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Scheduling Strategies for Construction Project Managers Toward On Time Delivery

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Abstract

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MBA, National-Louis University, 2013

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Construction management projects involve complex, dynamic environments resulting in uncertainty and risk, compounded by demanding time constraints. Research indicated project managers have struggled to identify best practices for scheduling construction projects via critical path methodologies while searching for tools to increase timely job completions and budget profits. The purpose of this single case study was to explore the strategies that construction project managers used to manage scheduled construction project delivery on time. The constructivist philosophical worldview was used as the framework for this study. Data were collected from semistructured interviews from 7 project managers from 5 different construction companies selected via purposive sampling throughout Florida. All project managers had at least 15 years of experience and multiple construction projects with managing scheduled project deliveries. Three themes emerged through thematic analysis: project, time delay, and cost. A construction project can have many variables that project managers cannot control such as the issue of on-time scheduling. Project managers identified that a project could be within the budget or cost set for the project and still be on time and go over budget or be within budget and not meet schedule. No broad support was found for agile project management, and no confirmation could be made that principles of philosophical theories were critical for project success. Implications for a positive social change result in creating new jobs during and after construction, bringing new individuals to neighborhoods, schools, and area businesses.

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Dedication

I dedicate this dissertation to my gorgeous wife, Michelle, who supported me unconditionally with love and assistance on every phase of this journey. I also want to dedicate this to my children, Josh, Charle, Cody, Brittany, Michelle, Justin, and Michael, for all their support. I would also like to dedicate this to my parents, Larry and Susan, who each provided an exemplary path for me to follow as a civic-minded individual, established high academic standards, challenged me to think critically, and ensured I had a good foundation to negotiate the challenges of this world.

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Section 1: Foundation of the Study

Background of the Problem

Construction management projects involve complex, dynamic environments resulting in uncertainty and risk, compounded by demanding time constraints. Construction business and the effects of construction delays on costs are of fundamental importance in project planning and execution (Blanc-Brude & Makovsek, 2013). Challenges encountered in comprehensive and new construction projects are entirely separate and independent from the business planning and funding processes (Porwal & Hewage, 2013). In the construction industry, contractors typically earn construction contracts either through direct negotiation or competitive bidding (Cheng, Hsiang, Tsai, & Do, 2011). Challenges in bidding and scheduling that involve execution commence shortly after approval of the funding or the business plan**.**

Problem Statement

Project managers' scheduling issues in the timeline, planning, and designing of construction projects often suffer time delays, cost overruns, and quality defects (Meng, 2012). Cost and schedule overruns occur from a broad range of factors. Ineffective oversight of construction projects negatively affects profits of business and stakeholders (Ramanathan, Narayanan, & Idrus, 2012). Thirty percent of construction projects either run over budget or fail to complete due to time constraints and a lack of effective project management (Hamzah, Khoiry, Arshad, Tawil, & Che Ani, 2011). The general business problem is that project managers are unable to deliver construction projects on time. The

specific problem is that some project managers lack strategies to manage on-time construction projects.

Purpose Statement

The purpose of this qualitative, single case study was to explore the strategies that construction project managers could use to manage scheduled construction project delivery on time. To ensure alignment with the research and experience requirements of this study, the participants I chose consisted of project managers in Central Florida each possessing 15 years of experience, which provided a reasonable basis for their perspectives on time delays, cost overruns, and quality defects. I focused the study on the performance regarding time delays at Central Florida area construction projects using a sampling of multiple construction projects for review. Project managers on construction projects can bring about positive social change in various ways by influencing the economy of a community. Project managers' scheduling of construction of healthcare facilities, retail establishments, manufacturing businesses, and other building projects all result in increased demand for employees, resulting in the creation of a number of new jobs. As a result, a new jobs created by the construction industry affects the community in a full circle manner, as it brings new individuals to neighborhoods, schools, and, essentially, the area businesses.

Nature of the Study

The nature of the study was a qualitative case study on the process of timeline business planning with planned schedule goals. Barratt, Choi, and Li (2011) piloted case studies demonstrating the effectiveness of a qualitative case design and research with data

generated in the business context. When analyzing qualitative and quantitative research methods, there is a noteworthy difference between the phenomena and the human aspect, given the ability of humans to speak and express their ideas (Toloie-Eshlaghy, Chitsaz, Karimian, & Charkhchi, 2011). Qualitative research methods help researchers understand human beings and their public and traditional situations better than quantitative methods as the primary goal of qualitative research methods is to understand phenomena from the viewpoint of participants in substantial and concrete social surroundings (Toloie-Eshlaghy et al., 2011). I selected a qualitative method for this study as opposed to a quantitative or mixed method.

Case studies involve up-close, in-depth, and detailed examinations of the subject, as well as related contextual conditions (Yin, 2013). Qualitative research includes case studies, ethnography studies, and phenomenological studies (Mason, 2010). These three approaches are representative of research that builds on inductive reasoning and associated methodologies (Qu, & Dumay, 2011). Comparable to a case study, researchers taking an ethnographic or phenomenological study approach the relevant research in social interactions (Smith, Bekker, & Cheater, 2011). Smith et al. (2011) defined ethnography in terms of exploring the meaning that individuals place on the beliefs and values of their culture group, which considers interactions, actions, and events in the system. I also considered a phenomenological design, but this strategy, while sharing the basic premise of understanding the lived experiences of people involved in a phenomenon, shows significant differences among phenomenological researchers in how phenomenological research is conducted (Finlay, 2012). I did not choose

phenomenological due to phenomenology, for instance, research steps are made explicit and sequential allowing them to be per- formed again by different researchers (Finlay, 2012). According to Eisenhardt (1989), case studies may include an analysis of data from one or more cases and either from within one case or across several cases (Ravenswood, 2011). An inductive case study approach is adopted given the complexity of project environments, and the need for in-depth understanding of the dynamics surrounding project-based motivation in order to effectively scope and identify projects (Rose, & Manley, 2011).A case study with data collection based on interviews is more appropriate for exploring scheduling inaccuracies resulting in time delays, cost overruns, and quality defects in construction projects from the perspective of project managers. My inclusion of project managers' perspectives in the study relates to Moustakas's (1994) assertion that qualitative case study research is a means for exploring the experiences and understanding participant perspectives accurately.

Research Question

Through the interviews, I wanted to learn about the strategies of building construction on time and under budget, with the focus on scheduling, funding, project managers, and business processes to support a construction project. The primary research question was as follows: What are the strategies of a project manager to manage scheduled construction project delivery on time? I asked all participants the following 12 questions.

Interview/Survey Questions

1. How is the start of a construction timeline and a project schedule process determined?
2. What factors do you consider necessary to prepare a timeline for a routine or specific project?
3. How does a project manager plan a baseline schedule and a timeline schedule?
4. How often do you update the timelines schedules and why?
5. What are the timeline techniques and tools used to monitor the progress of the project?
6. What factors do you consider in the contractor's timeline to the completion date within the budget cost?
7. What are the control tools and method used to control the cost of the project?
8. How familiar are project managers with cost details in figuring project cost timeline total for total budget savings?
9. What factors of the forecast schedule caused inaccuracies in the forecast results on a consistent basis on a project? Please be specific.
10. How does upper management participate in the timeline and budget updates of the project?
11. How did other departments (upper management, finance, and controller) support you in the development of the project's timelines?
12. What is the influence of a project that is on time?

The interview protocol contained background questions to classify the job role of each participant to ensure accurate coding of the data. Those background questions were:

1. Provide your title and describe your duties and job responsibilities.
2. How long have you performed in this position?
3. What other positions have you held in your current organization or other organizations?
4. Do you have additional information or comments to add to our discussion?

Conceptual Framework

The conceptual framework for this study involved the philosophical constructivist worldview. Constructivism is a term that covers a broad array of sophisticated philosophical theories that address the way knowledge is acquired (Willey, Burke, & Thics, 2011). The four core concept structures in constructivist learning are knowledge construction, cooperative learning, self-regulated learning, and using real-world or business problems (Schreurs & Al-Huneidi, 2012). The argument is that there is a lack of effective project management practice suitable for innovation projects and that systems thinking can be a suitable conceptual framework to provide constructs for the development of better theory and practice (Kapsali, 2011). The main questions followed the constructivist worldview, which explored construction on time and under budget processes for projects and the factors affecting forecast inaccuracies.

Qualitative researchers can rely on participants' views of situations by qualifying the participants during the selection process (Ihantola & Kihn, 2011). Qualitative research consists of rigorous methods of dissimilar data sources: (a) interviews either

structured (interview tool remains fixed) or semistructured (interview tool is updated based on emerging data); (b) observations (e.g., site visits, attendance at meetings); and (c) archival sources (e.g., documents, historic records, organizational charts, and production statistics (Barratt et al., 2011). Constructivist researchers connect theoretical concepts as pointed out in practice with the empirical occurrence of events (Lupovici, 2009). Projects include cooperative activities based on the development of standard interpretations of goals, a practice that fits the constructivist theory (Leufkens & Noorderhaven, 2011). The constructivist framework acquired by project managers in this study can help researchers improve construction projects, which often suffer regarding strategies that construction project managers use to manage scheduled construction project delivery on time.

Definition of Terms

Balanced scorecard basics: The balanced scorecard is a strategic planning and management system that is used extensively in business and industry, government, and nonprofit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals (Sundin, Granlund, & Brown, 2010).

Baseline: The approved time-phased plan (for a project, a work breakdown structure component, a work package, or scheduled activity), plus or minus approved project scope, cost, schedule, and approved changes. This term refers to the current baseline but may refer to the original or some other baseline. It is usually used as a

modifier (e.g., cost baseline, schedule baseline, performance measurement baseline, technical baseline (PMI, 2014).

Lean Six Sigma: A managerial approach that combines Six Sigma methods and tools and the lean manufacturing/lean enterprise philosophy, striving to eliminate waste of physical resources, time, effort, and talent, while ensuring quality in production and organizational processes (Lyberg, 2012).

Project: A temporary endeavor undertaken to create a unique product, service, or result (PMI, 2014).

Project management: The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMI, 2014).

Scheduled start (SS) date: The point in time that work was scheduled to start on a scheduled activity. The SS date is normally within the range of dates delimited by the early start date and the late start date. It may reflect resource leveling of scarce resources. Sometimes called planned start date (PMI, 2014).

Six Sigma: A set of management techniques intended to improve business processes by greatly reducing the probability that an error or defect will occur (Lysberg, 2012).

Target completion date: An imposed date that constrains or otherwise modifies the schedule network analysis (PMI, 2014).

Target finish date: The date is work planning (targeted) to finish on a scheduled activity (PMI, 2013).

Target schedule: A schedule adopted for comparison purposes during schedule network analysis, which can be different from the baseline schedule. See also baseline (PMI, 2014).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions serve as part of the foundation of research and include facts that researchers assume to be true but that are not verified (Da Mota Pedrosa, Näslund, & Jasmand, 2012). I assumed that general business construction schedules and information provided by participant project managers supplied timelines and actual schedules were accurate. Through their companies' websites, I confirmed the project managers had an accurate schedule and completion time. Furthermore, I assumed that the meeting minutes from project sites' records of decisions and events leading up to the development of a baseline schedule were accurate.

Limitations

Leedy and Ormrod (2013) concluded that limitations in a study are potential weaknesses that are out of the researcher's control. I limited the study to a qualitative approach and the data I received about construction in the Central Florida area of the United States. The scope and size of a construction project was not included in the interview responses or considered, viewed, or discussed. Project managers in leadership roles could be different based on the type of project and industry. Likewise, leadership roles could be industry specific because of differing industry-specific work cultures and

competitive environments (Anantatmula, 2010). Future research efforts should consider project leadership roles for different types of projects and different industries.

Delimitations

Delimitations of a study are characteristics that limit the scope and define the boundaries of the study within a researcher's control (Thomas, Nelson, & Silverman, 2011). I did not include construction projects implemented outside the United States. This exclusion eliminated any uncertainties caused by different regulations, policies, procedures, or economic risk factors (see Isik, Arditi, Dilmen, & Birgonul, 2010). In addition, I focused only on the Central Florida region as the area of study.

Significance of the Study

Contribution to Business Practice

The influence of construction projects provides significant confirmation of timeline planning for the business plan and analyzed planned schedule goals. With the effects of timelines in the construction business, scheduling issues in the planning and designing of construction projects often suffer regarding time delays, cost overruns, and quality defects (Meng, 2012). The results of this study contribute to a positive outcome of timeline planning of construction and correlation between planning schedule and the actual completion dates as related to the development of the project in the construction schedule. The following measures influenced the outcomes of construction projects: (a) time, (b) cost, (c) quality achieved, and (d) project managers' decisions that affect the financial results (Park et al., 2005). The literature review I completed provided an overview of the timeline impact in construction projects, findings of the importance of

studying the subject, and findings of the direct relationship between projects' cost variables and financial results. Project manager's viewpoint on numerous cost variables, as well as techniques for forecasting project and cash flows, supported the timing, accuracy, level of details, methods of compilation, and different approaches to integrating variables with money elements (Park et al., 2005).

Following Memon's (2011) suggestion, I defined delays at the time as overruns beyond the completion date specified either in a contract or beyond the time that the parties agreed on for delivery of the project. When the project starts inching over, adhering to the planned schedule becomes a common problem for project managers in construction projects. To the owner, delays mean the loss of revenue through lack of production facilities and rentable space or dependence on existing facilities (Assaf & Al-Hejji, 2006; Pham & Hadikusumo, 2014).

Implications for Social Change

The analysis of project managers' perceptions about scheduling and forecast inaccuracies should improve the efficiency of resource allocation during construction. The findings and recommendations from this study can also help owners, communities, and construction companies with cost overruns and time delays because of scheduling issues and conflicts in future infrastructure projects by helping develop more realistic financial forecasts for the allocation of resources. The beneficiaries of the positive social change that may result from the findings of this study will be Central Florida organizations that will build projects for future growth. The exchange of knowledge could help with the professional development of project managers, owners, and

construction companies. Construction cost overruns are among the greatest risks faced in organization project development and knowing the probability, occurrence, and influence on projects is important (Doloi, 2013). The costs are of fundamental importance in project planning and execution (Blanc-Brude & Makovsek, 2013). Project managers of construction projects can bring about positive social change in various ways by affecting the economy of a community. Project managers' scheduling of construction of healthcare facilities, retail establishments, manufacturing businesses, and other building projects all result in increased demand for employees, which contributes to the creation of a number of new jobs. As a result, new jobs created and the influence of construction on a community come full circle, as it brings new individuals to neighborhoods, schools, and essentially the area businesses.

A Review of the Professional and Academic Literature

I conducted a comprehensive literature review on the topic of building construction on time and under budget, with the focus on scheduling, funding, project managers, and business processes to support a construction project. A literature review provides results of studies related to the one undertaken (Trotter, 2012). A project is a temporary endeavor undertaken to create a unique product, service, or result (PMI, 2014). Relevant literature is a significant piece of any research project (Onwuegbuzie, Leech, & Collins, 2012). The benefits of conducting a literature review include the identification of relevant themes of the study, avoidance of replication, discovery of inconsistencies, and defining areas for research action (Onwuegbuzie et al., 2012). Construction managers focusing on scheduling, phase delay, project expansion, or cost factors could affect the

business operations. The indications of these factors support the project managers to focus on a dedicated project, especially if substantial changes are needed to the business operations.

The literature I reviewed included peer-reviewed journals and other relevant sources, such as research-oriented websites. The themes that emerged showed conflict within project managers in scheduling, time management, and professional efficacy, change and culture management, project management strategic organizational leader and manager, human resources manager, and the influence of construction practices (Liang, 2010). The second part of the review includes an exploration of literature related to different techniques and tools used in construction.

Project Construction Management

In this study, project managers provided information to support a framework to help researchers improve the construction projects that often suffer schedule delays. Construction is the foundation of America and is an integral part of U.S. society. Based on available statistics, information, and a representative sample of one-half of the country's construction projects, total construction activity for December 2014 ($982.1 billion) was 0.4 % (±1.3%) above the revised numbers from November 2014 ($978.6 billion; U.S. Census Bureau, 2014a). As the U.S. population continues to grow, the challenge facing cities and states is finding adequate space, funding, and construction planning for all levels of construction projects.

Construction scheduling techniques used by construction personnel often generate schedules that cause undesirable resource fluctuations that are inefficient and costly to

implement on the site (Zeynalian, Trigunarsyah, & Ronagh, 2013). Scheduling forecasting is the process of predicting future project outcomes based on the actual performance (PMI, 2014). Cornick and Mather (1999) detailed that the construction team organized particular trades and functions, with project team members selected based on the technical and financial soundness of design and the competitiveness of the submitted tender. Focusing on organizations' individual professional capabilities has resulted in construction teams working toward individually defined objectives, often in disagreement with other team members (Elmabrouk & Aljiebali, 2012). Part of the reason for poor performance of product delivery in the construction industry is the inability of project participants to work collaboratively (Elmabrouk & Aljiebali, 2012).

In Alabama, Florida, Georgia, and Mississippi, construction managers completed construction business worth $1.2 billion in 2014 (U.S. Census Bureau, 2014a). In these states, the project managers applied effective cost management, and they are an area of continued population growth. On a cost basis, about three-quarters of all construction projects in these states (almost $900 million) are new construction (Klein, Perrault, Teachout, & Hilgendorf, 2014). The construction of new buildings has increased in the past several years, giving the construction business a cushion during the recession (Klein et al., 2014). Even though the impetus for some construction sites is the need for more space, meaning new construction, some potential construction customers have gone through comprehensive assessments of existing facilities' infrastructures (Klein et al., 2014). The U.S. Census Bureau (2014b) attributed the costs of construction projects to three areas: residential, private, and public (see Table 1).

Table 1

Construction in the United States ($000S)

	2013 completed	2014 projected to be completed	% change Dec 2014
Residential construction	$355,014	$369,282	0.4%
Private construction	$695,441	$698,551	0.1%
Public construction	$265,717	$283,538	1.1%
Total	$1,316,172	$1,351,371	1.6%

With the money spent on construction business planning, a recurring theme echoes across construction projects: Project managers who have problems with expertise, knowledge, and proficiency in construction and who do not have the proper guidance, can lead to severe and costly problems in construction. Project managers' essential focus on projects includes, but is not limited to, budgeting, planning, and monitoring for compliance with regulations and available budget, time, and business planning (Kim, Shin, Kim, & Shin, 2013). The accuracy of construction estimates is a critical factor in the successful bid for a construction project (Yang, Chou, Lo, & Tseng, 2014). Accurate estimates of the construction costs at the planning stage support the drawings and documentation in a timely manner (Kim, Shin, Kim, & Shin, 2013).

The idea that construction provides a variety of business factors when a building project is in progress is prevalent. With the unique prototype of buildings and project funding throughout states, counties, and cities, construction, more than any other industry, supports the premise of a sophisticated business strategy (Gavetti, 2011). For every complex construction project that stands constructed, a knowledge curve is inevitable. The industry produces many various prototypes without significant repetition

(Whitfield, 2012). With the growth of the construction business, projects managers in the construction business have learned to adapt, and this has become significant in the building process. Construction meanwhile has a poor record of accomplishment for completion on time or within budget (O'Carroll & Brinckerhoff, 2012). The building construction business is working within the parameters of the design phases that have gained an understanding of the business style process (Ramanathan et al., 2012).

Of the fundamental issues in construction projects, the delay is a serious problem in the construction industry and is an important issue to the completion of the construction projects (Abdul-Rahman, Wang, Takim, & Wong, 2011). Delay in business construction is significant, occurring at different stages in a construction project. Even though construction delay is an issue, researchers have identified the underlying problems for any late project, budget overrun, or reduced specifications as issues with project concepts (Blackstone, Cox III, & Schleier, 2009). Ogunsanmi, Salako, and Ajayi (2011) documented 35 sources from which design and build risks can emanate. The 35 risk factors combine into three broad categories of cost-, time-, and quality-related factors (Ogunsanmi et al., 2011). From a business standpoint, one factor is not more important than the others when considering risk factors (Doloi, 2013).

Project Critical Factors

Even with all the tools at their disposal, project managers often run construction projects over budget and over time (Meng, 2012). Change orders contribute to significant cost and time overruns (Love, 2002). Rework is another factor that affects the cost and time performance of projects, and it remains unexplored in the construction management

literature. The construction project manager provides details so that cost and schedule growth can remain calculated for each project (Love, 2002). The effect from the calculation in a project should not overlook the affect of completion on time or within budget, which is, at least, a minimum expectation (Barlish & Sullivan, 2012).

The completion of construction projects in a timely manner is often a critical factor and measure of project success (Khosravi & Afshari, 2011). Conflicts in construction projects related to project delays are a recurring theme in construction litigation (Kent & Becerik-Gerber, 2010). Simultaneously, a combination of construction management and project management research has identified the commencement and early stages of construction projects as the critical junctures in either overcoming or being hindered by project delays (Li, & Carter, 2005). Nevertheless, the outcomes of prior research have focused on scheduling methodologies and schedule management reporting techniques (Hartmann, Van Meerveld, Vossebeld, & Adriaanse, 2012).

Traditional measures of project success reflect three aspects of the "triple constraint" or "iron triangle" (Papke-Shields, Beise, & Quan, 2010, p. 653): cost, time, and quality/performance (Papke-Shields, Beise, & Quan, 2010). These dimensions are central when measuring project success. In the minds of professionals, cost, time, functionality, and quality remain relevant for assessing the performance of projects and have appeared in numerous studies, either in conjunction with other measurements or alone (Papke-Shields et al., 2010). However, performance goes beyond these general assessments.

Projects that begin poorly rarely get back on track; they lose collective focus, and excessive time and energy are spent correcting mistakes rather than forging ahead with the schedule (Li & Carter, 2005). When analyzing the literature research, the timeline schedule is a factor in the completion of the project; more accurately, the baseline schedule development phase is a potential source of poor project planning, leading to problems in completing on time (Yang, Chou, Lo, & Tseng, 2014). The commencement of the construction project is the baseline to the targeted completion date (PMI, 2014).

Managing human resources is often overlooked in construction projects (Heagney, 2011). It involves identifying the people needed to do the job; defining their roles, responsibilities, and reporting relationships; acquiring those people; and managing them as the project is executed (Heagney, 2011). The construction management teams, along with the business stakeholders, have a process that remains apprehensive in the face of completing the construction project on time and under budget (Morris & Pinto, 2010).

Public relations are another issue for the construction management team and stakeholders of the project (Olted & Moran, 2012). Construction problems can have a lasting relationship with the community in a negative way by economic contributions. The failure of a construction project to open on time typically means that the cost overrun is one factor for all the stakeholders to check (Ramanathan et al., 2012). The failure of a construction project to meet on-time delivery has a potentially negative influence on construction work or could conceivably be a positive outcome for the contractor or stakeholder (El-Gohary & Aziz, 2014). The positive effect is a project that is completed

and economically good for all involved. The negative issue or effect can be a funding issue, which arises on both sides, the contractor and stakeholders, in the processes of being on time and funding the project to the end (Jaffar, Tharim, & Shuib, 2011).

Business Project Management

Project managers are exposed to risk from the moment of project inception to implementation. When projects fail, the seeds for that failure are often sown within the first 5 minutes of the lifecycle of the project (Gardner, 1999). The lifecycle of a business project is a processing tool that demonstrates the entire building lifecycle system from start to finish for the project (Porwal, & Hewage, 2013). The decision-making system is part of the development in all stages of the project lifecycle from the framework to the foundation. A business system that uses a lifecycle can use different characteristics to determine the lifecycle at each stage of the project (Zavadskas, Vainiūnas, Turskis, & Tamošaitienė, 2012).

Project scheduling is a complex process, and construction managers are required to consider multiple processes that can affect the accuracy of a project's projection. Dovern and Weisser (2011) found a high degree of dispersion of accuracy across forecasters, exposing large differences in the performances of forecasters across countries and different macroeconomic variables. Microeconomics suggests a tendency of obtaining biased forecast results when forecasters had to learn about large structural changes or gradual changes with variable trends (Dovern & Weisser, 2011). An accurate forecast of the cost and duration is imperative for successful construction projects (Ökmen & Öztas, 2010). In cost estimating and other areas of value engineering, asset

management, and project controls, the projects are continually increasing in complexity (Zimina, Ballard, & Pasquire, 2012).

A building information model can forecast the characteristics of geometry, spatial relationships, geographic information, and quantities and properties of building elements, cost estimates, material inventories, and the project schedule (Azhar, 2011). This estimation of project duration is beneficial in various categories of construction management practices, such as construction planning, contract administration, and bid evaluation (Irfan, Khurshid, Anastasopoulos, Labi, & Moavenzadeh, 2011). Given the estimated project duration, there is a user cost of delays and safety associated with the project implementation for that project (Irfan, Khurshid, Anastasopoulos, Labi, & Moavenzadeh, 2011). The application in a project period can use what project managers refer to as a business lifecycle. The business timeframe in the lifecycle is figuring the benefits in the construction business with the owner understanding the issues at each phase of construction (Irfan, et al., 2011). The business timeframe is necessary for building on time and under budget regarding lifecycle; scheduling is important for many aspects of the construction business (Irfan et al., 2011). The lifecycle system has many different methods to gather information on business projects that project managers can use (Szuba & Young, 2003).

Construction managers use many managing tools that help them carry out their duties. Scheduling tools, such as Gantt charts and Work Breakdown Structure (WBS), represent the flow of activities and organization of a construction project (Cao & Hoffman, 2011). Schedule information requires separate and distinct analytical tools,

such as Gantt charts, Critical-Path Management (CPM) or Critical-Path Analysis and Program (or Project), the Project Evaluation and Review Technique (PERT), and WBS. Gantt, CPM, and PERT are powerful tools that help in the scheduling and management of complex business projects (Sharon, De Weck, & Dori, 2010). The methods of Gantt charts, Critical-Path Management (CPM) or Critical-Path Analysis and Program (or Project), the Project Evaluation and Review Technique (PERT), together with WBS, regarding their objectives and applications, are the most referenced PM methods in systems engineering handbooks, indicating that the most common method that project managers use is systems engineering management (SEM; Sharon et al., 2010). SEM in the construction business focuses on many systems and not one system alone, which can manage a construction site on time and under budget (Sharon et al., 2010).

Researchers explored Gantt charts in a business construction with project management planning and found them critical for a successful project (Whitty, 2011). Project managers have long used Gantt charts in business construction as an effective means to coordinate and execute a project. The easy-to-read and common display of schedules and activities is why project managers use Gantt charts as a tool (Heagney, 2011). Chavada, Dawood, and Kassem (2012) used Gantt charts in an interactive process that ran a full simulation using the timeline, with the instrument displaying in real time the results of the conflict. As the project management team identifies the conflict, the resolution process starts. A review by the project manager allows the description of all sorts of sequential constraints and relationships among tasks, graphically and with significant ease in Gantt charts (Chavada et al., 2012). Nevertheless, when project

managers use Gantt charts, the charts do not specify what to do when; because of contingencies in the execution, a temporal constraint or a temporal relationship is violated (Flores & Sepúlveda, 2011). In these circumstances, the course of action is left to the project coordinator's discretion, because no relationship is specified in the chart. The project manager allows the main contractor to separate the project concerns into two different plans (Gantt charts): one to manage the principal advances, and another to handle the contingency issues. Diagnosing the current project state, the project manager uses these plans together (Ochoa, Bravo, Pino, & Rodríguez-Covili, 2010). Depending on the software that project managers use to produce the Gantt chart, the chart might also show activity sequences, activity start and end dates, resource assignments, activity dependencies, and the critical path (Phillips, Heldman, Baca, & Jansen, 2006). A project manager can view a project schedule in a Gantt chart, which shows activities in a graphic chart with dates. The schedule plan in this chart details how the project changes in the schedule and helps in managing changes such as the costs obtained from the budget and the schedule from the initial project time chart (Marrero, Fonseca, Falcon, & Ramirez-de-Arellano, 2014). One significant aspect of process control is data measurement and accuracy (De Marco & Narbaev, 2013). The method, structure, data, and precision of detailed measurement may vary depending on the particular characteristics of the project (Kog & Loh, 2012).

When project managers explore cost budget, expenditures, and variance in performance, they exhibit them in a chart as an S-curve or other form depending on the chart or diagram used to represent the cost factors of the business project (Han, Love, &

Peña-Mora, 2013). Project managers can use a variety of other resources, such as Gantt charts, Critical Path, PERT charts, resource allocation, activity dependencies, what-if analysis, and various reports produced by plugging in scheduling information to most project management software tools (PMI, 2014). Gantt and PERT methods, together with WBS, vary regarding their objectives and applications and are the most referenced project management methods in construction sources (Sharon et al., 2010). The CPM schedules should set thresholds for the project with the support of the WBS levels that act as warning signals during the project's progress to indicate when corrective actions are necessary to bring the project back on track. The choice of the right WBS level is important and requires a balance between the degree of detail and ease of project tracking (Vanhoucke, 2011). To apply the method successfully requires knowledge of the WBS (PMI, 2006), the duration of each activity, and the precedence of relationships among them. The user or project manager enters the data in the margin or imports them from a standard project scheduling problem library file (Salas-Morera, Arauzo-Azofra, García-Hernández, Palomo-Romero, & Hervás Martínez, 2013). There is no single best approach in developing a WBS; therefore, it is possible to use a combination of approaches in a WBS development (Han et al., 2013). According to experts, considering another approach to project planning has suggested the use of product breakdown structure or a deliverable-oriented WBS in creating a WBS (Han et al., 2013). The advantage of this approach is that the project's focus is on what is achievable rather than how; in other words, the focus is on the end instead of the means (Han et al., 2013).

The importance of examining these programs is that they help in scheduling and tracking the critical success factors. The overwhelming failure of projects and the belief that the identification of these factors would profoundly improve project implementation in practice needs to be addressed (Söderlund, 2011). CPM is another useful tool for all types of projects, such as construction, engineering, facility maintenance, and research and development. A project manager can use a mathematical algorithm to schedule a set of activities in a project (Kim, Kang, & Hwang, 2012). The CPM is a technique developed in the late 1950s by Kelly of Remington Rand and Walker of Dupont (Lin, 2013). Project managers use the CPM method fundamentally linked to the tradeoff between completion time and the costs of the project (Kelley & Walker, 1959). This is suitable for application to deterministic conditions rather than probabilistic conditions (Kim et al., 2012). Project managers can use CPM to determine the time–cost tradeoff for an activity that meets given completion times at minimum cost and is useful when similar experiences from previous projects. In project management, a critical path is a sequence of project network activities that add up to the longest duration (Hebert & Deckro, 2011). The critical-path sequence determines the least time possible to complete the project (Lin, 2013). Any delay in an activity on the critical path directly affects the planned project completion date. A project can have several parallels and near critical paths (Lin, 2013). An additional parallel path through the network with a total duration shorter than the critical path is a subcritical or noncritical path (Lin, 2013).

At about the same time as Kelly and Walker were developing CPM, PERT was developed and put into practice and contributed to the success of the Manhattan Project

(Lepadatu, 2010). The Navy initiated a project called PERT, developed in the 1950s, to control large defense projects and has used it routinely since (Salas-Morera et al., 2013). With respect to the PERT method, features include the value of completion times for each task and the task durations. Calculating the probability timeframe supports the project completed within a given timeframe. The resources that project managers' tools should cover are assigning the tasks and understanding the constraints for a project. PERT is a method for evaluating the completion time of a project and was specially designed for those projects in which the durations of the activities were uncertain (Yang, et al., 2014). PERT calculates the weighted average estimate for each activity or task with optimistic, pessimistic, and most likely times and determines variances or standard deviations to come up with total project duration within a given confidence range (Phillips et al., 2006). PERT supports the task of depicting tasks along with dependency information and length. PERT supports assigning parametric probabilities to task completion times in accordance with optimistic, pessimistic, and likely estimations (Sharon et al., 2010). Each method, when used in construction scheduling, has limits and gains. Using different methods in each phase will result in or lead to a focused timeline approach (Söderlund, 2011).

Forecasting Processes

Forecasting refers to the process of estimating future outcomes (Chen, & Zhang, 2012). Hall, & Virtue (2002) stated that the main goal in forecasting was to reduce the uncertainty associated with project costs by providing standardized measurements for performance. Forecast processes established by organizations have a tendency to rely on

feedback from different groups, whose members represent various functional areas, for arriving at consensus forecasts (Önkal, Lawrence, & Sayim, 2011). Önkal et al. (2011) conducted a study that compared the forecasting performance of modified consensus groups with that of the average individual member forecast (in groups) using formal role playing. The results of the study showed that group forecasts contributed positively to forecasting accuracy when undistorted model forecasts existed (Önkal et al., 2011). Group discussions might be an efficient method of displaying and resolving the different motivations for including contingencies in a forecast, potentially leading to group forecasts with high accuracy (Önkal et al., 2011).

The numerous cost variables reviewed by project managers, as well as techniques for forecasting project and cash flows, supported the timing, accuracy, level of details, methods of compilation, and different approaches to integrating variables with money elements (Park et al., 2005). Research in the fields of construction and project scheduling indicated that they often suffer regarding time delays, cost overruns, and quality defects (Meng, 2012). Hundreds of articles written describing why projects fail can be found in the traditional project management literature: lack of leadership, low user involvement, inadequate competencies or skills, poor stakeholder communication and management, lack of top management support, and poor requirements definition (Blackstone et al., 2009). While project managers do not dispute the existence of these problems, more issues fundamentally exist and cause project failure (Kim et al., 2012).

Management of Scheduling

Previous project management research has identified a wide range of measures that describe the outcomes of the project and the input characteristics that affect outcomes. In repetition, project schedule are statistically using a singular project performance measure in some construction firms (Xu & Yeh, 2014). Project scheduling is still a worthwhile practice. Construction businesses and the use of project schedules can measure results in business projects (Vanhoucke, 2011). Schedules, in turn, show the timeline and possibility of being behind schedule and coming in over budget. Schedules act as a guide to make sure that the business project is on schedule and that the next scheduled task is on time. A common misconception about project management is that scheduling is just scheduling tasks. At last report, Microsoft Corporation had sold more than a million copies of Microsoft Project, yet the failure rate on business and projects remains high (PMI, 2014). Scheduling is a primary tool used to manage projects, which is not nearly as significant as developing a mutual understanding of what the project is supposed to accomplish or construct (Heagney, 2011). Managing projects thoroughly requires a significant amount of time, skill, and finesse. Project management has many attributes that make it interesting and demanding. Project managers focus to take an unclear event and make an absolute promise of delivery time to the owner as well as to the whole construction team and community (Blanc-Brude & Makovsek, 2013). Project management teams manage to do this within a specified time and a limited budget (Robinson & Richards, 2010). With this information, schedules help the project and business stay on time and under budget (Robinson & Richards, 2010).

Business Performance

Construction time performance (CTP) is a concept that shows the flexibility in approaches to project time planning. CTP raises an interesting question about the effectiveness of planning and control (Walker & Shen, 2002). With planning and control in the schedule of the project, flexibility in overcoming unexpected problems is possible. In many referenced constructions, time performance was identified, along with cost and quality, as one of the three success factors for a construction project (Anuar, Torrance, & Hamid, 2006). Planning and flexibility form the framework for the project team in understanding and providing a model that contributes to the project understanding of mechanisms and drivers that deliver flexible behavior that may affect CTP. No matter how seamless the construction project plan is, if consistent and timely reviews are not performed during the project execution, neither the project progression nor the effectiveness of the construction plan can make progress (De Marco & Narbaev, 2013). Performance drivers that any project team tries to keep on track are (a) cost, (b) time, and (c) scope of work. Monitoring the performances of these drivers gives the business contractor a better understanding of what the planned performance will achieve (Papke-Shields et al., 2010).

Monitoring is a recurring action to compare actual versus planned performance to determine cost and time estimates for scheduling and completion phases, and, if necessary, to take preventive and corrective actions based on such estimates (De Marco, 2011). Project managers measure project performance regarding time, cost, quality, and safety, which should form the client's project objectives, although different clients have

varying weightings and might negotiate conflicts among the objectives (Lam & Wong, 2009). Performance measurement and analysis comprise recording resource use during the project execution, objectively measuring the actual physical work progress, analyzing and forecasting cost/schedule performance, reporting performance problems, and taking corrective actions (PMI, 2011). Business performance measurements show that both ability, supported by organizational and team competence, and commitment to exploring construction method options in a flexible manner (i.e., responding to unanticipated problems) are necessary to facilitate safe CTP (Walker et al., 2002). In the construction business, the project manager may find it necessary to determine the performance levels regarding time, cost, and quality so that when the evaluated, both parties understand the outcome (Hampton, Baldwin, & Holt, 2012). In particular, performance based on time, cost, and quality form the performance level of a project. Understanding the construction plan will help in better decisions made to give clients value for their money (Eriksson & Westerberg, 2011).

Business Decision

The decision-making support looks at the measurements to illustrate the current state of the project performance evaluation and the stakeholders' point of view. The projects' different stakeholders do not have the same needs regarding performance evaluation to support their decision-making processes (Hampton et al., 2012). Construction has a significant effect on the availability of decently paid local or regional jobs and obviously on the profitability of construction companies (Howley, 2008). I mention that it still not clear how to measure project success, because project

stakeholders perceive success or failure factors differently. Lim and Mohamed (1999) believed that project success was viewed from the different perspectives of the individual owner, developer, contractor, user, the public, and so on (Khosravi & Afshari, 2011). The more modern development includes quality frameworks or business excellence models, such as Total Quality Management, International Organization for Standardization standards, the Malcolm Baldrige quality award criteria, the European Foundation for Quality Management, Six Sigma, Lean Six Sigma, and the Balanced Scorecard (BSC; Lyberg, 2012). These models are not entirely different. They often share a common set of values and common criteria for excellence. Rather, they represent a natural development that shows in all tracks of the business project (Lyberg, 2012).

Six Sigma is the most developed business excellence model, because it relies so heavily on statistical methods (Lyberg, 2012). Six Sigma supports project managers in simultaneously monitoring multiple error sources. Six Sigma supports project managers in the construction project tracking (Bozdogan, 2010). Lean enterprise practices and Six Sigma methods merged into a harmonized implementation "package" known as the Lean Six Sigma continuous process improvement toolset (Bozdogan, 2010). In effect, Lean enterprise concepts are reduced into a mechanical implementation toolset in the service of a practically exclusive emphasis on process improvement at the tactical and operational levels (Bozdogan, 2010). Using the Six Sigma models is important, and an understanding of the quality of each Sigma remains unstated in the project management of construction (Lyberg, 2012).

The BSC, with its broad-based approach, has the perspective to support the management of multiple goals through the systematic and overt recognition of stakeholders and their goals in balancing organizational objectives in a strategic performance management system, allowing trade-offs of these using perceived cause-and-effect relationships between objectives and measures (Sundin et al., 2010). The BSC developed in reaction to the deficiencies of sole reliance on financial measures (Boari & Cantaluppi, 2010) in management control systems (Sundin et al., 2010). Stakeholder scorecards miss the point (causal relations) to achieve goals; they do not address goals. Consequently, a stakeholder scorecard is not a "strategy Balanced Scorecard" (Sundin et al., 2010). Balance scorecards, if used properly by project managers, show the financial aspect of the stage, and more needs to show goals and each phase or section accomplished in the project (Sundin et al., 2010).

Project managers controlling project performance using the elementary components of the Iron Triangle (a) cost, (b) time, and (c) quality alone seem inefficient. The "Iron Triangle," has cost, time, and quality as its criteria (for the delivery stage; Khosravi & Afshari, 2011). The postdelivery stages comprise (a) the information system, with criteria such as maintainability, reliability, validity, information quality use, benefit (organizational); (b) improved efficiency, improved effectiveness, increased profits, strategic goals, organizational learning, and reduced waste, benefit (stakeholder community); and (c) satisfied users, social and environmental influence, personal development, professional learning, contractors' profits, capital suppliers, content project team, and economic influence to surrounding community (Khosravi & Afshari, 2011).

The proposition integrates the characteristics of each project task, objective, decision makers' personality, and competencies. The aggregation tool called MACBETH analyzes the performance measures according to project managers' performance interests (Marques, Gourc, & Lauras, 2011). MACBETH stands for "Measuring Attractiveness by a Categorical-Based Evaluation TecHnique" (Bana e Costa & Chagas, 2004). MACBETH is an analytical hierarchy process in the project context; for example, Dweiri and Kablan (2006) proposed a fuzzy decision-making system to quantify a global project management with internal efficiency (Marques et al., 2011). In the Iron Triangle theory, in construction scheduling, on time and under budget could benefit the business aspect of project management. The business world in the construction industry has many options, and each project needs to be aware of different evaluations in the process (Kapsali, 2011).

Business Communication

The bidder's conference meeting and procurement negotiations are the priority techniques to minimize bidding and legal procurement problems (Morris & Pinto, 2010). The limitation of this process by project managers includes only three procurement options: general contracts with fixed price, design-bid with fixed price, and collaboration with a cost-reimbursement form of payment (Osipova & Eriksson, 2011). The process of determining which procurement process is appropriate depends on the owner and funding allocated to that construction project (Hillson, 2009). Before getting to this step, stakeholders need to evaluate the process and understand the project and funding allocations (Hillson, 2009).

The use of stakeholder analysis and communication analysis permits effective communication management in the process of cost and bidding (Papke-Shields et al., 2010). Bidding on projects is a time-consuming task that needs to be evaluated. The team needs to have an understanding of the project at hand for a proper bidding protocol. The evaluation or protocol is based on project managers' and team member's values in the Project Management Body of Knowledge (PMBOK) Guide, which is unique to the needs and design of effective training programs for construction specialists (Chou & Yang, 2012). The PMBOK Guide is only a reference that contractors and owners can use to understand the language and processes of a construction project (PMI, 2014).

Project complexity is a particular and unique combination of emotional, intellectual, and managerial challenges (Mills & Treagust, 2003). While the interactions between leadership behavior and performance in business have received substantial attention, the number of studies dealing with the leadership style of project managers and its contribution to project success is rather low (Yang, Huang, & Wu, 2011). Leadership in business has many theories in the process, and understanding the critical path in scheduling is relevant for finishing on time and under budget (Yang et al., 2011).

One theory in the business process is the use of CPM scheduling. Critical path scheduling uses workflow scheduling of construction projects (Abrishami, Naghibzadeh, & Epema, 2010). Construction businesses that analyze the critical path of a workflow identify the longest execution path between the entry and exit tasks of the workflow. Team schedules or elements of a project on the critical path cannot delay without delaying the completion of the project. Subjects of optimization can be both minimal

project duration as well as minimal resource deployment to complete all construction tasks on time. The schedule timeline by project managements have start and completion times for every in activity and respective resource allocation (Horenburg, Wimmer, & Günthner, 2012). The project manager can divide the process into three principal phases project conception, project design, and project construction (Ramanathan et al., 2012). The vast majority of project delays occur during the first construction phase, in which many unforeseen factors are always involved (Chan & Kumaraswamy, 2001). Factors involved in construction are not limited to time delay, funding, logistics, and scheduling (Chan & Kumaraswamy, 2001).

The schedule factors in the relationship are such that even a one-day delay in project completion could result in a concurring one-day delay to completion of the project (Yang & Kao, 2012). This occurrence is identified as the critical path or lag time event in a project. Activities scheduled by project managers that are not on the critical path can have two types of relationships to the critical path, known as their float. The float is identified as a free float, total float, or lag time. The time delay in a project is the end of one task and the beginning of another in a sequence (Elmabrouk & Aljiebali, 2012). Technically, the float is the difference between the early finish and late finish times for tasks on noncritical paths. The total float for an activity measures the time that an activity delays without influencing the completion of the project. The free float for an activity is the amount of time that the activity delayed without affecting the commencement of the planned earliest start of activities that logically succeed that activity, also called the successors (Yang & Kao, 2012).

In research on scheduling methodologies, scheduling techniques include, but are not limited to, assigning probabilities to the activity durations. Although this technique is used by project managers in some construction businesses, not all districts use this technique to review and analyze for potential relevance. The construction process is a nonlinear dynamic system, which by its very nature suggests an opportunity for application of chaos theory's concept that the initial conditions have a bearing on the path of the project and the project's relatively defined constraints (Idrus, Nuruddin, & Rohman, 2011). Systems theory's suggestion that the dynamic stability of the construction project is an internal and inherent characteristic does not conflict with decision theory's suggestion that the mathematical representation of scheduled project activities, regardless of the prioritization, will involve conscious decisions by the participants to emphasize the completion of easier and quicker tasks first (König & Kleinmann, 2007). The fieldwork revealed that the fundamental heuristic used by top management to prioritize a project relative to others for resource allocation purposes relates to the extent a business-critical project is likely to overrun the original deadline (Yaghootkar & Gil, 2012). The theory may give, on the results of this study, recommendations for prioritization of tasks within the project scheduling process plus further segmentation and assignment of the schedule development task responsibilities. At the heart of this research is a constrained optimization business problem (Yaghootkar & Gil, 2012).

The constraints a construction project has a start date and the proposed end date are fixed contractually but may be determined by the inherent tendency for construction

to attempt to complete prior to origination of the project at the beginning (Kastor & Sirakoulis, 2009). From the mathematical perspective of constrained optimization, the solution or solutions can be found through an iterative series of steps (König & Kleinmann, 2007). The schedule development process for these projects is also iterative and not primarily a mathematical exercise; instead, a project management practice in task prioritization and system balances between the needs of the various contracting elements. To the theoretical basis noted earlier, project management and construction management comprehensively are to validate the implemented project scheduling method and provide background for proposed outcomes of the project (König & Kleinmann, 2007).

To ensure project success, the project management team should identify issues and decide the time, expectations, and estimated working hours of each activity accurately in a real situation (Yang et al., 2014). There is a tradeoff for not accomplishing this task on related issues at the frontend. Time is a fundamental factor for success or waste, and the backend of the project's time is the rush to fulfill a completion date (Yang et al., 2014).

Rival Theories

Since the introduction of CPM in the late 1950s, time–cost tradeoff problems in project scheduling have been researched extensively (Heagney, 2011). Several models or procedures for solving the time–cost tradeoff problems have been proposed using linear programming, nonlinear programming, integer programming, dynamic programming, mixed integer linear programming, and heuristic algorithms, but most of the models or procedures do not consider activity quality in the problems (Kim et al., 2012). In the

linear model, time and cost trade-offs of activities represent a straight-line relationship on the graph that depicts the relationship between regular time and overtime. With the tradeoff of mathematical figures in the construction, the tradeoff is not as easy as one of these models (Kim et al., 2012). Of particular concern, the over-quality degradation time, cost, and contractor requirements for project management are significant elements for judging the successes for on time and under budget (Kim et al., 2012).

When reviewing other widely used project management tools (Gantt chart, milestone, and PERT), PERT was regarded as a practical tool to manage large-scale projects (Yang et al., 2014). Conversely, in the project-planning field, Gantt charts are effective means to specify the coordination and execution of projects (Flores & Sepúlveda, 2011). These charts allow the description of all sorts of temporal constraints and relationships among tasks graphically and with ease. Gantt charts do not specify what to do and when to do it because of contingencies in the execution, a temporal constraint, or a temporal relationship violation. In these cases, the course of action is left to the project coordinator's discretion, because there is no behavior specified (Flores & Sepúlveda, 2011). That is why PERT was developed—primarily to simplify the planning and scheduling of broad and complex projects. The U.S. Navy Special Projects Office developed PERT in 1957 to support the U.S. Navy's Polaris nuclear submarine project (Yang et al., 2014). PERT offers some advantages to help in the decision-making process, forces stakeholders to organize and quantify project information, and provides them with a graphic display of the project. It also helps them to identify which activities are critical to the project completion time and ought to inspect carefully and which

activities involve slack time and delay without affecting the project completion time (Yang et al., 2014). PERT/Cost is an extension of PERT to include economic considerations and cost factors in project control decisions. PERT/Cost is usually developed by project managers without enough experience. PERT is an approach to analyzing the involved tasks in completing a given project, especially the time needed to complete each task and to identify the minimum time necessary to complete the total project (Yang et al., 2014).

The background for research in scheduling theory and the CPM focused on the productivity across the board in business, which begins with studies in organizational management and funding in construction. The support of the CPM is to identify important activities on the critical path so that resources may determine these activities to reduce project time (Shankar, Sireesha, Rao, & Vani, 2010). The Evaluation and Review Technique (Clark, 1962; Malcolm, Roseboom, Clark, & Fazar, 1959) and CPM (Kelley & Walker, 1959) were the first major computerized project management decision-support systems (Trietsch & Baker, 2012). Although Kelley and Walker presented a fundamental stochastic analysis, CPM is deterministic. By contrast, PERT focuses on creating and controlling project schedules in stochastic environments. PERT relies on a stochastic analysis approach (Trietsch & Baker, 2012). The BSC is important quantitative tools for strategic business planning. The implementation usually concerns the construction and analysis of properly weighted averages of the so-called Key Performance Indicators; these are either objective or subjective evaluations of the performance levels achieved by the various subsystems constituting a business organization (Boari & Cantaluppi, 2010).

Because projects are inherently uncertain, they are prone to unexpected events (Geraldi, Lee-Kelley, & Kutsch, 2010), that is, procedures that may be predicted (or not), but are not expected to happen. The project is a vehicle for change, including a defined scope that needs to deliver in a specified time and at an agreed-upon cost. Systems theory relates to the challenges of scheduling and managing the schedule of construction projects. Project managers show costs in two classified categories: the direct costs related to individual activities and the indirect costs related to overhead items (Kim et al., 2012). Although risk management seeks to identify many of the variations and to provide for their mitigation, is impossible to de-risk a project. De Meyer, Loch, and Pich (2002) showed that projects face a continuum of unforeseen changes, ranging from simple variations (aleatory uncertainty) to chaos (epistemic uncertainty). Project managers' cause and effort are to predict possible risks from any project and residual uncertainties. Unexpected events, for the purpose of this study, are the outcome of a range of residual uncertainties that can threaten the viability of a project (Geraldi et al., 2010).

No matter what the risk management processes are, project managers will invariably face unexpected events. The aim of this study was to identify what differentiated successful and unsuccessful responses to unexpected events from the perspective of project and program managers. Project managers must accept the significance of people in projects, the fact that "the unexpected happens," and the fact that front-end thinking alone is not enough to develop successful projects (Geraldi et al., 2010). Baptiste and Demassey (2004) researched 60 activities for the activities

constrained to a constant (which is not the reality in construction projects), limiting the application of their research.

The relationship of chaos theory to construction scheduling problems is a link with nonlinear DP problems. Research in chaos theory has attempted to model the nonlinear nature of the performance of systems to assist planners in dealing with the potential flaws in their assumptions about predictable behavior (Djavanshir & Khorramshahgol, 2006). Because construction fits that description—rarely if ever do things go as planned in construction chaos theory research may have an application to the development of risk reduction methodologies for construction scheduling (Djavanshir & Khorramshahgol, 2006). I included the scheduling logic activity relationship in Table 2.

Table 2

Scheduling Logic Activity Relationships

	Relationship Description
Start to Start	Two activities start concurrently
Start to Finish	The first activity must start before the second can finish
Finish to Finish	Two activities finish at the same time regardless of start times
Finish to Start	The second activity does not start until the first completes
Lag	Any of the above relationships can modify the timeframe defined as either a positive or a negative value on the second activity in the relationship

Method

Qualitative research is an appropriate method for this study; because the focus of this study required the perspectives of project managers. Systematic with Merriam's (2014) suggestion, qualitative researchers study people in their natural environment and attempt to use an interpretive and naturalistic approach in terms of participants' views

and understanding of the meaning. Qualitative researchers do not focus on objectives or hypotheses but rather research questions. By contrast, quantitative researchers generate hypotheses during the initial phase of the study for the purpose of collecting and analyzing data for statistical purposes (Merriam, 2014).

Schultze and Avital (2011) suggested that qualitative researchers should use interviews to describe and clarify the participant's experiences. Quantitative researchers use survey research or an experimental cause-and-effect research to gather information to produce statistical analyses (Merriam, 2014). Merriam (2014) described the following key characteristics of qualitative research: (a) the research focuses on process, understanding, and meaning; (b) the primary instrument of data collection and analysis is the researcher; (c) the research process is inductive, and (d) the study is descriptive. For this qualitative research, the primary goal of the research methods was to understand phenomena from the views of participants in substantial and concrete social surroundings (Toloie-Eshlaghy et al., 2011).

Other Cost Factors and Time Delivery Tools

Regardless of the wide-ranging use of simulations in project management, the continuous simulation model for cost estimation remains unexploited, specifically for construction engineering and management (Chou, 2011). While instituting the applicability of the simulation procedures, Chou's (2011) study results showed that the simulated cost model presented superior accuracy by separating principal work items and unit price components (Chou, 2011). Chou suggested that a cost simulation approach

offered a simplified decision tool with which to evaluate construction cost and uncertainties objectively based on the experienced judgment of project managers.

Some collective methods for generating project cost estimates are inadequate, because they forecast only construction costs and apply them to the total project (Ökmen & Öztas, 2010). Professionals have used calculating techniques such as probability theory, fuzzy set theory, and Monte Carlo simulation to evaluate uncertainty in construction costs (Ökmen & Öztas, 2010). Ökmen and Öztas (2010) suggested that the insignificance of projected costs risk factors could not be spotted, thereby preventing the assessment of uncertainties for those forecasting techniques. Okmen and Oztas proposed a risk factor and simulation-based model called the correlated cost risk analysis model to help evaluate construction costs under uncertain conditions given the relationship between risks and cost factors. The results of the study showed that this model produced credible results under uncertain project cost conditions; the conclusion requires further evaluation for general application in projects (Okmen & Oztas, 2010).

Project scheduling, risk analysis, and project tracking are strategic indicators of a successful project (Vanhoucke, 2011). Project managers often encounter the challenge of prioritizing between cost and schedule in deciding on strategies for project execution (Bayraktar, Hastak, Gokhale, & Safi, 2011). Project managers should make such decisions throughout the life of the project. Senior level managers ideally will maintain an interest in the project performance and will know about the urgency of the various project activities and objectives (Vanhoucke, 2011). This attention, combined with the

accurate response during project tracking, should contribute to the performance of the project (Vanhoucke, 2011).

The research in the literature regarding construction timelines and scheduling methods focused on which factor contribute to financial forecast inaccuracies in a construction project. To achieve this required research, the use of a qualitative phenomenology study approach was considered to be the most appropriate for describing and analyzing the data obtained from interviews with project managers with experience in construction management inaccuracies of a construction project. The data collection process included e-mail, internet research, surveys, and telephone research interviews (Makkonen, Pohjola, Olkkonen, & Koponen, 2014; Muir, 2010). To support the evaluation of findings, I applied recommendation, simulation, and productive debriefing strategies in the study for themes that occurred most often. Debriefing took place efficiently, producing qualitative feedback and optimal learning transfer (Der Sahakian et al., 2015). Introducing a qualitative component to the testing validation process, I applied a bias approach, as suggested by Secolsky, Wentland, and Denison (2011), to identify and address potential bias during the study.

Transition and Summary

Construction scheduling, along with funding, project management, and business process, helps in the projection of cash flow and cost forecasting integral parts of many forecasting methods. Breakdown planning benefits construction projects through the improvement of forecast accuracy. Implications of the study results include techniques to improve the scheduling processes implemented by construction project managers. The

findings from my review of research literature supported the problem of inaccuracies in scheduling conflicts with the delivery of on time and under budget costs forecasting that results in adverse financial consequences for the construction industry. The results of this study will benefit the construction industry as well as project owners, the financial community, and other construction industry stakeholders. My conclusions and recommendations in this study will aid the scheduling processes for construction projects. Section 2 of the study will include the (a) research design, (b) selection of participants in the study, and (c) a discussion of how I analyzed and validated the data collected. I will discuss the findings in greater detail in Section 3.

Section 2: The Project

The purpose of this case study is to identify and explore construction project managers use of managing scheduled construction project delivery. General construction management projects, from the introduction, are complex, dynamic environments resulting in uncertainty and risk, compounded by demanding time constraints. In the Southern United States construction, scheduling and profits made project managers manage scheduled construction project delivery to maintain profitability during construction of projects. The literature review and research validate choosing a case study. Informed by a case qualitative research design, analysis of various sources of primary data is carried out using semi-structured interviews with construction project managers that understand their opinions and perceptions about the construction process (Qu, & Dumay, 2011); Reiter et al., 2011).

Purpose Statement

The purpose of this qualitative, single case study was to explore the strategies that construction project managers use to manage scheduled construction project delivery on time. To ensure alignment with the research and experience requirements of the study, the participants I chose consisted of project managers in Central Florida possessing 15 years of experience. This level of experience provided a reasonable basis for their perspectives on time delays, cost overruns, and quality defects. I used a sampling of multiple construction projects to address performance regarding time delays within Central Florida area construction projects.

This study of project managers of construction projects can bring about positive social change in various ways by influencing the economy of a community. Project managers' scheduling of construction of healthcare facilities, retail establishments, manufacturing businesses, and other building projects all result in increased demand for employees and the creation of a number of new jobs. As a result, new jobs can create and influence the community in a number of ways, bringing new people to neighborhoods, schools, and the area businesses.

Role of the Researcher

Myers (2013) suggested the obligation for a researcher to be aware of the different underlying assumptions and research designs that can inform qualitative research. The researcher does this by connecting with the participants and the environment and expanding the understanding of the phenomenon based on participants' views (Irfan et al., 2011). The primary focus of such research is to capture "authentically" the lived experiences of people and to represent them in a "convincing" text, which demonstrates that the researcher fully understands the case (Ihantola & Kihn, 2011, p.42).

Project managers determine whether construction completion occurs in a timely manner by comparing the project's progress with a baseline. In this study, I compared project schedule performance on a series of projects. Specifically, I collected and analyzed data to determine whether there was (a) a relationship between the baseline and timeline needed for the construction manager to obtain the schedule and for the schedule to be adopted and (b) the relationship between planned and actual project durations. In this research study, I used e-mails, face-to-face communication, and phone calls to verify

the companies from which to select participants. Participants were verified using a personalized questionnaire to ensure that they met the requirements and understood the process of the survey. The participants returned a consent agreement, similar to the one used in the study conducted by Halabi, Barrett, and Dyt (2010).

My role in the study was to investigate the views of the participants and to establish relevant themes from their perspectives about the construction business and scheduling issues in the planning and designing of construction projects, which often suffer time delays, cost overruns, and quality defects. I designed the interview protocol for the study, and I transcribed and stored the data collected from the interviews. To minimize subjectivity in this qualitative study, I stayed aware of my personal judgments and biases and presented only the information provided by the interviewees. My scholastic background and 10 years of work experience in project management supported my qualification to conduct this research study.

Participants

I selected the study participants from five different construction companies located in the Central Florida area that I found from an Internet search. I contacted the companies and sent forms for permission to interview participants. Each participant was a project manager with at least 15 years of experience. Participants were asked to provide a perspective on time delays, cost overruns, and quality defects. In the construction industry, project managers are responsible for scheduling and meeting timelines as well as meeting planned milestone dates and staying within a budget (Perkins, 2014). Kog and Loh (2012) stated that respondents with 15 or more years of experience are experts in

construction because, in their study, professionals with less than 15 years of experience had distorted and biased views and judgments about critical success factors for construction projects.

Identifying research strategies is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem (Gunasinghe, 2014). Strategies I used in this study included building a complex, holistic picture; analyzing words; reporting detailed views of the informants; and conducting the study in a natural setting. My identification of targeted participants in the construction industry with knowledge-intensive activities was essential, as much knowledge is experience based and along these lines tacit (Zhang, He, & Zhou, 2013). I conducted research for participants with my knowledge in the construction industry and an Internet search for large and small construction companies. The information I found was available from (a) construction companies in Central Florida, (b) social and professional websites, and (c) a list of projects completed during the last 5 years from websites. I documented the selection of participants for this qualitative case study via e-mail, texts, phone calls, and using a participant's questionnaire.

Research Method and Design

Research Method

The method I chose for this study was the qualitative approach. This method was appropriate because the focus of this study required a perspective of project managers in construction. Gilson, Sheikh, Akua Agyepong, Ssengooba, and Bennett (2011) stated that qualitative researchers study people based on historic and social perspectives and

interpret phenomena regarding participants' views. Qualitative researchers do not focus on objectives or hypotheses but rather research questions (Merriam, 2014). By contrast, quantitative researchers devote more space to a theoretical discussion of method and data collection than to the actual management and analysis of data once collected (Merriam, 2014). Myers and Newman (2007) suggested that in qualitative research, researchers should use interviews to describe and clarify participants' experiences. Quantitative researchers use survey research or experimental cause-and-effect research to gather information to produce statistical analyses (Merriam, 2014). Merriam (2014) described these significant characteristics of qualitative research: (a) the research focuses on process, understanding, and meaning; (b) the primary instrument of data collection and analysis is the researcher; (c) the research process is inductive; and (d) the study is descriptive.

Research Design

For this qualitative research, I used a case study design to expand on the existing literature about the perspectives of project managers regarding the factors that influence scheduling inaccuracies in construction projects (see Merriam, 2014). A case study research design was appropriate for this study because I wanted to explore a process and program in detail from the perspective of one or more individuals (Yin, 2013). According to Eisenhardt (1989), using the case study design, researchers may analyze data from one or more cases, either from within one case or across several cases (Ravenswood, 2011). When exploring some qualitative designs, researchers can also consider ethnographic and grounded theory approaches, showing the relevant research in social interactions (Smith

et al., 2011). I considered an ethnographic study, but the very nature of this study sought to understand people's behavior, attitudes, and the significant differences (see Hiller, 2010). A case study with data collection based on interviews was more appropriate for studying the schedule inaccuracies phenomenon in time delays, cost overruns, and quality defects in construction projects from the perspective of project managers.

The inclusion of project managers' perspectives in the study related to Moustakas's (1994) assertion that qualitative case study research is a means for exploring the experiences of and understanding participant perspectives accurately. In sampling the data (the constraints project managers faced), I was guided by the concept of data saturation, which occurs when the researcher no longer sees new data appearing in the research or when the additional data collected appears redundant (Koerber, & McMichael, 2008). To reach the point of data saturation, researchers must continually analyze their collected data while still collecting more data (Koerber & McMichael, 2008).

While gathering data from project managers, who I audio recorded in for each interview, I also took field notes regarding the interview to establish biases and insights (Thomas & Magilvy, 2011). Participants received a summary of the results from the interview that included my notes and audio recording for validation. Participant project managers had an opportunity to discuss and understand the findings.

Population and Sampling

The population of this study consisted of project managers with at least 15 years of experience in construction projects. The sampling process I used for the selection of

participants was a combination of purposeful and snowball sampling to find participants who could provide a better understanding of the problem and the research question, based on their perspectives and experiences (O'Reilly & Marx, 2011). In my discussions with participants, the focus was on scheduling and time management of a construction site with respect to planning highly challenging tasks.

Project management is the "application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations" (PMI, 2006). Perkins (2014) suggested that the project managers assemble appropriate resources within the organization to complete projects on time, within budget, and according to end-user specifications. Therefore, in this study it was appropriate to interview project managers about factors contributing to project scheduling and cost factors in the inaccuracies in construction projects. I selected the project managers from a group of professional acquaintances familiar to me from previous work experience and project managers referred to me by those colleagues, in accordance with their experience relevant to the study (see Kent & Becerik-Gerber, 2010; Lamm, Tosti-Kharas, & Williams, 2013). The list was a simple random sampling process is a qualitative research method, which researchers find particularly useful in the investigation and development of theories and questions that deal with the role of meanings and interpretation of the findings (Ezzy, 2013).

I used a case study for research similar to that used by Sunding and Odenrick (2010); this included placing telephone calls to project managers to validate and document interviewee's relevance to the study. I contacted the companies by phone,

received the e-mail addresses of possible participants, and then sent forms for permission to interview participants. The participants were given information on the study, asked to fill out a questionnaire, and participated in a one-on-one interview with me where I asked them the interview questions I developed for the case study. One requirement of the participants was 15 years or more experience in construction project management. In their study, Sunding and Odenrick conducted interviews and telephone calls after receiving feedback from the participants. I followed up with participants after the interviews by sending e-mails or placing phone calls to project managers identified during the research to validate and document participants' relevance to the study.

I also followed Sunding and Odenrick's example in questioning the participants throughout the qualitative case study, which included interviews with seven project managers who had at least 15 years of experience in construction projects (Tan, Shen, & Yao, 2011). Brunk and Blümelhuber (2011) conducted research with a diverse pool of 20 project managers. They collected data from their 20 participant's in-depth interviews (Shea, 2010). I either conducted phone interviews or e-mailed participants the questions. The phone interviews lasted approximately 15 minutes, following a similar duration as a separate qualitative study conducted by Evans, Twomey, and Talan (2011).

I used a purposeful sampling method to select the project managers to participate in this study according to the criteria I found to be significant (Koerber & McMichael, 2008). Purposeful sampling is often used in agreement with the qualitative intention (Creswell, 2008). Data were collected using in-depth interviews, semistructured questionnaires, and face-to-face interviews. The sample included 20 project managers, as

supported by the number of participants in qualitative studies conducted by Brunk and Blümelhuber (2011) and Walker (2012) and verified by theme saturation (see Gutiérrez, 2011). Similarly, Winkelen and McDermott (2010) conducted a qualitative study with semistructured interviews to understand the participants' thoughts and views, providing further support for my approach in this study.

In my study, the 5 construction companies selected had project managers with experience in general construction in Central Florida. These participants possessed the following characteristics: (a) more than 15 years of experience in project construction, (b) experience in small or large construction projects, and (c) experience in all phases of construction as a project manager. For the interview setting, I consulted the interviewees to choose a convenient and comfortable time for the interview, which should not last more than 45 minutes.

Ethical Research

I obtained permission to conduct the research from Walden University and its IRB prior to conducting the study. Once I received approval, I contacted the selected participants to explain the purpose of the research study and conduct interviews. I consulted the interviewees to choose a convenient and comfortable time for the interview, which should not last more than 45 minutes.

I interviewed participants that I identified or that were referred to me. I provided all participants an invitation and consent agreement form. I informed the participants that they could withdraw or terminate their participation in the study at any time during the

process and without repercussions. I also informed the participants that no monetary compensation would be offered.

I contacted each participant by phone or e-mail before conducting the study, as approved by Walden's Institutional Review Board approval number (11-04-16-0433374) for the study. I informed the participants about the purpose of research and the confidentiality of their responses. I also asked them to sign a letter of informed consent to document their approval to participate in the research. To protect the confidentiality of the participants, I did not reveal their names and titles when reporting the results. I used a 256-bit algorithm to encrypt all data collected to protect the identity of participants and identifiable data.

I also protected the confidentiality of the participants by using code names, such as Participant 1, Participant 2, and so forth. A list of assigned code names for project managers will be maintained in a locked cabinet at my home; the Excel spreadsheet will be password protected. I will retain the files for no less than 5 years. Safeguarding of study documents will guarantee the confidentiality of participants, including stored transcripts from interviews, audio recordings, and all related documents. I retained all documentation pertaining to the participants and saved these files on my computer, backed up to an external hard drive. I will destroy the information maintained in the recordings after 5 years.

Data Collection

Instruments

The approach used to collect data for this qualitative study was semi-structured interviews (Krane, Olsson, & Rolstadås, 2012). I conducted a semistructured interviews with each of the participants, some of which were supplemented with questions administered by telephone and e-mail (Krane et al., 2012). I telephoned or e-mailed all project managers to confirm that they had 15 years or more of experience in construction projects and experience managing at least one project in the Central Florida area of the United States (see Kog & Loh, 2012). The data collection and consent form process included telephone and e-mail communications with the participants to clarify questions, confirm interview availability, and schedule interviews. I e-mailed invitation letters, consent forms, and confidentiality agreements to prospective participants and provided each potential participant with interview documents.

I also used archival sources such as documents, historic records, organizational charts, and production statistics from contractor web sites and projects. Documentation of project meeting minitues was used as a souce from the interview on which projects the project manager chose to refer to during the interview. I researched information regarding participants on company websites.

Qu and Dumay (2011) suggested the steps during data collection include establishing the boundaries of the study, collecting information using interviews, and determining a protocol for data recording. I conducted the interviews with a semistructured and open framework (see Appendix), which was provided to the

participants before the interview for their review (Brewer, et al., 2013). The purpose of the interviews was exploratory research to address the lack of performance regarding time delays, cost overruns, and quality defects in the Central Florida area.

Semistructured interviews allow for ethical, open discussions and followed the recommendations and policies outlined (Brunk & Blümelhuber, 2011). Semistructured interviews promote extemporaneous responses on the part of the participants when they share their views, thoughts, and experiences on the topics discussed during the interview (Mayer, 2008; Rabionet, 2011). Rabionet (2011) focused on and used a semistructured interview process to explore and understand the experiences of the participants. Similarly, Campbell, Quincy, Osserman, and Pedersen (2013) conducted an in-depth qualitative study with semistructured questionnaires, which tended to produce short responses requiring only a single code for each one. Semistructured interviews tend to elicit more open-ended, rambling responses that often require several codes simultaneously. I designed the interview questions to gather background knowledge from the participants and to provide opportunities to elaborate and expand on questions for further inquiry.

I retained the semistructured interview with questionnaire template to stay focused on the research study (Qu & Dumay, 2011). I achieved reliability in the study by conducting interviews and confirming the responses received during the interviews with the participants via the use of the interview protocol. For the assessment of validity, throughout the study, I implemented member checking, rich description, and peer debriefing strategies (Brunk & Blümelhuber, 2011). I applied a bias clarification, in terms

of keeping my thoughts and feeling from interfering with the process, as suggested by Secolsky et al. (2011), to identify and be aware of potential bias during the study.

Data Collection Technique

In-depth, semistructured interview data constitute the empirical backbone of qualitative research. Campbell et al. (2013) and Qu and Dumay (2011) proposed that qualitative methods offer a list of interview questions based on similar concerns embedded in most typologies of interview questions, drawing on sources suggested for interview questions. The framework of the study involved the philosophical constructivist in terms of a broad array of four concept structures knowledge construction, cooperative learning, self-regulated learning, and using real-world or business problems (Schreurs & Al-Huneidi, 2012). The interview questions for the current study included a similar framework to questions used during a study conducted by Green (2001). In the study, I used semistructured interview questions to identify and address the lack of performance time delays, cost overruns, and quality defects in Central Florida area and to validate the factors identified from the literature review. Cachia and Millward (2011) conducted an appointment type of telephone and e-mail interview lasting approximately 30 minutes. I followed this standard in a semistructured interview with a similar length in time. I recorded and transcribed the semistructured interviews (Timmermans & Tavory, 2012).

I validated the case study design from the literature review with a semistructured interview process (Qu & Dumay, 2011; Ruikar, Koskela, & Sexton, 2009). Qualitative research interviewing techniques requires the use of different skills, including (a) careful planning, (b) note taking, and (c) intensive listening to collect valuable data (Qu &

Dumay, 2011). An audio recording device was used to record the interview with note taking establishes a chain of evidence of each interview (Cachia & Millward, 2011). The recorder was a handheld recorder, which participants acknowledged at the beginning of the interview. I asked each of the questions that was given to the participant before the interview. I took notes that pertained to times and dates of interviews and during the interview any information that I felt that was important to the research from all participants. The notes pertained to a calendar of scheduled interviews and information on the interviews during questioning participants.

Data Organization Techniques

Lyberg (2012) suggested a method in which the effect is the acceptance of data that product quality cannot achieve without a sufficient underlying process quality, and process quality cannot achieve without a good organizational quality. Data organization should lead to a detailed understanding of project managers' perceptions. Open-ended questions in the interview, observation data, document data, audiovisual data, and text and image analysis are all incorporated. Study notes were compiled into a valid database for organizing, categorizing, and maintaining future access to information.

I maintained a journal to highlight biases, beliefs, and personal feelings relevant to the study and to check for subjectivity before interviewing participants and immediately after the interviews. The purpose of the journal was to increase the validity of the study to use as a bias clarification strategy. I conducted peer debriefing with a member of my DBA study group at Walden University, who provided feedback about interview content, techniques, and adherence to procedures throughout the research. A

journal was used to maintain the minutes of meetings between the peer reviewer and myself as documentation for these exchanges.

To ensure the confidentiality of proprietary information, I did not identify the names of the participants in the study. Instead, I identified the stakeholders by an alphanumerical system in the study. For example, I identified participants interviewed for construction projects as Participant 1, and so forth.

I retained all documentation pertaining to the participants and saved these files on my computer, backed up to an external hard drive. I will keep paper documents and the external hard drive in a secure location for a period of 5 years. After 5 years, I will destroy the documentation by deleting the files and shredding all documents.

Data Analysis Technique

I conducted research for this study and analyzed the data following Eriksson and Westerberg (2011) and PMI case strategy, which includes classifying or coding text from interviews. Data for this study were collected from state web sites and construction company web sites. Case description is a way of specifying perceptions through facts and experience (Yin, 2011). The information gathered fresh, complex, rich descriptions of the complexities of the study regarding how the participants perceived their experiences. The framework of the study involved the philosophical constructivist in terms of a broad array of four concept structures knowledge construction, cooperative learning, self-regulated learning, and using real-world or business problems (Schreurs & Al-Huneidi, 2012). I chose to apply methodical triangulation in this research, because I believe it is a good way to cover a subject thoroughly. Further, the different methods applied help validate

each other, assuming that they point toward the same answers. I used a methodical triangulation combining observations, interviews, and a survey to systematically aggregate different perspectives of the investigated object. Methods to establish credibility included triangulation, which is (a) collecting data from more than one source, with more than one data collection method, and with more than one observer, gathering detailed evidence (often referred to as "depth" of data or "rich description");
(b) observing for prolonged periods; and (c) using skillful interview techniques (Hanson, Balmer, & Giardino, 2011). The descriptive approach helped me to identify a pattern or theme of complexity to present factors contributing to time delays, cost overruns, and quality defect inaccuracies (Hanson et al., 2011). From the original concept of triangulation emerged additional reasons for mixing different types of data. For example, the results from one method can help develop or inform another method (Greene, Caracelli, & Graham, 1989). Based on the descriptive approach, I used the following framework for data analysis (Nilsson, 2010):

- Summarize all interviews on paper, record in audio format, and transcribe the data into qualitative data analysis software.
- Categorize and code the data from the interviews conducted to identify emerging patterns.
- Codify data in a meaningful way to help describe the implications of the responses to the research question.
- Tabulate the data to facilitate and support the study results and conclusion.

- Validate findings and interpretation by using a member-checking approach after the interviews.

I compare the qualitative data analysis software NVivo, Atlas and dedoose, to determine the best software for my data collection. NVivo and dedoose import PDF, whereas Atlas uses a link. Dedoose is a perminute site with no backup and many clicks for a simple task. For this reason, dedoose was not selected. NVivo is excellent software; however, mapping is an issue, so, for this reason, NVivo was not chosen.

I used qualitative Atlas.ti data analysis software to support the coding and analysis of qualitative data from the research. The qualitative data analysis software is a tool that facilitates the classification, coding, and sorting of information. I collected the data and put it through a repetitive process of validation, categorization, codification, and tabulation to produce a comprehensive list of participants' views about factors contributing to forecast inaccuracies in the United States.

Transferability and Credibility Confirmability

Transferability

The concept of good quality research is related to the success of the study in generating understanding (see Golafshani, 2003). Similarly, Bogdan and Biklen (1997) and Cowan and Butler (2013) used reliability in a qualitative study as the fit between the data collected and the reality of the actual situation research. I ensured the reliability of the study by conducting all interviews myself following an interview protocol to maintain consistency and neutrality of questioning to participants during the interviews and by confirming the interview responses with the participants. I analyzed the data myself and

determined which categories or themes emerged. I then drew conclusions to determine answers to the research questions.

Credibility Confirmability

Golafshani (2003) suggested that validity is a concept that is not a single, fixed, or universal concept, but rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects. Hanson et al. (2011) posited that (a) triangulation of data, (b) member checking, (c) rich description, (d) potential for bias clarification, (e) presentation of discrepant information, (f) prolonged time in the field, (g) peer debriefing, and (h) the use of an external auditor are acceptable strategies for assuring the validity of qualitative studies. The amount of information pertaining to project managers' perspectives regarding information and the contributing scheduling forecast has caused inaccuracies in the construction industry in the United States.

Thomas and Magilvy (2011) explained how to establish credibility; a researcher reviews the individual transcripts, looking for similarities within and across study participants. Credibility strategies for this study included member checking and bias clarification; transferability strategies included rich descriptions and peer debriefing (Gardner, 1999; Mackiewicz, 2010; Sundin et al., 2010). To establish credibility, I reviewed individual transcripts, looking for similarities across study participants (Thomas & Magilvy, 2011). Member checking or feedback was one technique used to establish credibility in this qualitative study. For this process, Mackiewicz (2010) presented an examination to encourage the researcher to invite the study participants to examine and

convey credibility and influence the review. Thomas and Magilvy suggested using participants' reviews to ensure the validity of their perspectives. Bias clarification is a self-reflection of the researcher's potential biases toward the study (Secolsky et al., 2011). Because I conducted the interviews and collected the data for the study, I remained cognizant of my experiences in construction management. My journal was available to highlight biases, beliefs, and personal feelings relevant to this study and to help me check for subjectivity before and after interviewing participants.

I established transferability by providing a dense description of the population studied (Thomas & Magilvy, 2011), which included project managers with experience in construction in Central Florida area and 15 or more years of experience in construction. The use of rich descriptions to convey the findings was another technique used to ensure transferability of the case study. Merriam (2014) stated that rich descriptions might place the readers into the context of the study and give the discussion an element of shared experiences and the potential for different perspectives. Peer debriefing involves appointing a person to review and ask questions about the qualitative study to impart the views of people other than the researcher (Merriam, 2014). I asked a peer reviewer from my Walden doctoral study group to provide feedback throughout the research. During peer debriefing, the peer reviewer asked relevant and hard questions about method credibility and reliability of the study after listening to my thoughts. I maintained a journal with minutes of meetings with the peer reviewer for trustworthiness purposes.

Transition and Summary

In summary, I used the qualitative method because the focus of the study was to explore the perspectives of project managers about the factors influencing forecast inaccuracies in construction projects and the outcome with the level of inaccuracies. I applied member checking, rich descriptions, bias clarification, and peer debriefing strategies throughout the study to support the credibility of findings from the standpoint of the participants and readers. To ensure reliability, I followed an interview protocol and used a template with the same interview questions while conducting interviews with the participants. The implications of the study could affect the forecasting processes performed by project management in the construction industry in the United States. The study included general findings of forecast processes in the domestic industry. Section 3 of this study will contain the presentation of findings and recommendations from the research conducted with project managers.

Section 3: Application to Professional Practice and Implications for Change

The content of this section will include (a) an overview of the study, (b) the presentation of the findings, (c) applications to professional practice, (d) implications for social change, and (e) recommendations for action. The remaining subsections will be recommendations for further studies, reflections, and the summary and conclusion. In Section 3, I will also provide a discussion on how the study themes relate to the conceptual framework and my findings on time delays, cost overruns, and quality defects.

Overview of Study

The purpose of this qualitative, single case study was to explore the strategies that construction project managers use to manage scheduled construction project delivery on time. Construction is the process of constructing a building or infrastructure (O'Carroll & Brinckerhoff, 2012). Construction differs from manufacturing in that manufacturing typically involves mass production of similar items without a designated purchaser, while construction typically takes place on location for a known client (Kog & Loh, 2012). To ensure alignment with the research and experience requirements of the study, the participants I chose consisted of project managers in Central Florida possessing 15 years of experience. This amount of experience provided a reasonable basis for their perspectives on project management, timeline, and costs. I addressed performance regarding time delays within the Central Florida area construction projects using a sampling of multiple construction projects for review. The results of this study on project managers of construction projects could be used to bring about positive social change in various ways by influencing the economy of a community. Project managers' scheduling

of construction of healthcare facilities, retail establishments, manufacturing businesses, and other building projects all result in an increased demand for employees, resulting in the creation of new jobs. As a result, new jobs create and influence construction in the community in a full circle, as they bring new individuals to neighborhoods, schools, and the area businesses.

Presentation of the Findings

In this study, I used a qualitative research methodology and a single case study design. I used a case study design as the way to structure the phenomena understudy from the viewpoint of participants in substantial and concrete social surroundings (Toloie-Eshlaghy et al., 2011). For this case study, I used semistructured interviews and an open framework in order to answer the study's overarching research question: What strategies do project managers use to address scheduling issues in the timeline, planning, and design of construction projects to avoid time delays, project management, and cost? Semistructured interviews took place by a phone interview. Interviews did not last longer than 45 minutes, and member checking of participant responses did not last longer than 30 minutes. The average interview time was 18.23 minutes.

Scheduling issues in the timeline, planning, and designing of construction projects often cause time delays, cost overruns, and quality defects. In addition to using semistructured interviews, I reviewed timelines and baselines of construction projects through external company sites and confirmed data gained from interviews. A review of company documents revealed retention strategies that supported, confirmed, disconfirmed, extended knowledge, or otherwise gave insight regarding delayed

information and evidence recorded and represented in different records, documents and schedules during the construction phase (see Yang et al., 2012).

After collecting and analyzing data collected from semistructured interviews and reviewing company documents, I identified many themes in the data, and I grouped these themes into three main themes: (a) project management, (b) timeline, and (c) cost. The study sample for this qualitative multiple case study consisted of seven project managers with more than 15 years' experience in construction in Florida. I used codes (e.g., Participant 1, Participant 2, etc.) to preserve the confidentiality of the participants. Demographic data from project managers appear in Table 3.

Table 3

Demographics Data of Project Managers

Participant	Position	Location	Years in Construction
1	Project Manager	Florida	20
2	Project Manager	Florida	25
3	Project Manager	Florida	15
5	Project Manager	Florida	16
6	Project Manager	Florida	17
7	Project Manager	Florida	20

The semistructured questions that I developed and incorporated into the interview protocol included the same 12 questions presented to every participant. Some participants did not maintain preparedness and recovery plans, and these items were not addressed. Using interviews, documents, and member checking revealed holistic and compelling strategies of the participants in the construction phases of projects they were managing. I will discuss key elements of the study in the following subsections.

Case Study Design

In the semistructured interviews, the participants responded to my 12 open-ended questions and provided an in-depth understanding of how project managers in Central Florida influence construction projects. The interviews provided significant confirmation of timeline planning for the business plan and analyzed planned schedule goals. I analyzed each participant's response to each interview question separately and coded it for the recurring themes. I then conducted a second analysis using all of the participant responses combined. The same main themes resulted from this second analysis as the first. The main themes were (a) project management, (b) timeline, and (c) cost.

The results from the research showed the common phrases that were used by participants during the interviews. The most common phrase was project because of the mission of construction is building projects. The table shows *n* as the number of times that particular word occurred in the data. The participants' use of phrases was not consistent with each interview and the understanding of phrases and words was an issue in understanding basic phrases. During the interview, explanation was necessary for the participants on phrases or words that would seemed to be common by the PMBOK (PMI, 2014). The most common keyword developmental phases from the data analysis appear in Table 4.

Table 4

Code Frequency

	Codes	*n*	Theme
Strategy:	Projects	34	1
Strategy:	Cost	48	2
Strategy:	Time delays	62	3

Note. n = number of times the word occurred.

I conducted another analysis that included a most common keyword count. Grouping keywords allowed me to build theme relationships. Participants' secondary word grouping led to theoretical ideas. The table shows *n* as the number of times that particular word occurred in the data. The keywords presented in Table 5 comprise theoretical ideas that resulted in thematic formation.

Table 5

Top Five Frequently Occurring Words and Groups Related to Content and Context

No.	Group and Keywords	Theoretical Ideas	Theme	*n*
1	Project	Projects	1	314
2	Schedule	Scheduling	2	188
3	Timeline	Timeline	2	158
4	Cost	Cost	3	28
5	Budget	Budget	3	91

Note. n = number of times the word occurred.

Themes

I identified three themes from the interview transcripts and the other data sources. The first theme, projects, included statements regarding the objectives of the projects and goals of businesses. The second theme, time delays, consisted of statements regarding how construction planning and cost respond to the overall finished project reviews. The

final theme, cost, stemmed from the participants' views on how to monitor and manage the effects of cost and labor reviews.

Theme 1: Projects. The theme of the project's objective relates to the central research question by confirming that the project manager and owner have an objective or business goal that relates to using project management strategies to generate business success in a project. Project managers have an objective to enhance timeline and scheduling awareness and profitability for their clients and the owner(s) of the construction business using software to help reach that goal for any project. Owners have an objective to save time and money on getting a project completed on time and under budget with the project manager.

Participant 6 stated that a "typical construction project undergoes three stages: preconstruction, construction, and postconstruction." Along these stages, numerous activities are performed to achieve the output and objectives specified by the owner. Therefore, project managers typically start a construction project with an award contract and owners' scope of work. Participant 1 stated that "scoping out contracts and verifying construction documents to the scope of work to make sure that everything is covered before writing subcontracts are critical." The quality control process starts with a contract that has a start date and finish date, which forms the baseline-planning phase. The major outcome of the planning phase is the project plan as developed by the project team during the planning phase of the project (Zwikael, 2009).

Participant 6 stated that "program meetings decides as far as the construction document and design with a schedule and delivery timeline". Which could be called

preconstruction meetings. Participant 1 stated that the contract award date is the second biggest factor due to the construction time delay duration and scheduling conflicts within the finish date. The delays are factors and receiving a contractual date early supports the timeline and overall completion date of a project. During the preparatory phase, the client's project team develops the initial time and cost estimates for the overall project duration (Khamidi, Khan, & Idrus 2011).

Project managers meet with a team formed possibly by a superintendent, owner, managers, and architect (Participant 2). For a team to be successful and effective, it is essential for a team to receive support from the top management within its organization. Most of the respondents received support from their top management to some extent, giving the project manager and the business client a relationship on which to align the objectives of the construction project. Respondents who received support had a good working relationship with their top management. All the respondents agreed that their top management viewed their team to be successful and a place to further develop employees' skills. Overall, having and maintaining good relationships with top management resulted in receiving good support from top management.

According to Participant 4, "owners and upper management receive positional reports of cost and audit during the first quarter of a project." Participant 5 stated:

> Upper management have a recurring schedule meeting with the project manager to seat down and have a reelevate look at the information and understand if you are on schedule, on budget, and any issues that we need to be resolved but does not impact the project.

According to Participant 3:

> After a certain timeframe, upper management gives free range to project managers to run the project. Project managers have an intuition for when to involve upper management. The involvement of upper management in the construction project with the project managers is important in not only making sure contracts and buyouts are completed but also that the overall cost of the project is in line with positive gains.

The path of a construction project with the project manager takes on quality control at the beginning of a project. Project managers have shown that even when a project is behind schedule, a stereotype formation formed supporting a view of unsuccessful performance and teamwork, which might not be accurate. Participant 5 stated:

> Projects that are just falling week after week you start to get a negative vibe on the project there is not a lot of energy and project has no momentum, so it is a struggle to get people to do and meet their milestones and completion dates within the schedule.

Identifying best practices is an imprecise task due to the nature of scheduling and quality review versus critical path methodology (Kim, Kang, & Hwang, 2012). Many variables multiply the vast factors of tools and schedule development in projects. Assessing a schedule delay's impact on the total project duration to distribute delay liability remains a controversy (Yang & Kao, 2012).

Theme 2: Time delays. The time delays theme relates to the central research question by confirming that the project manager and owner have an objective or business goal that relates to using scheduling and timeline strategies to generate business success. The baseline schedule needs to meet the phasing and sequence requirements as specified in the contract documents. Time constraints and site accessibility issues can cause a project to formulate into executed phases (Participant 3). After the contract award, the contractor needs to provide a schedule within the timeframe specified in the contract documents. The baseline schedule needs to identify the project critical path (Participant 6). A reasonable critical path view should be an expected project's physical location and characteristics. The critical path needs to be distinctly shown as the longest path in the project schedule leading to completion. If the critical construction path is shown rather than the nonconstruction activities, such as procurement or owner review activities, the critical path is debatable and should review to ensure reasonableness (Li & Carter, 2005). "Once you have all the major building blocks put in place you link them and logic between than you have a good base line schedule and identify with a critical path" (Participant 3). The true critical path needs to identify and monitor of the actual construction progress, rewards, and risks among stakeholders; to create incentives for exceptional results; to reduce operational and maintenance costs of the finished project; to improve project delivery timelines; and to reduce waste through better planning and shared costs (Kent, & Becerik-Gerber, 2010). A project can have several parallels, or near-critical paths (Lin, 2013). As far as a timeline schedule, Participant 2 stated that fundamentally "it is how you establish the initial setup." The setup consists of trailer,

vehicles, employees and staging of trades during the beginning and through the project. The issue is updating the timeline schedules on larger jobs, typically done with all key subcontractors in a room together. Logically, each subcontractor has individual timeframes, and all subcontractors have a buy-in regarding scheduling to help with not having time delays. In the project plan, the planning should fit the limited timeframe (Schreurs & Al-Huneidi, 2012).

Six-week and weekly look-ahead are important to the accuracy of the completion date and progress dates (Participant 5). Participant 6 stated that scheduling software and walkthrough reviews could verify actual timeline against the proposal for any time delays. The purposes of these tools are to monitor and adjust the process as well as to clearly understand the scope of work and progress from a two-dimensional plan to a three-dimensional plan. The building information model uses a three-dimensional computer models coexisting with traditional two-dimensional drawings (Porwal & Hewage, 2013).

Depending on the project and timeline, Participant 4 stated "that baseline scheduling and updates could be scheduled weekly and with a 6-week look-ahead using a board for critical items." Participants all had the same values when checking the quality of a project. They all reported that comparing a timeline and baseline is critical in progress of a project. The issue is quality verses timing and control of a project. Participants agreed that a timeline is important to completing the project on time; however, the issue is budget verses time and quality.

Theme 3: Cost. The budget and cost objective theme relates to the central research question by confirming that the project manager and owner have an objective or business goal that relates to using budget and cost strategies to generate business success. I discovered that cost management was not a primary service offered by construction companies, with only three participants (40%) noting cost as a direct service provided. The cost of a project within the bid process on a contract and the guaranteed maximum price (GMP) presented to the owner (Participant 6). Under GMP agreements, frequently used in target cost construction, the risk pendulum swings to the contractor side even further (Zimina et al., 2012).

On construction projects, there is a code that project managers have an allegiance to the architect by way of the team dynamics and other previous projects they have worked on together. Participant 2 explained, "Your position as a project manager is to protect the owner." Participant 3 stated that as the manager, and the immediate office manager, and the project engineer have to be the first line of defense to review and see if there are issues with those costs. When reviewing cost or proposal to the project by design from the architect, the review staff evaluate the scope of work to determine whether it is already in the project or is an additional cost. By accomplishing this task will support the cost and budget for any request for information (RFI) or change order, which is the biggest cause of disputes between contractors and their clients (Participant 2).

Normal mobilization costs in operating the project (e.g., a trailer, vehicles, staffing and site work setup) are all negotiable (Participant 2). The response by

Participant 2 was consistent with published literature. Participant 5 stated that budgets should be reviewed on a monthly basis. Creating a monthly snapshot of the budget on the project helps to avoid exceeding the budget and costing the owner or construction company. The project's snapshot view is critical without giving a detailed synopsis of the progress and evolution. By reviewing the snapshot, the project manager seeks to elicit some of the timeline and cost involved in projects (Söderlund, 2011).

Participant 4 stated that "part of the weekly meeting is a budget update to review the trend report". Monitoring is a recurring action to compare actual versus planned performance, to determine cost and time estimates at completion, and, if necessary, to take preventive and corrective actions based on such estimates (De Marco, 2011). In the construction industry, one of the basic goals of practitioners is to achieve timely completion of projects within the stipulated budget and required quality, because each day of time overrun in the completion of any project has a direct impact on the cost of the project (Memon, 2011).

Applications to Professional Practice

The findings contained in this study could offer project managers strategies to enhance the project, time delays, and cost control by providing definitions, information on the different software, and information on the progress that a project needs to make to be on time and under budget. The issue is not always just an on-time project. Project management also means that the project is within the budget or cost set for the project. A project can be on time and blow the budget or within budget and blow the schedule. The balance between to two factors is not simple, and then quality has an effect on both. Pick

two; you cannot have all three. The challenge of construction projects is that project managers want and strive for all three.

Prior research on project scheduling and critical path scheduling methods has focused on methodologies to improve efficiency during the project to achieve as hasty completion as possible, using schedules of claims and methods to find the best route to completion within a potential project schedule (Galloway, 2006; Sharon et al., 2010; Yamin & Hamerlink, 2001). Project managers similarly are interested in finalizing construction as soon as reasonably possible for profit and incentives in deference to contractual penalties and damage clauses as noted earlier. Prior researchers have noted flaws in critical path scheduling related to resource scheduling (Sharon et al., 2010), whereas decision theory approaches to time constraint logic have attempted to develop procedures or methodologies for solving linked multiple activity process problems (Jonas, 2010). Chaos theory advocates, similar to their related counterparts in decision theory, approach scheduling and sequencing problems from the perspective of solving with probability models and statistical approximations with their models (Singh & Singh, 2002).

The iterative nature of assimilating the contribution of a series of trade contractors in a project is in the same manner comparable to running simulation models of paths to completion with less responsiveness to the entire range of potential solutions and comparable effort to a group of probable solutions. One of the key differences between construction activity scheduling and solving routing and logistical sequencing problems is that a series of well-defined constraints remains within the construction sequencing

process. These constraints have not changed substantially or cannot change substantially in traditional construction methods contemplated by owners and project managers. The basic building sequence is preparing the installation of the foundations, building pads, underground utilities, and installing tilt walls that bear the structural materials that then receive roofing, and roof support materials. Starting the entire sequence has shown over time to be a tried and true approach to starting construction projects. The variables after this sequence in terms of which point or sequence, phases, or sections of the building built next are the subjects of discussion among the contractors, but once this sequencing that is established, the order in which the various trades should work through a space are also relatively fixed. Because of these constraints of how a construction project can built, the limitations of critical path scheduling methodologies are not uncovered in the range of impending solutions. The alternate approaches to constrained problem-solving methodologies do not appear to require or may be too complex or not cost-effectively applied for the return on the effort. This research does not challenge the validity of critical path scheduling methodology, but like prior research, it has attempted to address the issue of timely completion of construction projects within the construction industry practices. Unfortunately, like prior research, this research has not provided positive feedback on constructive solutions for managing the process to implement an accurate project schedule. Related research in the issue of timely completion of construction projects has included an investigation into alternate project delivery methods.

The concept of linking design build and development for complex and expensive construction projects such as high rises and lengthy projects of 1 year or more. In linking

design–build projects, the project can start construction activities early in the project for the long duration events related to structural supports and site work once geometry and basic schematic elements that are fixed. Because the site work and foundation work at a project can take 6–12 months to complete, depending on the project, linking design-related building tasks has been successful in cutting the overall duration of construction projects. However, the primary emphasis of these innovations has been to decrease the total project duration, not to solve the problem of how to increase the probability of a timely completion (Hazır, 2015).

For the purposes of construction activities, the default use of critical path methodologies has remained the preferred choice of contractors and the software developers that provide programs for the industry (Arashpour & Arashpour, 2015). As such, this research is relevant in terms of attempting to identify potential shortcuts to achieving a greater probability of timely completion of a project. However, the avenue of decreasing the time allowed at the origination of the project for receiving full contractor contribution on the specifics of the logic, durations, and sequencing of the project does not appear to have a benefit of reducing the risk of missing the completion date.

Implications for Social Change

Construction projects that complete on time and under budget undertake identities that are unique, even when two projects seem the same in the tasks required to build a structure. The analysis of project managers' perceptions about scheduling and forecast inaccuracies organized the improvement in the efficiency of resource allocation during construction. The findings and recommendations of this study could help owners,

communities, and construction companies in cost overruns and time delays because of scheduling issues and conflicts in future infrastructure projects with more realistic financial forecasts for allocation of resources. The beneficiaries of the social change include the communities of Central Florida, where organizations build projects for future growth. The exchange of knowledge will help with the professional development of project managers, owners, and construction companies. Construction cost overruns are among the greatest risks faced in organization project development. Knowing the probability, occurrence, and influence on projects is important. The costs are of fundamental importance in project planning and execution (Blanc-Brude & Makovsek, 2013). Project managers on construction projects can bring about positive social change by affecting the economy of a community positively. Project managers' scheduling of construction of healthcare facilities, retail establishments, manufacturing businesses, and other building projects all result in increased demand for employees, resulting in the creation of new jobs.

Recommendations for Action

The challenges associated with construction projects are variables that project managers cannot control. In a single prime contractor situation, the schedule development and management process could become the direct responsibility of the general contractor, reducing the owner's risks associated with coordinating multiple contractors as well as reducing the cost or possible need for a construction manager during the construction phase. Another alternative project delivery method is the facilitated GMP from a construction management at risk, which assigns the fiduciary and management

responsibilities for a series of bid multiple prime contracts. The opportunity for construction projects to work on design–build projects, also would be an avenue to reduce the owner's cost and time risks in the project at the potential expense of design creativity and input. A final approach could be using a form of bridging design–build that would allow the owner to develop the project slowly and carefully through the space programming and floorplan development at schematic design with an architectural team before handing the project off to a design–build team to finish the design and construct the project, again for a fixed fee plus the cost of the work.

Recommendations for Further Study

Future areas of research for construction are warranted in assessing and understanding what factors may be relevant to the completion of projects on time and under budget. One of the potential variances of opportunity to the investigation is the correlation between the completion of the project and the planned completion date. The timeline of project management was minimized in this research by looking at a cross-section of projects over a few project managers. The ongoing nature of the qualitative approach to assessing the skills of construction management teams in managing their subcontractors may reveal reliance on a set of skills or contract language parameters that have a greater impact on project success than currently recognized. Finally, the observation that the simpler construction projects appeared to perform better comparing the planned and actual completion dates than the more complex projects which counterbalanced by the observation that the potentially more complex renovation projects were on the opposite side of the comparison with new construction projects. The

development of a qualitative model for complexity in construction projects may be able to identify a key element in a project that has the potential to signal a need for additional attention to scheduling and sequencing construction activities from a preconstruction planning perspective.

Reflections

I found the doctoral study process challenging, exciting, and rewarding. As a project manager, I have an interest in managing projects based on my beliefs and experience, which has shown that the opinion of my trade was critical to generating success, knowledge, and profitability. My findings from this study revealed the significance of perceptions and why maintaining an encouraging relationship with my associates is important for businesses growth and profitability. Prior to conducting the research, my objective was to find ways in which project managers could use the belief of my research to develop successful methods for improving project performance and revenue. I had believed that the review of my trade was critical to making a successful viewpoint of the issue and a solution to have a better understanding of the issue discussed. After conducting the research, I concluded that my thoughts and reviews are important, but the reviews' balance of importance is dependent on specific contract obligations and objectives. Project manager's reviews are most important when the objective of the construction strategy is to increase profits, time management, and construction reputation.

If you describe a timetable of events to most people, they will explain what the result would be. They can put those events together in their minds and argue the point

that something will happen. There are few people, however, who, if given a result, who would be able to evolve from their inner consciousness the steps that led up to that result. This power is what I mean when I speak of reasoning backward or analytically (Doyle, 2008).

Summary and Study Conclusions

In conclusion, this research has revealed that the reflection to the scheduling specification sections of contracts and contract language may be a step in the wrong direction. Arbitrarily, the focus on the ability to complete construction projects in a timely manner is not a debate about the technical aspects of critical path scheduling methodologies but may lie in further research on the project management side of managing contractors. Exclusive of the human elements in project management and construction, it is worth noting that preventing this has been able to put cost, scheduling, and time management within the predictable level of construction litigation that is associated with insignificant construction design documents and cost overruns associated with late completion dates and timeframe. Analysis of the successes and failures of construction projects will be the key to continuing to improve on current success and conversion of their success to other project managers and owners.

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