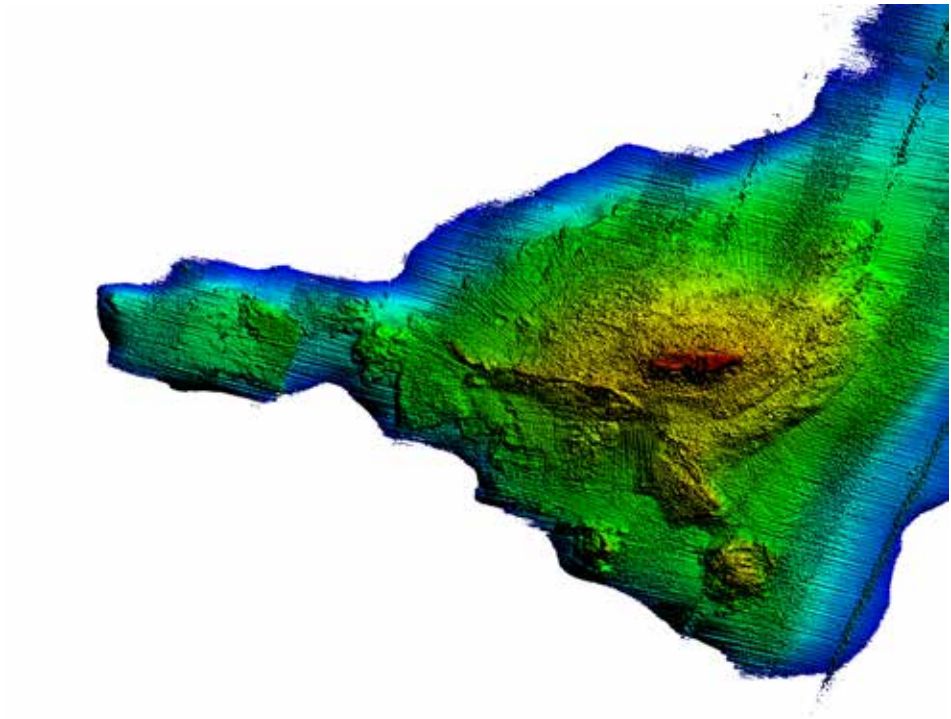
Pivot III

Physicality and Realisms



Filfla

Coast at -75m ERDF156 in 2012

GEO (WGS84) (14.4043388539, 35.7996659720) - -117.55 m,
35° 47' 58.7975" N, 14° 24' 15.6199" E

CHAPTER 14

Time and Team Efficiency in Construction Project Management

Francesca Azzopardi

Introduction

"It is possible to leverage project cost, construction speed and plant operability through effective people management" (Scott-Young & Samson, 2008). Project teamwork affects time management, irrespective of project size, type and scope; the more efficient the team is, the greater the level of project success in the least possible time with the least number of overheads. The client and contractor as well as project stakeholders stand to gain from time and team efficiency with respect to increased profitability and good exposure for works caried out. Societal benefits are also reaped since projects completed in a timely manner reduce nuisance on a macro and micro level, and begin serving the community in an immediate and effective manner.

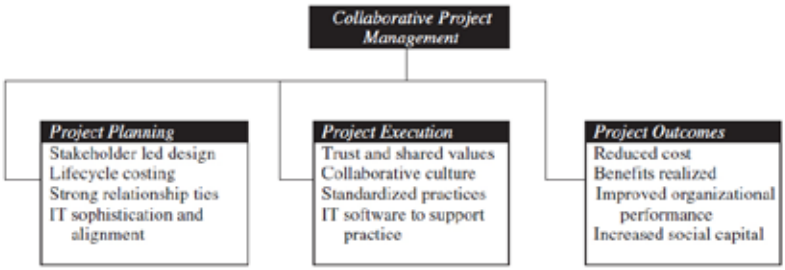
Theoretical Issues

Collaboration between and within construction companies is being envisaged as a means of improving productivity within the industry by a number of researchers. Amongst these, a study by AMA Research demonstrated that collaboration within the project management team can improve profits for all supply chain partners by as much as 3% (Attaran and Attaran, 2007). Authors Bresnen and Marshall identified several advantages of collaboration, including increased productivity with reduced costs, reduction in project times owing to early supplier involvement and team integration, improved quality, improved client satisfaction and enhanced responsiveness to changing conditions, and greater stability to help companies deploy their resources more effectively. Societal benefits have also been identified where proper communication channels established through such collaboration facilitate understanding between local communities and project stakeholders.

Fulford and Standing (2014) examined the factors impacting on collaboration in the project networks of three large companies through questionnaires and conducted expert reviews on these. Their findings (Figure 1) led them to present a model embracing the

concepts of collaborative project management at the planning and execution phases of a project, with project outcomes including reduced cost, improved organisational performance and increased social capital.

Figure 1: A model presented by Fulford and Standing showing the advantages of collaborative project management in the construction industry



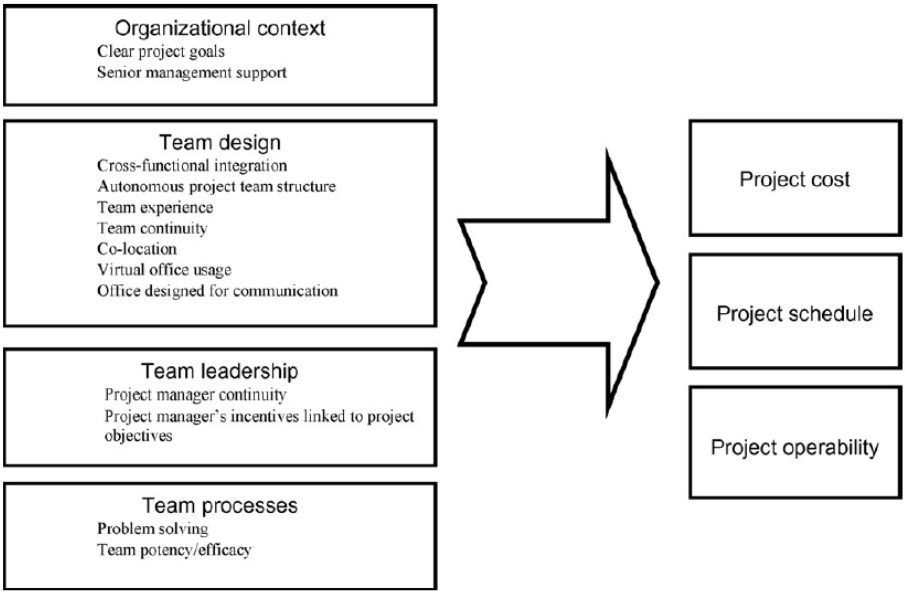
Source: Fulford & Standing (2014)

Scott-Young and Samson (2008) investigated how cost, schedule and operability are driven by project team factors. The researchers created a theoretically-based project team management model with five phases: organisational context, project team design, project team leadership, project team processes and project outcome factors, in order to analyse project management team factors among construction project management teams. Their results showed that having a cross-functional project team early in the project life cycle ensures a broad area of expertise which is needed especially in the initial phases of a project. Ensuring project manager continuity was also a favourable point among the companies taking part in the research. The researchers also found that it is considered vital for a project team to be supported by virtual technology in their office to facilitate effective communication. Virtual technology is in itself a great benefit to society which stands to gain from national and EU projects since it not only encourages project management efficiency but also contributes to helping society in general understand the purpose and gains of such projects in order to utilise these to their maximum potential.

Many empirical studies have been carried out regarding the use and popularity of project management methodologies; the general trend has reported an increase in the use of methodologies and tools within project management (PM) professionals over the years (Fortune, White, Jugdev, & Walker, 2011; Raymond & Bergeron, 2008). Such methodologies and techniques are all developed to help project managers and administrators manage a

project as successfully and efficiently as possible, in the shortest possible time with the best yielded results if used correctly. Fortune et al conducted surveys among project managers throughout Australia, Canada and the United Kingdom to determine the extent to which those involved in project management actually make use of the methods and techniques available and how effective these were felt to be in terms of project success and time management.

Figure 2: Model of team-realted factors impacting operability, cost and schedule.



Source: Scott-Young and Samson (2008).

Their research showed that with respect to PM methodologies, "Project in Controlled Environments 2" (PRINCE2) and "Project Management Body of Knowledge" (PMBOK) were deemed the most popular methods. In terms of PM software, "Microsoft Project" proved to be the most popular among the three countries, followed by "Primavera". Use of PM tools was mostly limited to 'GANTT' bar charts, Work Breakdown Structure, SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats) and Programme Evaluation and Review Technique (PERT), listed in order of popularity. "Probability Analysis" and "Life-Cycle Cost Analysis" (LCC) were mostly used as risk assessment tools, whereas the most popular ICT technology support tools included Integrated Groupware (email, collaborative tools, shared access to web portals) and video conferencing.

Experiences Gained Through Project Management and Implementation: Societal Benefits Gained From National, EU and International Projects

"Teams are essential in projects for tackling complex work requiring a variety of knowledge and skills, stimulating creativity and innovation, empowering workers" (Loo, 2002). From experiences gained through construction project management and implementation so far whilst managing a variety of largescale national and EU-funded projects, the author of this chapter identified that successful teams are likely to work on a team-think basis, defined by Erdem (2003) as a constructive and creative approach to teamwork and team building skills. Her research found that "inquiry, critical questioning, challenging behaviours are all positive if they take place in a generally trusting and supporting environment" (Erdem, 2003). The use of virtual technology facilitates time and team efficniecy for the benefit of societal gains.

The author's research effort also identified that the more varied the competencies of the project management team the more likely it is that team members complement each other to contribute to a successful project. Business-orientation coupled with organisational and computer skills, logistical thought and assertiveness are all important traits which need to be nurtured for a project management team to ultimately gain societal benefits from national and EU-funded projects. Locally, the author experienced many contractor groups who were competent in their work, owever, their individual site management was sometimes lacking in proper health and safety enforcement.

Such trends are extremely detrimental to surrounding communities since they not only discourage society from understanding project gains but may also pose a health hazard to neighbourhoods nearby. As an assistant project leader the author sometimes also found it challenging to submit required documentation for recording purposes, as the contractors seemed disorganised when reporting and handing over information.

Some projects suffered delays due to lack of communication between the client, the contractor and the subcontractors. Since one single point of reference was not properly established in the project contract with reference to on-site management, the client and his technical team found it challenging to monitor different trades simultaneously. Measurement of works was also a laborious process and led to delay in payment during some instances because of this flaw. As a result such delay caused unnecessary nuisance to the local community within the project surroundings until the projects were complete.

In turn inadequate selection of contract terms and ambiguous project clauses will also lead to poor productivity. Hence contractual management is an important factor

influencing project delivery as it will lead to delay and cost overrun if not followed up correctly, and is important to consider for an effective organised team structure based on proper time management.

Risk Management to Aide Efficiency

Design-Build contract types are becoming increasingly popular among largescale national and EU-funded projects. The 'single-point' responsibility of the contractor in Design and Build contracts is very attractive to clients, particularly those who may not be interested in trying to distinguish the difference between a design fault and a workmanship fault (Murdoch & Hughes, 1998). By removing these blocks to effective communication, experience has shown that programmes and budgets are more likely to be adhered to, and construction time may be shortened as a result (Pain and Bennett, 1998). Design-Build contracts may also be desired in order to encourage contractors to research innovative forms of building whilst simultaneously studying the practicality of their solutions. Malta has no natural resources and we must import material that may take time to procure. One of the biggest disadvantages of design and build is that the employer's requirements must be made very clear from the start and they should not be subject to change during the project. In my opinion this basic fundamental issue may not be adhered to in largescale projects, to the detriment of society standing to gain from such projects.

Design variations by the client prove to be the greatest risk affecting project success, and it may be usual for projects to be criticised for lack of design submitted at tender stage. Although such variations may not impede the pace of construction, it may take a substantial amount of time to be sorted, resulting in the delay of completion of certain project phases. Delays in procurement and purchasing of specific material are also considered risks to project completion. This could be attributed to the high performance and quality expectations of the client and design team. This risk can be identified and assessed better at feasibility stage with respect to project schedule.

Lack of coordination between project participants is a risk which needs to be given quite some weight during feasibility stage. The PM team should be successful in bringing together the design and contracting teams with the client for stipulated meetings. Although there may be delays on certain decisions, the teams' perception of cooperation and communication should as a project progresses, which would to be a positive outcome of the project. Addressing project risks at the earliest stage possible in the project lifecycle could minimise consequences brought about by these risks. The client and designers may work more cooperatively together during feasibility stage to address potential risks in time as a result. Zou, Zhang, & Wang, (2006) suggest that "contractors and subcontractors with

robust construction and management knowledge must be employed early to make sound preparation for carrying out safe, efficient and quality construction activities". Limiting the period for employment of contractors could also be considered to mitigate issues arising from potential risks associated with health and safety hazards.

Methodology: The Rise of Virtual Information Management in Time and Team Efficiency

Virtual information management contributes to achieving efficient time management within any project management team. In the construction industry it can be described as diverse and sometimes disorganised throughout many organisations, as many project managers are knowledgeable of IT but are inefficient in collating and using data in spreadsheets for preparation of bids, specifications, etc.

According to Fulford and Standing (2014), "many of the issues created by tiered project delivery could be alleviated through the standardisation of information and alignment of IT across organisations". Such standardisation might include the alignment of types and sizes of cost fields for material supplies or fields required to transfer work breakdown information from project managers to site management teams. Another option may incorporate the creation of a centralised data bank where information is stored and retrieved. Data can be organised on a project-by-project basis and can be accessed from any internet source with the appropriate passwords, in the form of a cloud system.

This system can be updated in real time with respect to the creation and issuing of reports, transactions of purchase, etc. In addition, "statistics, trends and forecasts can be made...readily available, which is invaluable to stakeholders" (Munier, 2013) and managers alike to track project and team progress accordingly. This system will definitely help to overcome the challenge of increasing productivity of the PM team as time is saved in finding and sorting data, albeit some start-up costs if the system is not already in place. Bankvall, Bygballe, Dubois, Jahre, (2010) found that the dissemination of IT is critical for productivity improvements, especially within supply chain management and emphasized the requirement for this to be supported by the use of data standards.

Matos and Lopes (2013) researched the concepts and ease of implementation of PRINCE 2 and PMBOK to support an entire project lifecycle, and argue that "methodologies area an indispensable tool used in project management which allow measure of progress and task control" (Matos & Lopes, 2013). Methodology is useful to assist in time management by analysing each step in the project life cycle and helps formulate measures and targets to deliver on time and with the best quality and resources provided.

PMBOK was created by the Project Management Institute and is a detailed framework of nine knowledge areas broken down into activities along five progress groups. These include initiation (involves gathering of commitments required to get the project started), plan (maintaining a schedule of tasks and resources required to fulfil a business need), execution (focuses on methods of co-ordinating people and resources to execute the project), control (aids project managers to ensure that targets are met by monitoring progress) and closing (formalising acknowledgement that project is complete). PRINCE 2 was created in 1989 by the CCTA (Central Computer and Telecommunications Agency). This has now been incorporated within the UK Government Digital Service. It aims to detail how the techniques of project management should be structures and implemented to develop a successful project (Matos & Lopes, 2013).

The main features of this methodology are based on business focus; "an organisation structure directed to the project management team" (Matos & Lopes, 2013). PRINCE 2 is the standard of project management methodology used by the English Government and is widely recognised and used in the private sector throughout the United Kingdom. PRINCE 2 emphasizes the division of a project into the following phases: starting up, directing, initiating, planning, controlling a stage, managing product delivery, directing and closing. They are intricately linked and can be graphically presented as shown in the image below.

Time monitoring and control is an important process associated with execution and overseeing of the project, and refers to checking of work advances in accordance with the schedule established during planning stage. Critical Path Method (CPM) or PERT methods can be used to time limits for a project plan. The CPMis commonly used to establish relationships between tasks and determine the critical path of the project by establishing durations for each task, taking into consideration tolerance (float). Float is important to consider to study delays due to extensions and to schedule tasks in order to level resources. Monitoring is then done by comparing actual advance of work with planned advance at a certain date, considering scheduled plan of work as a baseline. On the other hand the main goal of the Programme Evaluation and Review Technique (PERT) analysis is to create the distribution of project duration. In a PERT network, activity durations are defined by variables that are assumed to be independent of each other (Hajdu & Bokor, 2014). The distribution of the activity durations follows a so-called PERT-beta distribution. According to PERT theory, the project duration follows a normal distribution, with the mean being the result of time analysis based on activity mean durations.

Scope changes during project execution and slow close-out once a project is practically complete are two major instances which can contribute to lack of productivity and result in poor time management. Scope changes are the results of uncertainties at planning stage and with each scope change, project resources are diverted to activities which were not identified in the original project scope, leading to pressure on project schedule and budget (Ambituuni, 2011). To achieve proper control of scope change, Ambituuni (2011) suggests integrating a proper change management plan by seeking approval for change from stakeholders and communicating them effectively among all parties involved to avoid disputes. A slow close-out may occur whereby various handing over activities take too long to complete due to unresolved issues with the client, delays in issue of final change orders and disorganisation in issuing and handing over commissioning documentation. These all prolong handing over and demobilisation from site. Reducing idleness from team members to reduce possibility of any extra costs for overheads, ensuring stakeholder satisfaction with the final product and keeping all documentation up-to-date throughout the project lifecycle are all positive factors contributing to efficient time management to avoid conflict and doubt for final issue of certifications and payments.

Conclusion

Project managers and other professionals within the construction industry are becoming more dependent on virtual management with respect to use of tools that assist in the efficient use of time as well as collection and alignment of data. These ensure productivity and standardisation throughout a project to successfully complete it within the least possible time and to budget. Project team management, contractual management and managing scope changes and design errors are all important to consider in the enhancement of an organisation's productivity, and collaboration between different organisations can be sought to produce a more efficient management structure in terms of tendering and execution of a project upon award. The use of virtual information management should thus facilitate the understanding of societal needs in order for the nation to reap the benefits of vital construction projects which aim to improve citizens' lives through increased economy, improvement in accessibility and ease of mobility.

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