *Project management Planning and Control Techniques*, Third ed., Chichester: John Wiley & Sons, 2000, p. 17.
- [28] "Vision - Strategy and the Environment - Sheffield Forgemasters," 2015. [Online]. Available: <http://businesscasestudies.co.uk/sheffield-forgemasters-international/strategy-and-the-environment/vision.html#axzz3p8clhUQQ>. [Accessed 21 10 2015].
- [29] T. Cookie-Davies, "International Journal on project management," *Real success of project management*, vol. 20, pp. 185-190, 2002.

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