INVESTIGATION OF PROJECT MANAGEMENT PLANNING PRACTICES FOR RENOVATION OF HISTORICAL BUILDINGS IN URBAN CONTEXTS LOCATED IN TEXAS

A Dissertation

by

EDELMIRO ESCAMILLA

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2011

Major Subject: Architecture

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Approved by:

Co-Chairs of Committee,	Anat Geva
	James C. Smith
Committee Members,	James W. Varni
	Mark J. Clayton
Head of Department,	Ward Wells

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ABSTRACT

Investigation of Project Management Planning Practices for Renovation of Historical Buildings in Urban Contexts Located in Texas. (May 2011)

Edelmiro Escamilla, B.E.D., Texas A&M University,

M. Arch., Texas A&M University

Co-Chairs of Advisory Committee: Dr. Anat Geva
Dr. James C. Smith

This study investigated the relationship between Project Management Planning (PMP) practices and project success for preservation projects of historical significance located in an urban context. The planning for these projects was also emphasized because these historic buildings are recognized by the National Register of Historic Places. Yet, when analyzing the performance metrics of these historically significant renovation projects that included budget and time after the project has been completed denote problems in the management and delivery of these projects.

The project team members' perceptions of PMP practices and how these practices affect project success were the focus of this research. To ascertain the importance of these questions, the study incorporated three major bodies of knowledge. The first body of literature focused on project management practices associated with project success. The second concentrated on historic preservation with a focus on historic significance and project planning. The third body centered on facility management as it relates to project management issues in the delivery of a construction

project. Combining these bodies of knowledge into one literature review contributed to the development of a conceptual model to illustrate how the research variables and hypotheses were established.

To test the research questions and its hypothesis, three statistical tools were used: analysis of variance (ANOVA), descriptive data analysis, and ordinary least square regression. The conclusions from these tests indicated that differences in perceptions of success criteria existed between the project team members. The findings also indicated a significant disconnect between the perceptions of project success and actual performance of project delivery. Furthermore, the findings indicated that only a few project management practices tested were perceived to have significant correlation with project success.

The project team members felt that the success criteria of performance and the success factors associated with performance -- site analysis, site layout and staging, and a quality assurance plan -- were more important to the success of the renovation project than many of the management practices in this study.

DEDICATION

I dedicate this project to the memory of my father, Edelmiro V. Escamilla Sr., a talented craftsman and gifted singer, who emphasized the importance of pursuing a formal education and knocking on doors of opportunity to his children. Through his example of hard work and family values, he taught me the importance of remaining true to myself and never breaking my word. This project is also dedicated to my mother, Elvia F. Escamilla. You have been my emotional anchor through the stages of my educational journey as well as my entire life. Through your devotion to family, friends, and church, you have taught me that no matter how determined one is, no one can make it alone.

Mom and Dad, you have been my role-models for hard work, instilling in me the inspiration to set high goals, the confidence to achieve them, and the persistence to work for the things that don't come easy. You also taught me to remember the personal sacrifices of those who have gone before us so we can stand proudly and help future generations of dreamers succeed.

I love you and thank you, Mom and Dad.

ACKNOWLEDGEMENTS

I would like to express my profound gratitude to my committee members for their continuous support during my journey through this research study. I have been blessed to have the opportunity to work with a committee that had my success as the ultimate goal. I have developed relationships with the members of my committee, not only as student to professor, but as friend to friend, and colleague to colleague. We are given such a limited time on this earth to pursue our dreams; I thank you for your time and for allowing me to be part of your lives.

I would like to thank Dr. Charles W. Graham, who served as chair of my Ph.D. committee until his departure from Texas A&M University to serve as the Dean of Architecture at the University of Oklahoma. Drawing from his experience as a registered architect, Dr. Graham encouraged me to find ways to tie my architecture education to the construction science field. I am indebted to him for the valuable lessons and support he gave me both as a mentor and as a friend.

I am grateful to Dr. Robert E. Johnson, former design professor in the Department of Architecture at Texas A&M University. Dr. Johnson was involved as a committee member until his retirement in 2010. His expertise in facility management is greatly appreciated and it served to develop those sections of my dissertation.

I would like to express my heartfelt appreciation to Dr. Anat Geva, co-chair of my Ph.D. committee. Dr. Geva has been an inspiration to me not just as a scholar, but also by her example of devotion to her students' goals. During my studies she offered

me priceless advice on my career goals and centered me when I began to wander. I could always count on her for a thorough review of my writing and guidance in pursuing my objectives. This dissertation would not have been possible without her tireless dedication, words of encouragement, and passion for historical preservation.

I am indebted to Dr. James C. Smith, co-chair of my Ph.D. committee. Dr. Smith is a great mentor and great example of the professionalism and high standards he expects from his students. His insightful comments regarding project management were critical to the development of this dissertation. I knew if I could defend my findings to Dr. Smith's approval, I could be certain that I did a good job.

A special thank you goes to Dr. James W. Varni, member of my doctoral committee. Dr. Varni has been a great asset to my doctoral study by helping me develop the methodology and survey instrument implemented in my research study. I could always count on warm words of encouragement and solutions to my questions from Dr. Varni.

I am deeply appreciative of Dr. Mark J. Clayton's support. As a member of my doctoral degree committee, he was always open to discussion on my research study and my research agenda at a moment's notice. Through the years of my education, he showed me the true meaning of friendship. I could always count on his sound advice and direction to meet my goals.

My gratitude is also extended to the Texas Historic Commission. Without their assistance this research study would have been next to impossible. I always had access to the data I needed and a space to call home during the data collection phase. I look

forward to a long term relationship and future research with the help of the Texas Historical Commission.

I also would like to thank the Texas A&M University Engineering and Design Services staff for believing in me and offering me their continuous support through this dissertation study. EDS was instrumental in helping me develop my professional and leadership experience skills, from my time as a student worker to designer and, finally, project manager. This group has been my surrogate family for eleven years and I look forward to many more years of association with them.

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Finally, I would like to give my love and many thanks my wife, Cynthia F. Escamilla. The support she has given me through the years of my education has been the key to my success. Through the years we have shared a balanced relationship in which I am the eternal pessimist and she is the eternal optimist. I thank my children, Mariela I. Escamilla, Bianca E. Escamilla, and Adan E. Escamilla. No matter how stressful my days have been, I could always count on the affection of my children to see me through. I also want to thank my sister, Elsa Escamilla, who has always been proud of me and offered many words of loving encouragement. Without my family's help and guidance, I would not be the person I am today. It would be impossible to express how much they have impacted my life and I will carry their lessons to guide me through my future work.

I hope that someday I will be able to help someone else reach his or her goals and dreams.

May God bless all of you.

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CHAPTER I

INTRODUCTION

This study attempts to ascertain the relationship between Project Management Planning (PMP) and project success for preservation projects of historical significance located in an urban context. One would assume that delivering the project on time and under budget are the most critical influences to ensuring project success. Yet a multitude of studies have shown an eclectic collection of solutions to the project success puzzle (Nguyen, Ogunlana, & Lan, 2004; Sanvido, Grobler, Parfitt, Guvenis, & Coyle, 1992; Chan & Chan, 2004, Chan, Scott, & Chan, 2004; Atkinson, 1999). The primary outcome of this study was to identify success criteria variables (budget, time, performance, and satisfaction) that significantly affect project success. A matrix of project management practices categorized as success factor variables was developed from the results of this study.

Building projects are becoming more complex and owners expect their projects to be delivered as fast as possible, while maintaining a high level of quality. This requires the project manager to pay particular attention to the criteria affecting the success of a construction project. The literature review served to identify the criteria variables budget, time, performance, and satisfaction as indicators of project success.

This dissertation follows the style of *International Journal of Construction Education and Research.*

The variables for this study are defined as follows:

1. Budget denotes the costs associated with the project and includes the construction cost, overhead, and profit.
2. Time establishes the duration for the preservation construction project from project mobilization to project completion.
3. Performance is defined as the quality of construction necessary to meet the design intent set forth by the construction documents and specifications.
4. Satisfaction is defined as the perceived success or failure of the construction project by the project team members.

According to some studies (Baker, Murphy, & Fisher, 1983; Atkinson, 1999), cost, time, and quality are success criteria often referred to as the "Iron Triangle." Pinto and Slevin (1988) advocated that measures for project success should also include project psychosocial outcomes that refer to the satisfaction of interpersonal relations with project team members; they also suggested the inclusion of satisfaction as a measure of success. Numerous studies have indicated that construction planning effectiveness, and hence construction project performance, can be improved by increasing the amount of resources invested in construction planning activities (Laufer & Cohenca, 1990; Faniran, Love, & Li, 1999).

The planning problem is accentuated when the buildings, such as Texas courthouses, are recognized by the National Register of Historic Places (NRHP, 2010). According to the Texas Historic Commission (THC, 2010b), the complexity of

preserving such urban historically significant buildings led to House Bill 1341 legislation, which is also known as the Texas Historic Courthouse Preservation Program (THCPP) (THC, 2010c). Yet the significance of these important buildings had little impact on the actual delivery of these projects. The results of the actual data indicated overages in cost and time, which in turn led to performance issues and overall dissatisfaction. The historical significance of these courthouses played a crucial part in undertaking this study. These buildings serve as a testament to the historical fabric of the area where they are located. Contractors doing the work are held to the Secretary of Interior's Standards for Rehabilitation of Historic Properties as a guideline to keep the integrity of the building materials and craftsmanship (Weeks, Grimmer, & Little, 1992).

Research for the current study revealed that protecting these unique historic structures involves increased risks because of the nature of preservation work. Uncertainties regarding actual project site information are common during the design and construction phase of the project. Information available to project team members may not reflect the true condition of the courthouse projects. Based on these discoveries, the current research study focused on examining the delivery of preservation projects of Texas courthouses and how the application of PMP practices during the construction phase of the projects influenced the success of the project.

Facility management practices have a major impact in the delivery of construction projects. Each project is unique and requires the facility manager to adapt and revise his or her methods of managing the design and construction for historical projects. Studies show that there is a definite gap in how different facility managers

perceive the delivery of a successful project. This study will examine the management practices that are perceived to impact project success.

Research Questions and Outline

This study focuses on the following research questions. What are the project team members' perceptions of PMP practices? Moreover, how do these PMP practices affect project success? Following the literature review, two conceptual models were developed to illustrate the relationships between the indicators of project success and the PMP. This relationship is the basis for the research hypotheses. The general hypothesis includes the practical and theoretical assumptions that there is a relationship between the PMP and project success. The relationship between PMP and project success can be tested in three different measures: actual project success data, perception of project success, and statistical inference. In other words, project success for the THCPP is examined in terms of actual documentation collected by the Texas Historical Commission (THC, 2010b); the perceptions of the project team members' on project success following the use of the PMP practices; and the examination of the results from statistical analysis tests.

Research Objectives

Three major objectives were developed so that the research hypotheses could be addressed. These objectives are as follows:

1. Examine PMP practices and develop a matrix index that is refined and updated through personal interviews of project managers of successful projects.

2. Delineate the perceptions of the PMP matrix index by the project team members (owners, THC reviewers, architects, and contractors) through administration of a survey instrument.
3. Analyze the data and report the correlations between PMP practices and project success.

Research Significance

This research has significant theoretical and practical implications for the field of construction, historic preservation, and facilities management for the following reasons. The theoretical contribution involves the integration of three bodies of scholarly literature, project management; historic preservation; facilities management. The practical contribution of this inquiry takes existing PMP practices and identifies which of these are significant indicators of project success for renovation of historical projects. The study aims to set a standard for PMP practices that lead to a successful project. The results of this in-depth study of project planning practices affect not only the construction industry, but also city officials and local county citizens who rely on preserving the historic context of their city by retaining the town's landmarks. Furthermore, the Texas Historical Commission as well as facility managers could be affected by the development and implementation of methods to help protect these historically significant structures during the construction/rehabilitation phase of the project.

Organization of the Research

This study is organized as follows. Chapter I introduces the study and the organization of the research. Chapter II contains the literature review. Chapter III presents the conceptual model and hypotheses. Methodology and procedure are detailed in Chapter IV, and the analysis and results are discussed in Chapter V. Finally, the summary and conclusion are presented in Chapter VI.

The literature review (Chapter II) included three areas of the research study: project management, urban/historic context, and facility management. These are defined as follows:

1. *Project management*: The literature review examined the areas of PMP practices, project success, and performance metrics. The literature review establishes the relationship between PMP practices and project success.
2. *Urban/Historic Context*: The literature review defined the criteria for historic significance, preservation standards, and PMP practices for preservation.
3. *Facility Management*: The literature review examined project delivery, the role of the facility manager in preservation work, and PMP practices for facility managers.

Two conceptual models of this study were developed based on the literature review and these are discussed in Chapter III. The first general conceptual model was comprised of the procedure used to develop the literature review. From this literature review, a set of four success criteria variables (budget, time, performance, and

satisfaction) was established. The second conceptual model includes the success criteria variables as analyzed the success factors that develop the PMP.

The methodology implemented for this study was conducted in two phases, utilizing mixed methods sequential exploratory research design (Ivankova, Creswell, & Stick, 2006), and is discussed in Chapter IV. The projects were limited to Texas historic courthouse renovation projects. The study included the 37 completed renovation projects that had submitted the required completed reports to the THC (see Appendix A).

Phase I of the methods focused on collecting the completion report data that served as a means to categorize the Texas courthouse study population in the form of a Courthouse Data File (CDF) (see Appendix B). Collection of this data established three vital pieces of information: (a) contact information for the project team members who would be surveyed in Phase II of the study; (b) project performance information about the variance of the initial schedule vs. substantial completion; and (c) project performance information about the variance of the initial budget vs. final payout. Following the first phase, Phase II continued with a survey that was administered to the project team members. The survey focused on questions of the success criteria variables and PMP practices that influenced project success (see Appendix C).

Chapter V consists of the analysis and results. The results were analyzed by means of statistical methods including descriptive statistics, repeated measures of Analysis of Variance (ANOVA), and Multiple Regression Analysis. Chapter VI discusses the findings generated from these analyses, limitations of the methodology,

and the validity of the research hypothesis, as well as offering suggestions for further research on this topic.

CHAPTER II

REVIEW OF RELATED LITERATURE

Numerous studies about the construction industry have investigated the performance of project management plans (PMP) (Caron, Marchet, & Perego, 1998; Borges da Silva & Cardoso, 1999; Fei, Weijian, Lihua, & Juwei, 2008). Others investigated the various factors that influence the successful delivery of a project (Belassi & Tukel, 1996; Chan, Scott, & Chan, 2004; Parfitt & Sanvido, 1993). However, there are no current investigational studies on the relationship of PMP practices and project success for historic renovations. Though there are many different approaches to project planning, research has shown there remains a misconception of how historic preservation and facility management practices affect the project planning process. For instance, Weakly (1980) stated that the concepts inherent in the terms *planning*, *programming*, *coordination*, and *flexibility* are the keys to successful programs for the preservation of historic sites during construction. In addition, Friedman and Oppenheimer (1997) stated that new building design is a design-heavy process, requiring little contact with the world outside the office. Friedman and Oppenheimer also stated that once site information has been made available, designers could safely remain at their desks until the beginning of construction. On the other hand, renovation design is an exploration-heavy process, often requiring more time examining the actual building than in drafting and calculating structural capacity and structural integrity. Some studies (Friedman & Oppenheimer, 1997; O'Donnell, 2004) indicated that it is difficult to make refurbished

buildings meet current sustainability standards, which appears to support the perception that old, inefficient, and out-of-fashion buildings need to be replaced with new construction regardless of condition or life expectancy. Other studies maintained that the debate concerning sustainable development raised the importance of the building stock as economic, social, and cultural capital that should not be wasted (Curwell & Cooper, 1998; Kohler & Hassler, 2002; Myers & Wyatt, 2004).

Development of the PMP for the preservation of historical buildings is further complicated with a unique set of issues. These include:

1. Project team members have differing levels of historic preservation knowledge.
2. Limited time was allowed for value engineering during the procurement phase.
3. Historical significance of the site itself relative to other buildings may present issues not common in new construction.
4. The project may encounter geographic difficulties due to the renovation project being located on a constrained site in an urban area.
5. The designer/contractor may have a limited amount of time and resources for investigation before the project reaches the construction phase.

Renovations of historic building projects are complex and owners expect their projects to be completed as fast as possible, while still maintaining a high level of quality. In some cases, owners may require that buildings continue to function during renovation. These critical constraints require project managers to pay particular attention to the criteria that affect project success. The study of project success and critical success

factors are considered to be a means to improve the effectiveness of a project (Chan & Chan, 2004; Chan et al., 2004).

To establish a framework for this study, a literature review was conducted on the current academic and professional research related to PMP practices for preservation of a historically significant building. This was accomplished by dividing the literature review into four major sections. The first section focuses on issues of historic preservation planning related to the target buildings of this study. The second section investigated facility management practices related to project success. The third section investigated the project lifecycle stages and development of the PMP deliverables used during the bidding and construction phases. The fourth section defined the success criteria indices (SCI) that affected the project outcomes.

Historic Preservation Planning

Historic preservation projects generate more than $1.4 billion of economic activity each year, and support almost 41,000 Texas jobs (THC, 1999). In an online article titled *The Future of the Past*, Hosey (2009) stated that a 2005 Brookings Institution report predicted that by 2030, half of the buildings in the U.S. will have been constructed after 2000. This means half of the buildings that were built in the last few decades will equal the entire remains of the previous two centuries. This prediction demonstrates the importance of improving the project delivery process for preservation of existing historic buildings.

Another important reason for preserving historical structures is the important role they serve to the fabric of the communities in which they are located. Historic buildings provide a tangible connection to the past and contribute to a community's identity and stability (Historic Hawaii Foundation, 2003). Visitors to historic sites and cultural attractions stay longer and spend more money than other kinds of tourists, and therefore make an important contribution to local lodging and restaurant taxes, suppliers of goods and services, and other businesses (Advisory Council on Historic Preservation, 2009). Increasingly, federal legislation has strengthened efforts to preserve our nation's historic places. The Historic Preservation Act of 1966 created the National Register of Historic Places (2010), which is administered by the states historical commissions in coordination with the National Park Service (Bryant, 1976). Listing historic courthouses on the National Register denotes their importance and that the properties are worthy of preservation. The National Register of Historic Places does not require the owners of the listed properties to establish public access to their property, nor does it obligate the owners to use the buildings for a specific use or follow any restrictive guidelines when restoring or rehabilitating the building. However, the states historical commissions did adopt the Secretary of the Interior's Standards for the Treatment of Historic Properties for preservation of historic buildings, such as the Texas courthouses (THC, 2010a).

Many historic structures represent the highest architectural achievements of their period when they were built. Others reveal extraordinary construction technologies and craftsmanship, while some are significant because they represent a vernacular building

type. Many provide a unique perspective on important people and events in history (Swanke, 2000).

Look (2004) stated that cultural resources are unique, non-renewable, and irreplaceable. Once a resource is gone, it is gone forever. Our cultural resources are most vulnerable during construction for a variety of reasons. According to Look, the risk of damage is very high for historical projects, issues including natural disasters, human attitude, and human harm.

A consensus in the literature indicated that protection of the historic building during renovation is just as important as the historic site itself. Furthermore, rehabilitation of significant buildings requires careful planning and a comprehensive site investigation so that the project is executed successfully with minimal damage and loss to the existing building and site. For example, Lynch (2003) stated although fire is the most catastrophic threat to a building during rehabilitation, there are other threats such as theft, vandalism, weather damage, water damage, and threats from the construction process itself. The author goes on to say that each of these threats can be anticipated and the project can be planned to minimize these risks.

The National Historic Preservation Act of 1966 was passed in order to guide the decision making process for preservation work and as part of the preservation movement to protect the historic fabric of the United States. There are specific areas in which the act states the importance of preserving our inventory of historically significant structures. For example, Section I, part (b) (1) states that *the spirit and direction of the*

Nation are founded upon and reflected in its historic heritage. The act continues to describe the importance of planning and renovation in part (b) (6):

> *… the increased knowledge of our historic resources, the establishment of better means of identifying and administering them, and the encouragement of their preservation will improve the planning and execution of federally assisted projects and will assist economic growth and development* (NHPA, 1966; revised 1992).

Typically with every preservation project, the project team members follow the guidelines established by the Secretary of the Interior's *Standards for Rehabilitation* (36 CFR 67) (Grimmer & Weeks, 1995). These recommendations were developed to provide a series of general guidelines by which to approach the preservation of historic structures. The *Standards for Rehabilitation* states that the intent of the standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. In addition, the standards pertain to historic buildings of all materials, construction types, sizes, and occupancy, and encompass the exterior and interior of the buildings. As a result, the *Standards for Rehabilitation* although general and open to interpretation have been adopted and used by state and local municipalities in their preservation ordinances (Kelley, 1996).

After winning its independence from Mexico in 1836, the new Republic of Texas formed counties to create a framework for a localized governmental system. As the county seat, the courthouse soon became a symbol of independent self-government and

an architectural embodiment of democracy. County courthouses epitomized the community's pride and reflected the civic, social, and economic viability of the areas they served (Mercer County, 2004a). There are also economic reasons for preserving these historic courthouses. For example, most were designed to be cost-effective with thick masonry walls to conserve heat, large open spaces to allow good air circulation, and tall windows and skylights to let in plenty of natural light. The costs associated with the design, building materials, and construction methods of these courthouses would be extremely costly today (Mercer County, 2004b).

In 1999, at the urging of Governor George W. Bush, the Texas Legislature created the Texas Historic Courthouse Preservation Program through House Bill 1341 (THC, 2010c). As a result, the Texas Historical Commission was given review authority over changes or alterations proposed by the counties for the preservation of their courthouses. These buildings display some of the finest examples of 19th and early 20th century architecture in the United States.

Texas was the first state to introduce legislation to protect and preserve its courthouses. Providing assistance to counties for courthouse preservation reached a critical point when some Texas county courthouses were added to the National Trust's Most Endangered Properties list in 1998 (THC, 2009). House Bill 1341mandates yearly rounds of awards for renovation work on the Texas courthouses. As of 2008, five rounds of awards totaling $207 million and $130 million in local matching funds have been awarded to 68 counties. The THC requested $85 million for fiscal year 2009-10 from the Texas Legislature to continue funding for these projects.

To participate in the grant program, counties must follow instructions given by the Texas Historical Commission. To begin the process, counties submit a Master Preservation Plan that includes information on the history of the building, historic photos and drawings, an evaluation of existing conditions, plans for the future, and an estimated budget. The Master Preservation Plan is then reviewed and may either be accepted, returned with suggested changes made and resubmitted, or rejected. Upon final approval of the Master Preservation Plan, a grant application may be submitted. In rounds I through VI the Texas Historical Commission received 138 courthouse master plans. Of those138 plans, 126 were approved (THC, 2009). This concept has been an integral part of the Texas Historic Courthouse Preservation Program since its inception in 1999. Restored courthouses provide for economic development in the business districts surrounding the courthouses. Also, Texas courthouses are recognizable landmarks for heritage tourism.

The preservation approach taken by the counties was guided by the Texas Historic Commission's Master Preservation Plan outline. Each county developed its own set of goals and master plan for its project. The master plan included descriptions of critical rehabilitation needs and accounted for life, safety, and environmental concerns while retaining as much of the historic features as possible. A preservation approach was selected to return the courthouse to the condition chosen by the master plan participants. This varied from county to county; some went to the original look of the building, while others chose a period later in the timeline of the building. For example, Johnson County built in 1913 chose the original 1913 date because almost all the interior finishes

associated with that period were still viable. The work generally involved preserving the original character-defining features, restoring the courtrooms, providing accessibility upgrades that comply with the Americans with Disabilities Act (ADA), upgrading the mechanical, electrical, and plumbing systems complying with current codes, adding fire protection systems, restoring interior finishes, restoring the exterior masonry, and rehabilitating the historic site.

Facility Management Practices

Facility managers have an important role in maintaining a property to function as required by the ever-changing needs of the user. The International Facility Management Association defines Facility Management as a "profession that encompasses multiple disciplines to ensure functionality of the building environment by integrating people, places, processes, and technology" (IFMA, 2010).

Using this accepted definition of facility management, this study focused on project delivery processes and project management practices associated with construction projects. Though this study focused on the preservation of an existing historic building, other studies show that other terms used to define preservation work have similar meaning and those are discussed in this section. For example, facility management studies in the UK referred to the upgrade, major repairs work, renovation, alterations, conversions, extensions, and modernization of existing buildings, but excluded routine maintenance and cleaning work as refurbishment (Quah, 1988). One of the major problems identified in managing refurbishment projects is that the fragmented

and uncertain condition of existing buildings limits the availability of design information. Therefore, any decisions made at the early stage of design may have a major influence on the overall performance of the project delivery (Ali, Rahmat, & Hassan, 2008).

The literature addressed two major areas of project delivery. One area examined project delivery methods currently used to establish a contractual agreement. The other area examined the factors associated with project management practices implemented during the project construction phase. New and renovation construction projects are usually done by a newly created team of professionals. This presents the client with a number of challenges, which include establishing effective contracts, implementing relationship management, managing contractor performance, ensuring delivery, obtaining value for money, and controlling costs. Of these challenges, much attention has been paid to the issue of contracts and the influence of contract selection on project success (Nguyen et al., 2004). Fundamentally, project delivery systems define the roles and responsibilities of the parties involved in a project. They also establish an execution framework in terms of sequence of design, procurement, and construction (Oyetunji & Anderson, 2006).

Numerous studies have been done to develop methodology that helps the decision maker decide the optimal project delivery system given a certain set of circumstances (Ribeiro, 2001; Al Khalil, 2002; Oyetunji & Anderson, 2006). The predominant form of project delivery for the courthouse preservation project has been the Design-Bid-Build (DBB) process. Though this study focuses on the PMP practices

used during the construction phase, it is imperative to establish the positives and negatives of this historic project delivery method.

There are specific advantages and disadvantages to using the DBD process. The advantages include: (a) assisting the owner to establish a fair market price for the project, (b) using competition to improve the construction price, (c) having a fixed award amount for the contract, and (c) understanding the DBB process is relatively easy. According to Kashiwagi and Byfield (2002), the disadvantages of using the DBB process include: (a) working conditions can be adversarial; (b) the facility owner's representative is forced to make decisions on acceptable performance, which results in the responsibility to manage contractors; and (c) owners are unable to differentiate high quality from low-quality contractors. Though DBB has been the method used to deliver a majority of these courthouse preservation projects, the best value for the owner should be the driving objective during the project delivery selection process.

Organizations and institutions often fail to recognize the importance of facility management for their business performance and success (Lavy, 2008). El-Haram and Agapiou (2002) stated that there is a growing awareness of the need for facility managers to operate and manage facilities for long periods. This would require facility managers to be involved during the design phase, construction phase, commissioning of the building systems, and maintenance. Furthermore, the article goes on to define the two roles facilities managers should be involved with during project lifecycle. The first role is during the bid development and design process, and the second is concerned with

the utilization of the facility and provisions of the agreed service (El-Haram & Agapiou, 2002).

The second area examined by the literature review included the factors associated with project management practices implemented during the duration of the project. These management practices develop the deliverables to keep the project on budget, on time, perform to the specifications, and keep the project team members satisfied with the renovation process.

Site layout needs to be addressed routinely by construction managers at the construction sites. Generally, an efficient overall layout plan plays a key role in the operational efficiency, timeliness, cost, and quality of construction (Tommelein, 1989). Site layouts are further defined in the Project Lifecycle Stages section of this chapter.

According to Jergeas and Fisher (1997), value engineering is a systematic approach that analyzes the functional requirements of a project to optimize cost and performance over the project's duration. The authors go on to define the approach for value engineering as the process of evaluating the worth of alternative materials or methods against their cost in an effort to meet some re-determined function.

According to Dlugatch (1973), there are seven basic elements of value engineering methodology. These include:

- selecting the component (product) to which the value engineering effort is to be applied;
- determining the function, including an accurate description of each required function;

- gathering specific information about the product;
- developing a number of alternatives that meet required functions;
- analyzing detailed costs of each of the alternatives;
- testing and verifying the feasibility of the new alternatives; and
- submitting a formal proposal recommending the alternative.

A Quality Assurance Plan provides the framework necessary to ensure a consistent approach to quality throughout the project's duration. This plan, developed by contractors, defines the approach that will be used to monitor and assess the work in accordance with the overall plans and specifications. The Quality Assurance Plan monitors and evaluates such items as those listed below (Harrison, 2005):

- document control ensures employees have the correct procedures and the procedures are properly maintained (plans and specifications plus revisions);
- a plan verifies quality procedures are being followed;
- non-conformance tracking monitors and tracks quality issues to ensure that defects are kept to a minimum;
- corrective and preventative action (CAPA) is implemented where needed to prevent defects and quality issues from re-occurring; and
- management review of quality systems data (performance; quality metrics) is used to determine if the quality system is working and if it is not, determines the appropriate action to improve the system.

Mock-ups are a detailed, full-scale sample of part of a project to be completed. Mock-ups are used during the submittal process to verify the contractor's ability to install a given product in accordance with the specifications. They also provide the owner with a means of comparison by which to judge the acceptability of the required work. According to Bentz and Howell (2007), mock-ups also serve as a means by which a consultant can review the constructability of the design and test the system for various levels of compliance with the specifications. The authors go on to say, "Because of time and budget constraints, mock-ups are too often omitted from practice." This is unfortunate, because this neglected step has been shown to be crucial to project success. Not only do mock-ups provide a sample of the work to be completed, they set the standard for high quality workmanship on a project specific basis, help alleviate concerns that might arise during the actual construction, provide a comparison basis for final appearance for the project, and test the integrity of the design and construction solution.

Project Management Planning Stages

As mentioned previously, the complexity of preservation work of historic buildings tends to be less well-planned and more difficult to control than the construction of new buildings (Egbu, 1999). Therefore, development of a PMP is essential to help control activities during a project. To understand the complexity of issues associated with planning a successful project, we must first define the parameters that constitute a project and the extent of the project manager's planning duties during the project. The

Project Management Institute (2008) defines a "project" as a temporary endeavor undertaken to create a unique product, service, or result. According to Dobson (1996), a project must have four characteristics. It must be goal-oriented, consist of tasks that can be put into a connected and interrelated sequence, have limited duration, and finally, a project must be unique and non-routine. Once the work to be done meets the definition of a project, the planning process begins and continues throughout the project's lifecycle. The project's lifecycle is a result of a combination of many events and interactions, planned or unplanned, during the renovation period, with changing participants and processes in a constantly changing environment (Sanvido et al., 1992).

Jackson (2004) reported that the overall design and construction process of a project is linear in nature and requires a systematic, comprehensive approach. Each of the stages is unique, and specific management techniques and skills are needed to keep everything on track. Jackson also broke down the project lifecycle into six stages: design, pre-construction planning, procurement, construction, post-construction, and finally, owner occupancy. The six-stage approach depicts the total project from inception to completion. However, for the current study, the six-stage approach was condensed to the three stages: pre-construction planning, procurement, and construction. This was done because of the direct relationship between the project lifecycle stages and the PMP.

The pre-construction planning phase is typically defined as the transfer of information developed by the estimator during the bidding phase, which is then given to the newly appointed project manager responsible for the means and methods of the

project delivery. This is the first time the project manager is able to view the job, so the quality of the information is very important to maintain cost controls (Jackson, 2004).

The pre-construction planning phase sets up the systems that are used to manage and control the work during the project execution phase. Menches, Hanna, Nordheim, and Russell (2008) listed several things that need to be included in the pre-construction planning, including selection of the project team, creation of the project documentation system, initiating the purchasing of materials, development of the schedule and milestones, and several other activities that prepare a project for execution. The authors also pointed out that there is strong anecdotal evidence that projects are often executed without any formal planning, and these informally planned (or unplanned) projects tend to experience a greater number of problems, such as excessive changes, exceeding the budget, failure to complete the work on time, and low (or no) profits.

Research has shown that an appropriate procurement system may enhance the probability of project success (Rwelamila & Meyer, 1999; Luu, Ng, & Chen, 2003). The procurement stage is a process that is often referred to as “buying out” the job, or purchasing the labor, materials, and equipment needed to complete the project (Jackson, 2004). For all materials, purchase orders should have been issued before the construction process started. The procurement process is subsequently managed according to a 'push' approach, so as to deliver materials to the site in compliance with the deadlines established by the expected construction schedule (Caron et al., 1998).

This study focuses on the Design-Bid-Build (DBB) project delivery method, which was chosen by the THC as the preferred delivery method for the THCPP projects.

Award of the DBB contract is given to the lowest responsible bid. One study (Mallinder, 2005) indicated that using fixed price low bid (DBB) sometimes creates situations where the contractor tries to drive down costs at each level of the supply chain, resulting in compromised quality. In addition, contractors are driven to recover extra costs wherever possible, which can strain design team/contractor relationships and waste time and costs spent resolving disputes. Mallinder goes on to say, "Constructors only knew they would be working on a project just a few weeks after being awarded the project, and the lead-in time for resource planning was often far too short, resulting in problems on site" (2005, p.1). Furthermore, new contractor/design teams are formed on virtually every project, meaning new working relationships must be established every time.

The construction phase begins with a formal letter prepared by the owner known as the 'Notice to Proceed' (NTP). For this study, the construction phase will address three areas that affect the smooth operations of the construction project phase: coordination of trades, mobilization, and construction. Once the contractor has received the Notice to Proceed, then the construction manager begins the coordination of subcontractors for the project. This requires the construction manager to establish the ground rules for the many workers needed during the construction phase. The construction manager also has the opportunity to go over issues such as sequencing, work hours, material storage, quality control, site access, and many other pertinent topics with the newly formed construction project team. Relationship building is essential in establishing an environment of trust and cooperation at the start up of the project (Jackson, 2004).

Mobilization addresses all of the activities a project manager must accomplish prior to starting construction. Planning for these projects to reach a high level of success depends on management methods currently available to the project manager. For example, (Rad & James, 1983) proposed field manager guidelines depicting possible issues they may encounter when developing the site layout plan.

Contractors are well aware of their special role and are legally bound to deliver a quality project on time and within cost; their commercial survival depends on their continuing performance in the market place. Thus, it may be anticipated that contractors will use all available managerial skills, including current planning techniques, to plan and monitor their projects (Cole, 1991).

Numerous studies have focused on ways to improve the construction planning process. Dawson and Dawson (1998) attempted to define the duration and sequencing of construction activities by optimizing the scheduling problem. Chan and Kumaraswamy (2002) developed a prediction model for construction time that combines historic data and factors that affect the project duration. Some studies focused on project planning for preservation work, which was especially pertinent to the current study. These studies pointed out the complexities of dealing with existing structures, usually located in an urban context (Robson, 1999; Feilden, 2003; Mitropoulos & Howell, 2002; Jarsky, 2005) studied renovation improvement mechanisms, which resulted in the development of strategies to prevent design rework.

Defining the Project Planning Success Criteria Indices (SCI)

Building projects are becoming more complex and owners expect their projects to be delivered as fast as possible while maintaining a high level of quality. The concept of project success was developed to set criteria and standards to help guide project managers in completing projects with the most favorable outcomes (Chan & Chan, 2004). These standards require project managers to pay particular attention to the criteria that affect the success of a construction project. Lim and Mohamed (1999) also examined the criteria and factors necessary for projects to succeed. Figure 1 depicts the criteria needed for project success.

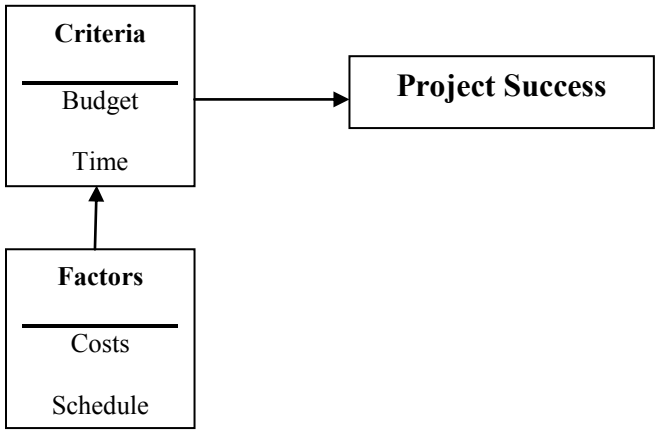


Figure 1. Project success model.

In the early 1990s, project success was considered to be tied to performance measures, which were in turn tied to project objectives (Chan & Chan, 2004). In addition, some researchers (Baccarini, 1999; Hatush & Skitmore, 1997; Nguyen et al.,

2004) have defined project success as occurring when a project meets time, cost, and quality objectives and satisfies the stakeholders. Furthermore, a project is considered an overall success if it meets the technical performance specification or mission to be performed (de Wit, 1988). A high level of satisfaction concerning the project's outcome included meeting budget, schedule, quality of workmanship, client and project manager's satisfaction, transfer of technology, friendliness of environment, and health and safety in their definition of project success (Kumaraswamy & Thorpe, 1996). Additional definition of project success includes functionality, profitability to contractors, absence of claims and court proceedings, and meeting the mission to be performed for occupiers (Takim & Akintoye, 2002).

Though there has been documented consensus on the success criteria of a construction project, recent research indicated that there has been little agreement on the causal factors of project success (Pinto & Slevin, 1987; Belassi & Tukel, 1996; Chan et al., 2004). Several studies have attempted to express the varied approaches to develop the project manager's planning for success. Sayles and Chandler (1971) looked at the project manager's competence, scheduling, monitoring, and feedback. Cleland and King (1983) focused on financial support, logistics requirements, facility support, project schedule, and acquisition as the success factors. Baker et al. (1983) studied the on-site project manager, adequate funding to completion, accurate initial cost estimates, minimum start-up difficulties, and planning and control techniques. Locke (1984) focused on appointing a competent project manager, setup communications and procedures, setup control mechanisms, and progress meetings. Pinto and Slevin (1989)

developed a success factor list that included monitoring and feedback, communication, and characteristics of the project team leader.

According to one study, a major reason for not having an agreement on the causal factors of project success is the widespread assumption that a universal theory of project management can be applied to all types of projects (Dvir, Lipovetsky, Shenhar, & Tishler, 1998). The search for a universal theory may be inappropriate given the fundamental differences that exist across projects and innovations (Dewar & Dutton, 1986; Pinto & Slevin, 1989; Damanpour, 1991; Shenhar, 1993; Shenhar & Dvir, 1996). Therefore, the concept of project success has remained ambiguously defined both in the project management literature as well as within the psyches of project managers (Pinto & Slevin, 1988). Therefore, the current study will focus on the success criteria of budget, time, performance, and satisfaction.

Cost is not only confined to the tender sum, it is the overall cost that a project incurs from inception to completion, including any costs arising from legal claims, such as litigation and arbitration (Chan & Chan, 2004). More generally, it is the total sum of money allocated for a particular purpose or period for planned costs of any or all tasks needed to reach project completion. The time to complete the project is scheduled to enable the building to be used by a date determined by the client's future plans (Hatush & Skitmore, 1997). Performance of the project represents a definite improvement in efficiency over the way clients used to conduct these activities (Pinto & Slevin, 1988). Customer satisfaction has a strong correlation with economic returns (Holm, 2000).

The criteria needed for a successful project -- budget, time, performance, and satisfaction -- are prevalent in the current literature and are generally agreed upon among researchers. However, the factors that lead to that success vary greatly. For example, some studies have been done from the perspective of the project manager as the expert. This has led to a narrow focus of perception that takes into account the variance between the project managers, but does not include the point of view from the rest of the project team members. The current study will also focus on those factors affecting success criteria at the project stages of pre-construction planning, procurement, and construction phases for preservation of a historically significant building. This integration of literature will be used to develop a theoretical framework of success criteria using three major bodies of literature.

The literature review described different topics; project management, historic preservation, facilities management and the significance of each of the success criteria; budget, time, performance, satisfaction. In addition, each success criteria are assessed by variables that are characterized by operational definitions. A conceptual model was developed following this review and hypotheses for this study were drawn.

CHAPTER III

CONCEPTUAL MODEL AND HYPOTHESES

The main purpose of this study is to ascertain the relationship between Project Management Planning and project success for preservation projects of historic building located in an urban context. As the literature review indicated the research has revealed that there is a consensus about the core group of success criteria variables. This includes budget, time, performance, and satisfaction. Thus, these four criteria are the variables that will be tested to determine their influence on project success. The tests will include two inferential statistical methods of analysis, one will be an Analysis of Variance and the other will be an Ordinary Least Square Regression.

Conceptual Model

A general conceptual model was developed to visualize the conclusions from the literature review (see Figure 2). The model depicts the three areas of interest that were the focus of the literature review (Project Management, Historic Preservation Planning, and Facility Management). *Project Management* includes the planning and execution of the project lifecycle. *Historic Preservation Planning* examines the importance of the historic significance of a building and the project planning process for renovation projects. *Facility Management* focuses on the planning and execution of the delivery and procurement through the project lifecycle.

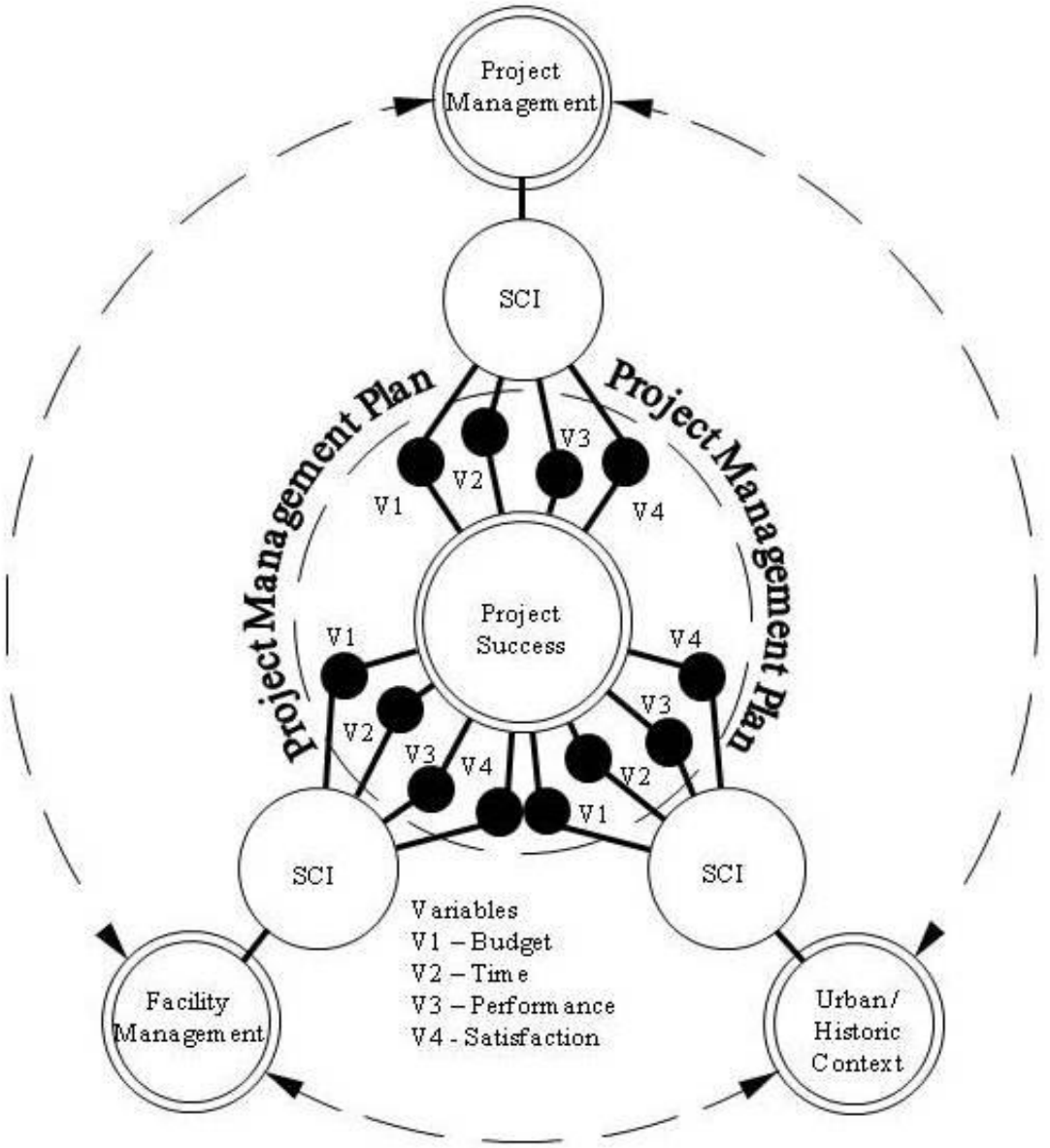


Figure 2. General conceptual model.

A dashed line in Figure 2 shows the association between the three independent areas of interest; Project Management, Urban/Historic Context, Facility Management. Two-sided arrows between these topics illustrate the overlapping relationships between these areas. A comprehensive literature review revealed gaps in the current research of project success variables; Time, Budget, Performance, Satisfaction. This led the current study to establish the three areas of Success Criteria Indicators (SCI). These are depicted by a bold line that connects the areas of interest and the success criteria indicators. These indicators exhibit congruency in the variables associated with explaining project success. For this study, the success criteria indicators have then been identified as the independent variables: V1-Budget, V2-Time, V3-Performance, and V4-Satisfaction. Figure 2 depicts the independent variables as solid circles located between SCIs and project success, while project success (at the center of the figure) is the dependent explanatory variable that can be tested both descriptively and inferentially. The PMP is expressed as a dashed circle that includes the independent variables. This was done to show that the development of the PMP depends on the success criteria variables.

Figure 3 is a more specific depiction of the conceptual model. It outlines the four major variables specific to this study: budget, time, performance, and satisfaction. The association between the independent variables is illustrated by a dashed line. As depicted in the conceptual general model Figure 2, these variables may also have overlapping relationships.

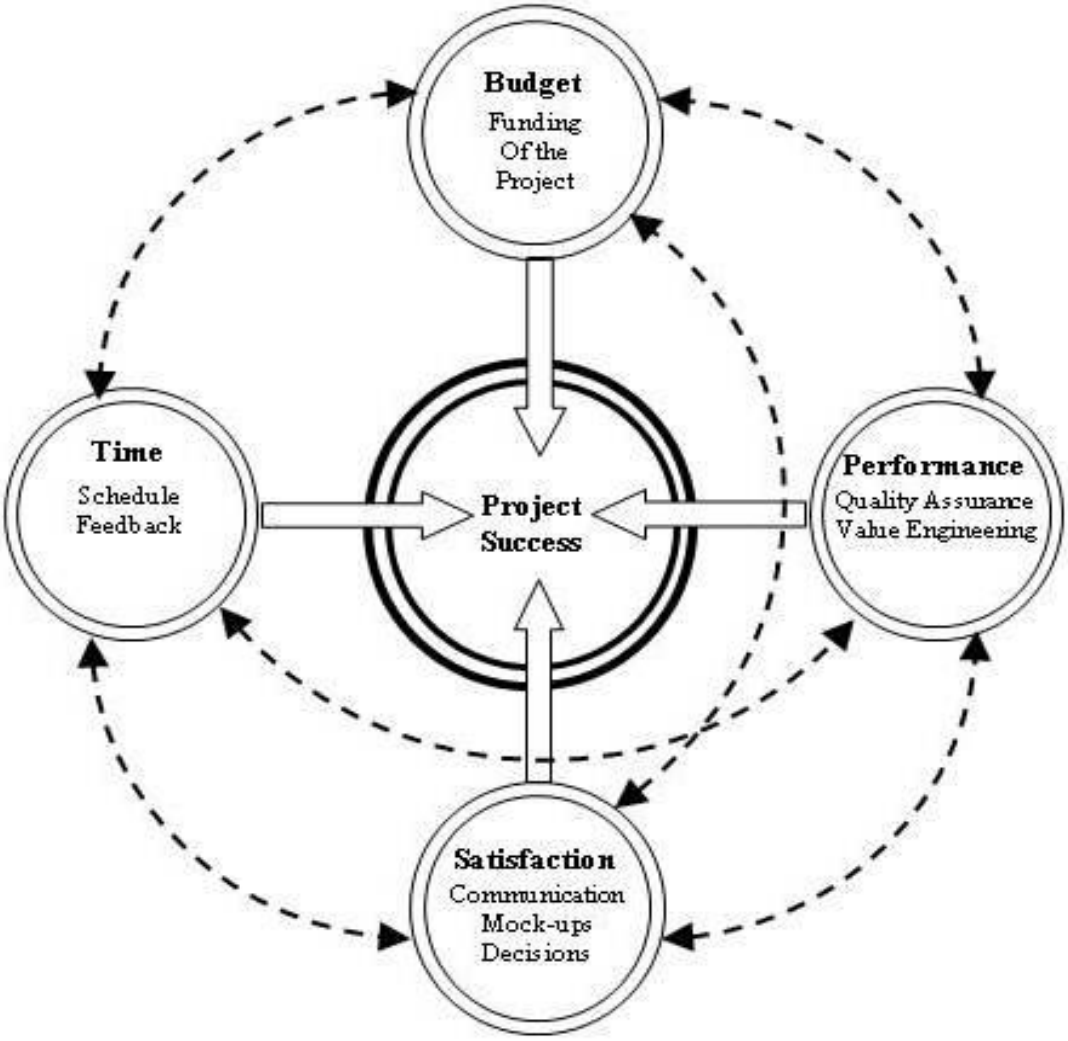


Figure 3. Conceptual variables model.

The effects of budget, time, performance, and satisfaction (the study's four independent variables) on project success (the study's dependent variable) are expressed by dashed arrows that represent the major criteria for project success and the probable interrelations between the variables. Furthermore, this specific model as described in

Figure 3 delineates the relationships between the dependent variable of project success and the independent variables of budget, time, performance, satisfaction. The four independent variables can be summarized as follows:

1. *Budget* establishes costs for the project construction. Cost is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubshait & Almohawis, 1994).
2. *Time* consists of two operational definitions: schedule and feedback, and is defined by the schedule for a project showing how construction activities and milestone events are arranged over the duration period. The dynamic nature of construction will require the schedule to be updated as circumstances affect the current plan. In addition, time refers to the duration for completing the project. Feedback focuses on the timeliness of important project information between the project team.
3. *Performance* is defined by two operational measures, quality assurance, and value engineering. Quality assurance is defined as the development of the project to "work" for a given problem; in other words, the product does what it is designed to do. According to Jergeas and Fisher (1997), value engineering is a systematic approach that analyzes the functional requirements of a project to optimize the cost and performance over the project's lifecycle.
4. *Satisfaction* consists of three operational definitions: communication and feedback between the project team, implementation of mock-ups, and decision tracking.

The current study documents the access of information dissemination by the project team during the project lifecycle and its influence on project success. Operational measures for these variables (e.g. budget, time, performance, and satisfaction) were drawn from the literature review and applied in this study to preservation projects in urban settings. The study also examines completed preservation projects of the same building type (courthouses), built in the same state (Texas), and renovated during the same decade (2000-2010). These buildings are part of the Texas Historic Courthouse Preservation Program (THCPP) created by House Bill (HB) 1341.

Hypotheses

The conceptual models illustrate the independent and dependent variables and their perceived relationships. A research hypothesis was developed to test the relationship between PMP and project success for projects of historical significance that are located in an urban context.

The study's main research hypothesis is as follows:

H_o There is no relationship between the project management planning and project success.

H_1 There is a relationship between the project management planning and project success.

To establish this relationship between project management planning (PMP) and project success, the current study investigated three phases of the project lifecycle: pre-construction, procurement, and construction. These three phases are common to any

construction renovation project (Jackson, 2004). The study acknowledges that each project team is different and unique with evolving methodologies, so a set of research hypotheses were developed to test if there was a difference of project success perception between the project team members (owners, THC reviewers, architects, and contractors).

The research hypothesis is as follows:

H_2 There is a difference between the project team members perception of the success criteria variables.

The sub-hypotheses are as follows:

H_{2A} Owner's Perception of Budget ≠ Architect's Perception of Budget ≠ Contractor's Perception of Budget ≠ THC Reviewer's Perception of Budget

H_{2B} Owner's Perception of Time ≠ Architect's Perception of Time ≠ Contractor's Perception of Time ≠ THC Reviewer's Perception of Time

H_{2C} Owner's Perception of Performance ≠ Architect's Perception of Performance ≠ Contractor's Perception of Performance ≠ THC Review's Perception of Performance

H_{2D} Owner's Perception of Satisfaction ≠ Architect's Perception of Satisfaction ≠ Contractor's Perception of Satisfaction ≠ THC Review's Perception of Satisfaction

Development of a third hypothesis was followed by testing the impact of the success criteria indicators (budget, time, performance, and satisfaction) for each of the project team members (THC reviewers, architects, and contractors) along project success. The research hypothesis is as follows:

H_3 There is a relationship between project success and the success criteria variables (budget, time, performance, and satisfaction).

Finally in order to determine the impact of the success factors for each of the project team members (owners, THC reviewers, architects, and contractors) against project success. A fourth hypothesis was established:

H_4 There is a relationship between project success and the success factor variables (Budget, Time, Performance, and Satisfaction).

The hypotheses listed seek to establish relationships between the independent variable, PMP (success criteria variables, success factors) and the dependent variable project success. There was some difficulty with this because project success cannot be measured directly, and varies depending on the project team member's viewpoint. The research study operationalized project success by using specific success criteria indicators. The conceptual models followed the literature review served as the basis to develop the research hypotheses. Chapter IV will present the methodology and procedures used to test the hypotheses.

CHAPTER IV

METHODOLOGY AND PROCEDURE

The study was conducted in two phases utilizing mixed-methods sequential exploratory research design. By definition, a mixed method is a procedure for collecting, analyzing, and "mixing" or integrating both quantitative and qualitative data. This is done at some stage of the research process within a single study for the purpose of gaining a better understanding of the research problem (Teddlie & Tashakkori, 2003; Creswell, 2005).

As described earlier in Chapter III, the dependent variable of this study is *project success*. The independent variables affecting the project success are identified as budget, time, performance, and satisfaction. In addition, this study examines completed renovation projects of the same building type (courthouses) that were built in the same state (Texas) and were renovated during the same decade (2000-2010). According to Veselka (2000), the Texas courthouse square offers an interesting window on American town planning traditions and the relationships between these traditions and the social meaning of civic space. Town planning, land use, social activity, and architectural symbolism are interwoven at the courthouse square in ways matched by few other elements of American urban design. In addition, civic pride, historical significance, the urban setting, and the availability of public information add many layers to the complexity and importance of these courthouses to the history of Texas. Furthermore, this type of building is also viewed as important and significant by architects and construction firms. All of these special factors may require the reallocation of resources

to focus not just on the budget and schedule but also on the performance and project satisfaction aspects in order to deliver a successful project.

These buildings are part of the Texas Historic Courthouse Preservation Program (THCPP) created by House Bill (HB) 1341. The test of the study's hypotheses was based on both quantitative and qualitative analysis methodology. This was done in two phases. Phase I included analysis of the completion reports for the 37 cases. Phase II included administering a survey to the project team members (THC reviewers, architects, and contractors) and analysis of the results. Furthermore, Phase I was analyzed using descriptive and ANOVA statistical analysis. Phase II was analyzed using descriptive and Ordinal Least Squares for Multiple Regression statistical analysis.

Research Design

This study was organized to follow mixed-methods sequential explanatory design and consists of two distinct phases. Ivankova et al. (2006) found that the rationale for mixing both kinds of data within one study is grounded in the fact that neither quantitative nor qualitative methods alone are sufficient to capture the trends and details of a situation. When used in combination, quantitative and qualitative methods complement each other and allow for a more robust analysis, taking advantage of the strengths of each (Greene, Caracelli, & Graham, 1989; Miles & Huberman, 1994; Greene & Caracelli, 1997; Tashakkori & Teddlie, 1998).

Phase I used a quantitative methodology in the form of analysis of 37 cases to investigate the relationship between estimated project data vs. actual project data by

using project performance metrics (budget growth, time growth). The analysis of the cases was limited to a single setting, utilizing data from the Texas Courthouse Preservation Program completion reports. The analysis of the cases methodology was used to build theory and find factors that may impact the phenomenon being studied (Meredith, 1998).

Phase II used a qualitative methodology in the form of an online survey instrument that was administered to the project team members. The aim of this methodology was to investigate the impact of the project management planning practices (success criteria and success factors) on project success of Texas historic courthouse preservation projects.

Assumptions

The following assumptions were made in this research:

1. The historic courthouses in Texas are still in use.
2. In June 1999, the Texas Legislature established the Texas Historic Courthouse Preservation Program (THCPP) through House Bill (HB) 1341 in order to provide partial matching grants to Texas counties for the restoration/renovation of their historic county courthouses.
3. All 37 renovated historic courthouse locations are in an urban setting.
4. Project team members had the opportunity to work on different THCPP projects, contributing to an increased level of expertise gained from working on multiple projects.

5. All THCPP renovation projects follow the standards for the treatment of historic properties established by the Secretary of the Interior.

Procedure

Figure 4 depicts the procedure of Phase I and Phase II. The bold arrows in the figure show process and the dashed arrows represent the output refinements being introduced back into the research stages. The overall model of procedure delimits the research stages and outputs for each phase. *Research stages* represent the steps taken to reach the expected beneficiaries. *Outputs* represent the deliverables that were developed from the research stages. These deliverables served to refine the study for the inferential statistics that were conducted during the statistical analysis stage.

Phase I Procedure

Figure 5 describes the procedure of Phase I. The steps pictured in Figure 5 are broken down by stages and are discussed below. Following the literature review, a list of success factors (project management practices, or PMP) was developed. This list was based on information gleaned from multiple research studies (Sayles & Chandler, 1971; Baker et al., 1983; Cleland & King, 1983; Locke, 1984; Morris & Hough, 1987; Pinto & Slevin, 1989; Parfitt & Sanvido, 1993; Faniran et al., 1999; Belassi & Tukel, 1996; Munns & Bjeirmi, 1996; Nguyen et al., 2004; Chan et al., 2004; Yu, Shen, Kelly, & Hunter, 2006; Chen & Chen, 2007). These project management practices were compared and categorized in order to identify what success criteria these factors fit.

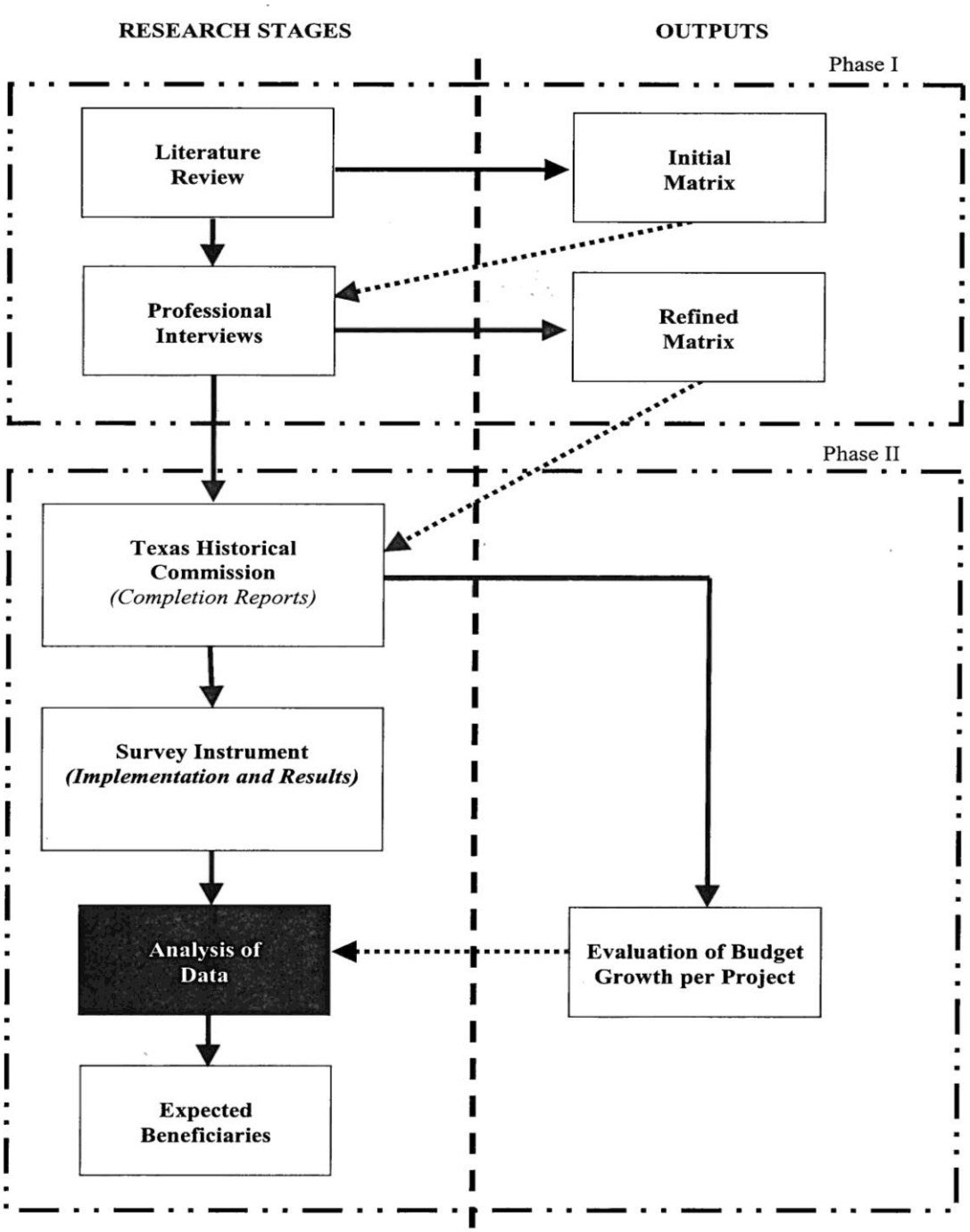


Figure 4. Overall operational design of the study.

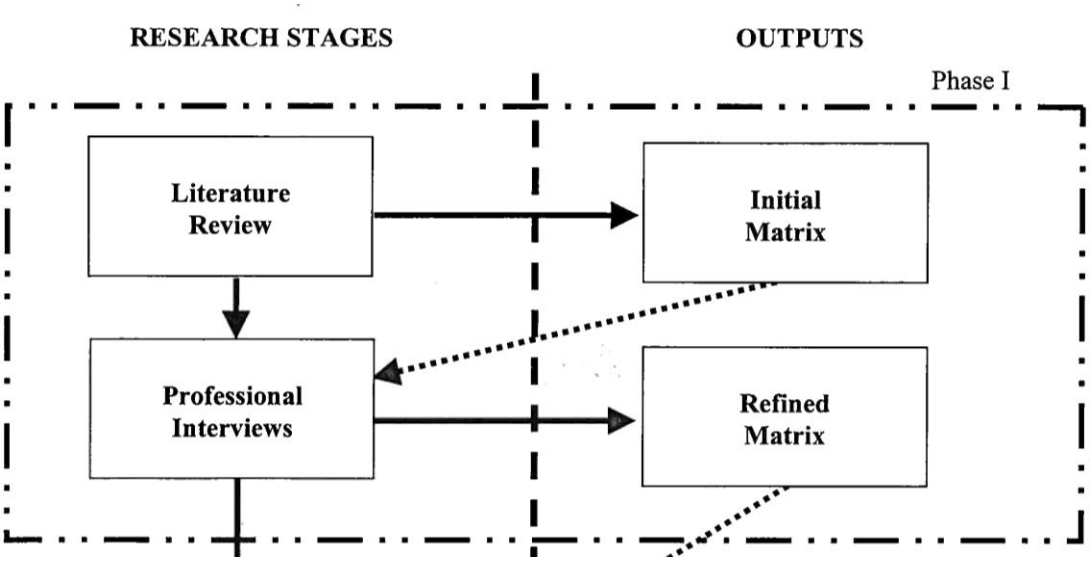


Figure 5. Operational design of Phase I of the study.

As stated in Chapter III, the activity list focused on success factors that influence the success criteria of budget, time, performance, and satisfaction. The filtering process was done along three objectives: (a) to achieve a list that combines similar management practices, (b) to categorize and further filter the list to the specific success criteria for budget, time, performance, and satisfaction, and (c) to classify the refined management practices list into the three project lifecycle phases: pre-construction, procurement, construction.

A PMP practices list (see Appendix D) was compiled using the researcher's background experience in the building environment industry and information based on the literature review. It was refined following a review from four project management professionals (architect, mechanical engineer, structural engineer, and construction manager) in the building environment industry.

The management practices list was further refined with two personal interviews. The interview data served as an indication of the project manager's views on activities essential to the delivery of a successful project. The interviewees were selected from the list of construction project managers, and had to meet the multiple projects experience criteria in order to be chosen. Contacting the construction project managers was done by telephone with an explanation of the interview process. The completion report only provided the name, address, and phone number of the project managers, so the telephone call was placed to update the contact information to include any information changes (see Appendix E). The finalized management practices list was used to develop the survey instrument that was administered to the project team members.

The project team members are homogeneous, because all the individuals surveyed have worked with the Texas Historical Courthouse Preservation Program. Because the process of project management planning practices varies from contractor to contractor and no set industry wide methods or procedures exist, the input from the project team served as a baseline of the criteria needed to deliver a historic courthouse preservation project successfully.

Phase II Procedure

The analysis of the cases approach, also known as grounded theory, was selected to explain the phenomenon of success criteria in PMP practices. The population of this study is listed by completion date from first rededicated courthouse to the most recent rededicated courthouse. Spreadsheet software (Microsoft EXCEL® 2007) was used to

track the data. This spreadsheet served only as a means to establish the list of completion reports that are available and for the study's relevant analysis.

The courthouses comprised the unit of analysis for Phase II of this study. Completion reports were analyzed for each of the 37 courthouse projects and project team contact information was collected. In addition, data was collected on the performance of two success criteria variables (e.g. time and budget) (Gransberg, Badillo-Kwiatkowski, & Molenaar, 2003). The collected data, as well as the analysis of time and budget growth performance metrics, allowed the completed projects to be sorted and ranked from the smallest budget/time growth percentage to largest budget/time growth percentage of delivered courthouse preservation projects.

An online questionnaire (see Appendix C) was administered to each of the project team members selected to participate in the study. This was done in order to collect data describing the current project management planning practices for those construction companies that worked on the Texas Historic Courthouse Preservation Program. The prevailing reason for utilizing the online key informant questionnaire was the ease of having the project team members being able to complete the survey on their own time. Data was analyzed using three different statistical methodologies: ANOVA, descriptive statistics, and inferential statistics. The survey aim was to gain data on project team members' perceptions of PMP and how they relate to a successful project delivery as detailed in Phase I. Figure 6 describes the procedure of Phase II, and shows the breakdown of steps taken during the study.

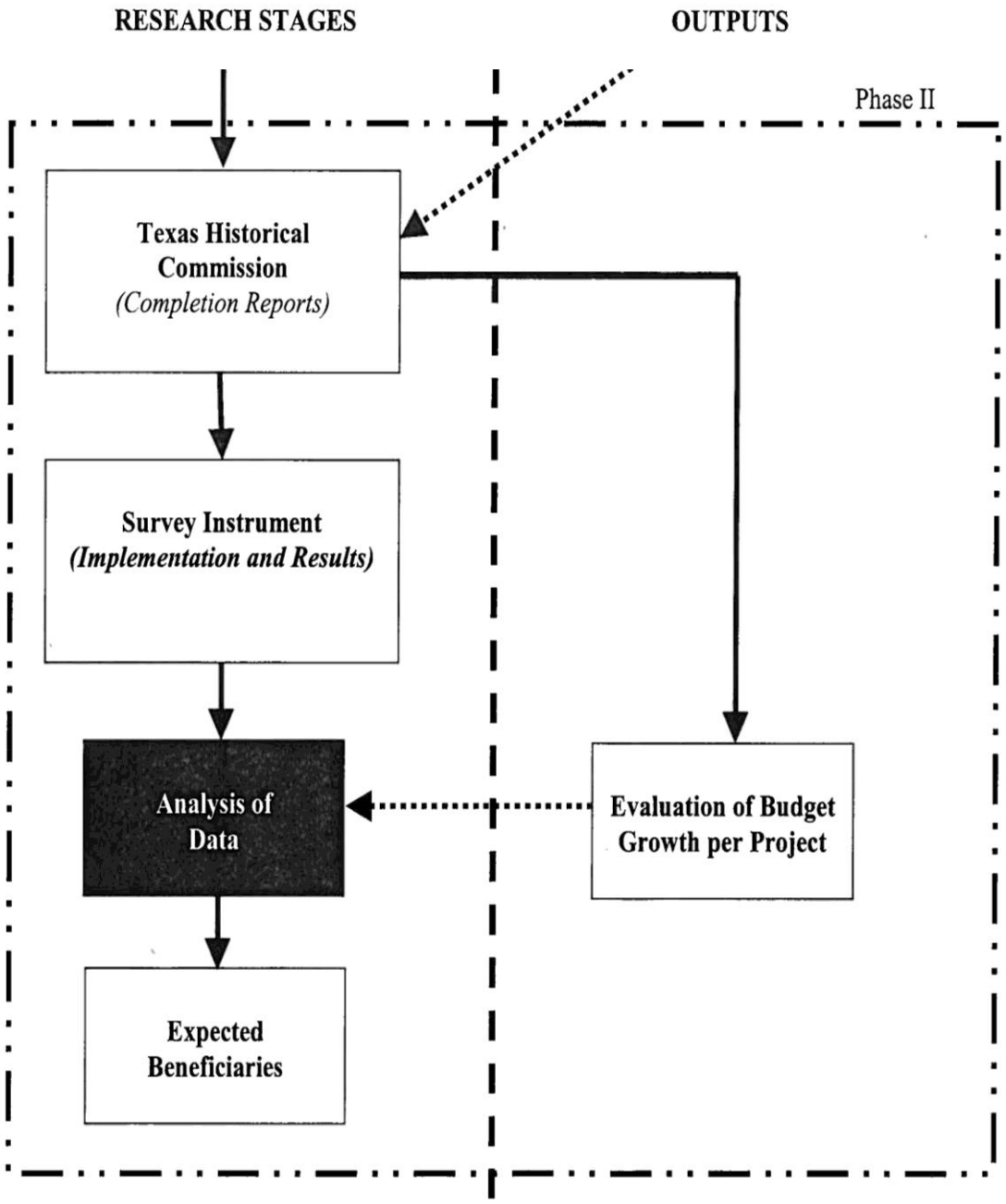


Figure 6. Operational design of Phase II of the study.

Performance metrics were used to analyze the actual performance of the THCPP projects used in this study. This was done by using two metrics that included Time Growth and Budget Growth. Time was evaluated on the percentage of time/days that a project increased or decreased. Budget was evaluated on the percentage of cost that the project increase or decreased.

$$\text{Time Growth (TG)} = \frac{\textit{Original Scheduled Days + (Number of Days to Substantial Completion)}}{\textit{Original Scheduled Days}}$$

$$\text{Budget Growth (BG)} = \frac{\textit{Original Contract Amount – Final Payout Amount}}{\textit{Original Contract Amount}}$$

Population of Interest and Sample Size

The Texas Historical Commission received 133 master plans for preserving and maintaining historic county courthouses in Texas. Of those 133 plans, 122 were approved. According to the Texas Historical Commission (2010b), the most recent information published listed 37 completed courthouse projects that have been rededicated prior to this study. The completed courthouse projects (see Appendix A) used for this study were required to submit a completion report to the Texas Historical Commission as part of their closing documents. These documents were invaluable, providing much of the data needed for this study.

Phase I Population of Interest

In Phase I of the study, the population of interest consisted of two separate groups. The first group included four professionals (an architect, a mechanical engineer, a structural engineer, and a construction manager) from the Texas A&M University Engineering and Design Services Department. The second group consisted of the 37 project completion reports that had been submitted to the Texas Historical Commission. A list of the construction project managers was established and used as a basis to select two interviewees.

Phase II Population of Interest

In Phase II of the study, the population of interest consisted of the key project team members who worked on the 37 courthouse preservation projects that were part of the Texas Historic Courthouse Preservation Program. As might be expected, the compiled list of the key project team members includes duplication of some of the architects, contractors, and THC reviewers. As a result, it is assumed that a learning curve was established in these cases and expertise as well as reputation was gained by working on multiple projects. Because each courthouse is "owned" by a different county, the owners are considered to be unique to each project.

Phase I Sample Size

The sample size for data collection in Phase I of the study had two independent sample group sizes. First, the sample size for the refinement of the project management practices

list contained ten professionals out of which four were randomly selected to review and update the list. Second, the sample size for the interviewees included the construction project managers for the thirty-seven completed preservation projects. The list did include repetition of construction project managers because there were some construction firms that were awarded multiple preservation projects. From the list of 14 possible construction project managers, two were randomly selected to do the interview. Phase I utilized qualitative methodology that aims to investigate the relationship between project management plan and project success.

Phase II Sample Size

Phase II utilized a quantitative methodology in the form of a survey instrument that expressed the perceptions of success criteria variables and success factors that impact project delivery. In addition, Phase II used quantitative methodology in the form of an analysis of 37 cases to document the actual vs. the estimated budget growth for the completed courthouse preservation projects. An open records form was completed at the Texas Historical Commission that allowed the use of the completion reports and any information available at the time to help with this study. Once the approval was granted, the Texas Historical Commission laid out a set of guidelines to be followed during the data collection phase. Furthermore, any information gathered was treated as confidential and remained exclusive to this study. The project team members were assured that no contact information or any other link would be disclosed. This was done so that the

project team could answer freely and not affect the perceptions of the individual. A unique numbering system was employed to protect sensitive information. For example:

Owners = O100, O101, O102… etc.

Texas Historical Commission = THC100, THC101, THC102… etc.

Architects = A100, A101, A102… etc.

Contractors = C100, C101, C102… etc.

The potential sample size for the survey implementation stage included 75 potential project team members chosen from the 37 completed courthouse renovation projects. Of the 75 project team members, fourteen were construction project managers responsible for the renovation of the courthouses. Seventeen were architects responsible for the design and specifications of the courthouses preservation documents. Seven were Texas Historical Commission project reviewers responsible for the inspection and adherence to the construction documents. Thirty-seven were the governing officials (Owners) representing the counties, including judges and owner representatives selected by the counties. There is a redundancy of project team members within the construction and architecture firms, as well as the Texas Historical Commission project reviewers.

Historic courthouses are selected for preservation in rounds done on a yearly basis. The number of courthouses per round has varied in terms of submittals for planning money and construction money. The goal of this study was to collect data from all the project team members associated with the completed renovation projects. However, this was not possible because of significant employment turnaround in the

different project team groups. In addition, there were a large number of redundancies in regards to the repetition in the design and construction professionals. Thus, the total actual respondents of this study included ten owners, six Texas Historical Commission members, eight architects, and seven contractors.

The sample size for the analysis was the 37 completed courthouse preservation projects. The case analysis methodology was chosen because of the small sample size of the study and the availability of data from the completion reports. In addition, case analysis methodology allowed the opportunity to immerse the investigator into a deeper understanding of the project, and the completion report offered detailed information on the budget and time success criteria variables.

Limitations

This research is intended to investigate success criteria variables and the project planning practices that contribute to the success of Texas historic courthouse preservation projects. This study acknowledges there are many factors that may affect the success criteria variables, (e.g. safety, experience, leadership). However, it is not be possible to account for all of them in one study.

There are two types of limitations placed on this study, uncontrolled and controlled. Uncontrolled study limitations included the experience of the project team members, the implementation of technology, and market fluctuations. Controlled study limitations included the following.

- The completed renovation projects are limited to historic courthouses in the state of Texas.
- There will be some redundancy among project team members because of the limited number of qualified architects and contractors available to work on renovation projects of this type. In addition, the THC employs only six reviewers and assigns only one to each project so there will be some redundancy among reviewers.
- The small sample size of the study presents a limitation when using the case analysis methodology. However, this practice seems to offer better measurements, due to the learning curve of the professionals involved in the projects and their expertise working with this type of building. Therefore, the empirical findings in this research should be observed and used contextually if they are applied to other building types or differing locations in the United States.

Delimitations

This study is delimited to an identified population of companies and professional individuals that worked on the Texas Historic Courthouse Preservation Program. Therefore, the study is not intended to be a completely inclusive model with regards to other types of projects (beside historic courthouses) in differing geographic locations (e.g. outside Texas).

Phase I Data Collection

Phase I followed the literature review, which determined the study's variables. Data collection was conducted through an investigation of archived data. The Texas Historical Commission has made available the rededicated courthouse completion reports submitted by the contractor as part of the close out deliverables. An interview form was developed by using an online survey site, www.surveymonkey.com; this survey was printed and presented to the two selected construction project managers.

Phase II Data Collection

Similar to what was done for Phase I, data collection was conducted using a matrix index spreadsheet (Microsoft EXCEL® 2007) developed from the completion reports. In addition, the online survey was conducted using the web site, www.surveymonkey.com. These completion reports served four functions for this study's methodology. First, a comprehensive timeline was determined that depicted what occurred during the renovation project. This timeline included budget, time, funding agreement, and substantial completion as well as other items (see Appendix F). Second, the completion reports included contact information for project team members, which was used to develop the list of potential project team members. Third, the completion reports were used to form a baseline for evaluating the performance metrics of time and cost growth associated with the different renovation projects. Fourth, the information gathered and analyzed was used to rank the project's success by smallest budget growth to largest budget growth (see Appendix G).

Development of Project Management Activities (PMP) List

To begin the process of collecting data on successful project management planning practices, a broad list of management practices (success factors) was compiled. Next, it was reviewed by two successful construction managers for refinement. Ultimately, the finalized management list served as the basis to develop the survey questionnaire.

This list of project management activities (see Appendix D) was produced by using a five-fold approach. First, the list was compiled using the researcher‘s background, which included over 15 years of working in the building environment industry, specifically in the renovation and preservation of a wide range of building types. This experience provided an overview of the problems associated with using a project management plan. Second, a literature review was conducted that focused on project management practices and performance metric procedures currently used by construction project managers.

Third, to refine the activity list beyond the literature review, the list was reviewed and revised by four professionals in the building environment industry. The reviewers included one architect, one mechanical engineer, one structural engineer, and one construction manager. Three of the reviewers (architect, mechanical engineer, and structural engineer) are currently licensed professionals in the state of Texas. The fourth reviewer (construction manager) has over 20 years of construction experience.

Fourth, the project management practices list was updated to include the reviewers committee’s recommendations. This included the practices that a construction project manager encountered during the project lifecycle. Fifth, interviews were

conducted with two construction project managers who were selected randomly from the potential fourteen respondents. This was done to refine the list and test the management activity list for completeness.

The two construction project managers' interviews were developed using a three-prong approach. First, a direct telephone call was placed to the construction manager to introduce the study's importance and interview agenda. In addition, the telephone conversation served to confirm the contact information, including email addresses that were not available in the THC completion reports. Second, a personalized email letter was sent to the two successful construction managers. The letter included a brief introduction of the study objectives and the agenda of the interview. The email letter also asked the project manager to decide if he or she would be willing to answer the questionnaire for this study (see Appendix H). Third, another email was sent to discuss the duration of the interview (one hour) and the location where the interview was to be conducted. The scheduling was done to best accommodate the limited time of the construction project manager (see Appendix I).

During the interview, the construction manager was asked to carefully review each project management practice from the original list mentioned earlier. Then the construction manager was given three directives (see Appendix D). First, the construction manager was asked to decide (Yes/No) if the listed project management practices are important to the delivery of a successful project. Second, the construction manager was asked to rank project outcomes for the projects they had completed on a Likert scale that categorized each of the success criteria from 1 through 5, with 1

equaling strongly agree, 2 agree, 3 neutral, 4 disagree, and 5 strongly disagree. Third, the construction manager was asked to apply lessons learned from their project experiences and predict where their construction firm would focus their resources to ensure a successful delivery in similar projects.

Development of Survey Instrument

The experiment used a web-based survey (www.surveymonkey.com) in order to make it inclusive in recruiting subjects, inexpensive, controllable, and quickly analyzed (Solomon, 2001; Wyatt, 2000). The online survey instrument was developed from the project management planning list that was discussed in the preceding section. The web-based survey dramatically reduced the time needed for survey implementation. In addition, important elements such as questionnaire layout and design, navigation path simplicity, and coverage were followed during the survey design.

The question-building process was continually evaluated and revisions were incorporated at different stages of the survey design. As described previously, the final survey questionnaire was designed to obtain information about the impact of the project management practices on project success. The design of the survey pursued two objectives, the reduction of non-response and the reduction or avoidance of measurement error (Dillman, 2000). The following section describes both objectives.

Composition of Questionnaire

The final questionnaire consisted of 19 questions (see Appendix C). Table 1 lists each question in numeric order, describes which of the project management practices is being described, and summarizes the intent of each question. Questions 1 and 2 focused on identifying the respondents and the date the survey was completed. The information is confidential but serves as an agreement of consent. Each respondent was given a coded number that served as the only identifier in the matrix index. Questions 3 and 4 focused on establishing whether or not there was a project management plan in place during the project lifecycle. The answers are based on a dichotomous set of Yes/No possible responses. For a number of questions, the answers were based on a four-point Likert scale used to measure the degree to which the project team member perceived the importance of the success criteria and project management practices. Questions 5-8 consisted of four possible numeric responses, ranging from (4) strongly agree to (1) strongly disagree. This set of questions focused on establishing which of the four success criteria was most significant in the overall success of the courthouse renovation project. Similarly, questions 9-18 were based on a four-point Likert scale consisting of four possible numeric responses, ranging from (4) strongly agree to (1) strongly disagree. This set of questions focused on the project management practices developed from the finalized list of success criteria and the factors that impact project success developed in Phase I. Finally, question 19 was based on rank ordering the project team member's lessons learned preferences for future historic renovation work. The rank order consisted of four possible numeric levels, ranging from (1) most important to (4) least important.

Table 1. Project management plan practices included in questionnaire

Question Number	Success Criteria PMP	Summary of Questions
1	Name	Consent Form
2	Date	Consent Form
3	PMP	Was there a PMP in place?
4	Success	Did the LMP contribute to the project success?
5	Budget	Did establishing the "Budget" lead to project success?
6	Time	Did establishing the project "Time" lead to project success?
7	Performance	Did establishing the project "Performance" lead to project success?
8	Satisfaction	Did establishing the project "Satisfaction" lead to project success?
9	Historical	Assessment of the building significance
10	Site Analysis	Was there a detailed site analysis done
11	Site Layout/Staging	Was there a site layout/staging plan done and implemented?
12	Value Engineering	Was there an opportunity for value engineering?
13	Funding	Was there adequate funding throughout the project?
14	Scheduling	Were construction tasks clearly defined?
15	Communication/ Feedback	Was there communication and feedback readily available during the project lifecycle?
16	Decision Tracking	Were RFI and Change Order directives resolved quickly?
17	Quality Assurance	Was there a Quality Assurance in place?
18	Mock-ups/Samples	Were mock-ups and samples effective contributors in conveying design and construction intent?
19	Lessons Learned	Rank the success criteria for future projects having previous experience

Institutional Review Board

Before Phase II (administering of the survey) was conducted, the Texas A&M University's Institutional Review Board was contacted. Because this experiment uses human subjects, the researcher followed standard Texas A&M University IRB (Institutional Review Board) protocol. Not a single datum was collected until IRB approval was obtained (see Appendix J) (Ahn, 2007). Both federal mandates and Texas A&M University require researchers to complete a series of requirements for IRB approval. This called for completing training on the use of human subjects, as well as the submission and approval of an application packet to the IRB, including an IRB application, applicable documents, and signatures from the researcher's dissertation committee and department head. The applicable documents included a copy of the email that was sent to the project team members informing them of the basis of the study and the criteria for why a particular project team member was chosen. The respondents were assured that all information would be confidential and kept private. In addition, no identifiers directly linking the respondents to their answers were included in any sort of report that might be published (see Appendix H).

Sampling Methodology and Data Collection

A representative sample of project team members, the population of interest, was drawn from the matrix index developed in Phase I of the study. As stated in previous sections, the population was obtained from the 37 courthouse renovation projects that were part of the THCPP. Selection of the population was done by identifying the project team

members: owners, Texas Historical Commission reviewers, architects, and contractors. Potential respondents totaled 75 project team members. Actual respondents totaled 31 project team members. The percentage of potential respondents vs. actual respondents totaled 41%, and is described in Table 2.

Table 2. Percentage of potential respondents vs. actual respondents

Project Team Member	Potential Respondents	Actual Respondents	Percentage
Owner	37	10	27%
Architect	17	8	47%
Contractor	14	7	50%
T.H.C.	7	6	86%
Totals	75	31	41%

The low number of responses may be attributed to two reasons. First, the accessibility to the owner's representative after the renovation project was completed was sometimes difficult. Second, the architects and contractors frequently deal with turnaround of employees so that information was not always readily available.

Strategies were employed to increase the response rate to an acceptable level for this research. For example, this study followed the Tailored Design Method (Dillman, 2000). During the survey implementation phase, the Tailored Design Method used five contact opportunities as a follow-up procedure. The five contact opportunities included:

1. A telephone call was made using a phone script to introduce the study,
2. An email was sent immediately following the initial phone contact that included the survey link,

3. A follow-up email was sent as a reminder to those who had not responded once the stated deadline had been reached,
4. A second email reminder was sent to those who still had not responded once an additional two weeks had passed, and
5. A final attempt was made by a using both a telephone call and an email reminder.

Dillman (2000) stated that considerable research has suggested that prior notice is an effective stimulus for reducing non-response. According to experts in the field of survey research, it is critical that potential respondents be given several opportunities to participate in a study. By implementing extensive and appropriate follow-up procedures, it has been found that response rates for mail surveys can approach and equal response rates obtained using other modes (Fowler, 1990).

As stated above, the survey implementation phase followed Dillman's suggested five contact strategies to increase the response rate (2000). A few modifications to the five contact strategies were adopted. The matrix index of Phase I and its organized data served as the basis for targeting the study's population. The modifications adhered to the same objectives of multiple contacts:

1. A telephone call using a phone script (see Appendix E) was placed to introduce the survey and correct any contact information that may be outdated. This initial phone call was the first opportunity to ask the project team member if he or she would be interested in completing the survey. A number of follow-up calls had to be conducted because of respondents not being available to answer call. In

addition to the introduction to the survey and contact information, a schedule for the date of completion was given to the respondent. This was done to ensure the importance of completing the survey by the time the information needed to be returned. There were some problems in reaching the entire possible project team members. For example, some respondents had moved on to other employment. In a few instances, the respondent was deceased. Several respondents refused to be part of this study for a myriad of reasons. Table 2 details the final number of respondents that returned the survey.

2. An email was sent immediately following the initial phone contact. The email included an introduction to the survey, reasons why the respondent was selected, information regarding the confidentiality of the study, the researcher's contact information, Texas A&M IRB contact information, and a link to the survey (see Appendix H). Initially, respondents completed nine surveys after one call and one email reminder.
3. Once the deadline had been reached, a follow-up email reminder was sent with a new set of instructions to those who had not responded. The reminder email thanked the respondent for taking the time to complete survey, defined project management practices, introduced the survey, gave reasons why the respondent was selected, and guaranteed the confidentiality of the study. It also included the researcher's contact information, Texas A&M IRB contact information, and a link to the survey (see Appendix I). Finally, a schedule of an additional two

weeks was included in the instructions. This gave the respondents more time to complete the survey. This helped to gain an additional ten completed surveys.

4. When the additional two-week deadline was reached, a second email reminder was sent to those who had not responded. This email consisted of a reminder about importance of completing the survey and the link to the survey, and gave the respondents one additional week to complete the survey (see Appendix I). This helped to gain additional five completed surveys.
5. A final attempt was made to include the project team members who had not completed the survey. This was done by incorporating two contact strategies. First, a telephone call was made to target those respondents who had shown interest but had not returned the survey. Once contacted, the respondents were asked if they were still interested in completing the survey. The second strategy was to send an email to the respondents. This email served as a reminder to finish the survey and included the link to the survey in the instructions. This email was sent and confirmed as received by the respondent. This helped to gain the final seven completed surveys that made up the sample population.

Classifying the Data

Classifying the data was done by assigning a specific alphanumeric code to each of the respondents. As questionnaires were received by the researcher, each was checked against the matrix index and highlighted on the original list so further contacts would not

be made to those project team members. Every questionnaire was classified by profession and then given the coded identifier.

Data collection for each question was keyed into electronic spreadsheet software. This was done by first listing each alphanumeric questionnaire that was received in sequential order and by profession in a columnar format across the spreadsheet. Secondly, each possible answer taken from the questionnaire was listed in a row-by-row format down the spreadsheet. The heading of every column corresponds to the question asked in the questionnaire. By entering the information collected on an electronic spreadsheet, the data was readily exchanged to STATA Statistical Software, the program used for all statistical analysis performed in this study. It should be noted that according to the confidentiality agreement discussed in the email script and authorized by the Texas A&M University's Institutional Review Board, specific answers that identify the individual respondent were not published in this study.

The research hypotheses were analyzed by using descriptive and inferential statistical methodologies. The inferential statistical methodologies included an analysis of variance (ANOVA) and ordinal least squares for multiple regression. Chapter V discusses the analysis and results of the hypotheses testing.

CHAPTER V

ANALYSIS AND RESULTS

This chapter includes the analysis and results for the data collected in Phase I and Phase II of the study. The chapter is divided into three main sections. Section I discusses the descriptive statistics associated with the analysis of the Project Management Plan (PMP) success criteria indices and success factor variables. Section II demonstrates how the project team members (THC reviewers, architects, and contractors) perceive the success criteria differently through the use an inferential statistics test Analysis of Variance (ANOVA). Section III focuses on inferential analysis (Ordinal Least Squares for Multiple Regression) of the PMP success criteria indices and success factor variables.

Ordinal least squares for multiple regressions are the most widely used type of regression for predicting the value of one dependent variable from the value of one or more independent variables (Ott & Longnecker, 2001). As mentioned in Chapter IV, success criteria indices include budget, time, performance, and satisfaction, while success factor variables include building significance, site analysis, site layout and staging, value engineering, funding, scheduling, communication and feedback, decision tracking, quality assurance plan, mock-ups and samples, as well as lessons learned from the success criteria indices.

Following the data collection in Phase II of the study, graphs were developed using percentages to represent the responses of the owners, THC reviewers, architects, and contractors. This descriptive analysis was performed on the project team members'

attitudes toward the PMP success criteria as well as their attitudes toward the success factors. These analyses were summarized as 'lessons learned' and described the views the project team members acquired after working on the Texas Historical Courthouse Preservation Program (THCPP). As stated earlier, only 31 out of the potential 75 respondents took the survey. Following this, the groups of respondents were categorized into invested respondents and observational respondents. The group of invested respondents' included eight architects, seven contractors, and six THC reviewers. This was done so that the responses reflected the views of those who were actively involved in the project delivery. In addition, the 10 owners were categorized as the observational group. This group reflected the views of the respondents who served as the clients' representatives of the counties.

Inferential statistical tests included ANOVA and Ordinary Least Square regressions. The results of these statistical tests illustrate the differences in the perceptions of the invested respondents (THC reviewers, architects, and contractors) toward the success criteria. Furthermore, the findings illustrate the relative contribution of each success criteria variable and the success factors on project success.

Descriptive Statistics

Summaries were drawn from the results depicted in the figures for each group of project team members. Each figure illustrates the perceptions of each independent project team group. Groups were asked the same questions about a diverse collection of project

management practices. The survey questions focused on the project management practices used in planning for the success criteria variables.

The results profiled both the project team members who were surveyed and their views on the success factors. The data shows that assessment of building significance was done during the pre-planning phase, including a comprehensive analysis of the site. The site layout and staging area were developed and updated as needed through the courthouse preservation. Both THC reviewers and architects perceived there was sufficient opportunity for value engineering, but the owners and contractors were not as convinced. The project team members were mostly agreed that there was adequate funding throughout the project, while scheduling of the construction tasks was perceived as clearly defined by the majority of the project team members. Among the respondents, owners and THC reviewers demonstrated higher disagreement. In terms of communication and feedback between the project team groups, almost all the responses were listed as 'strongly agree' or 'agree.' There were small differences between the project team members, but contractors had the highest percentage of 'disagree' responses. Requests for information submissions and change order directives were viewed mostly as being quickly resolved so that the impact on the courthouse project was limited. Contractors and THC reviewers had a higher percentage of respondents who 'disagreed' and 'strongly disagreed' with the quick response time. A majority of the project team groups cautiously believed a comprehensive quality assurance plan was developed during the pre-construction phase of the courthouse preservation project. The THC reviewers and architects had higher percentages of 'disagree' and 'strongly

disagree' responses. The project team groups agreed that mock-ups/samples were effective contributors in conveying the design and construction intent.

Analysis of PMP Using Descriptive Statistics

In order to determine the perception of the owners, THC reviewers, architects, and contractors towards the PMP, responses to each of the questions associated with the PMP in the sample were collected and analyzed. From the survey questionnaire (see Appendix C), two questions were specifically focused on the use and success of the PMP. This was done to establish the understanding of what role the PMP had during the preservation process. Both dichotomous questions asked to give an answer of yes/no.

Question three (Q3) asked respondents to acknowledge if there was a PMP in place during the courthouse preservation project. Findings show that the observational respondents were closely divided in their answers if the PMP was in place (see Figure 7). As a result, 51.61% of the respondents believed that the PMP was not in place during the courthouse preservation projects. The invested respondents show similarities in their perceptions with the exception of the architects. Both the THC reviewers and contractors (69.23%) responded that 'Yes' there was a PMP in place. Similar to the owners' responses, the architects' responses showed agreement that 'No' PMP was in place during the courthouse preservation project. A possible explanation for the owners and architects responding 'No' is their involvement in the construction process. Both were engaged in the design and served to evaluate the process but were not active in determining the methods used to plan the construction phases.

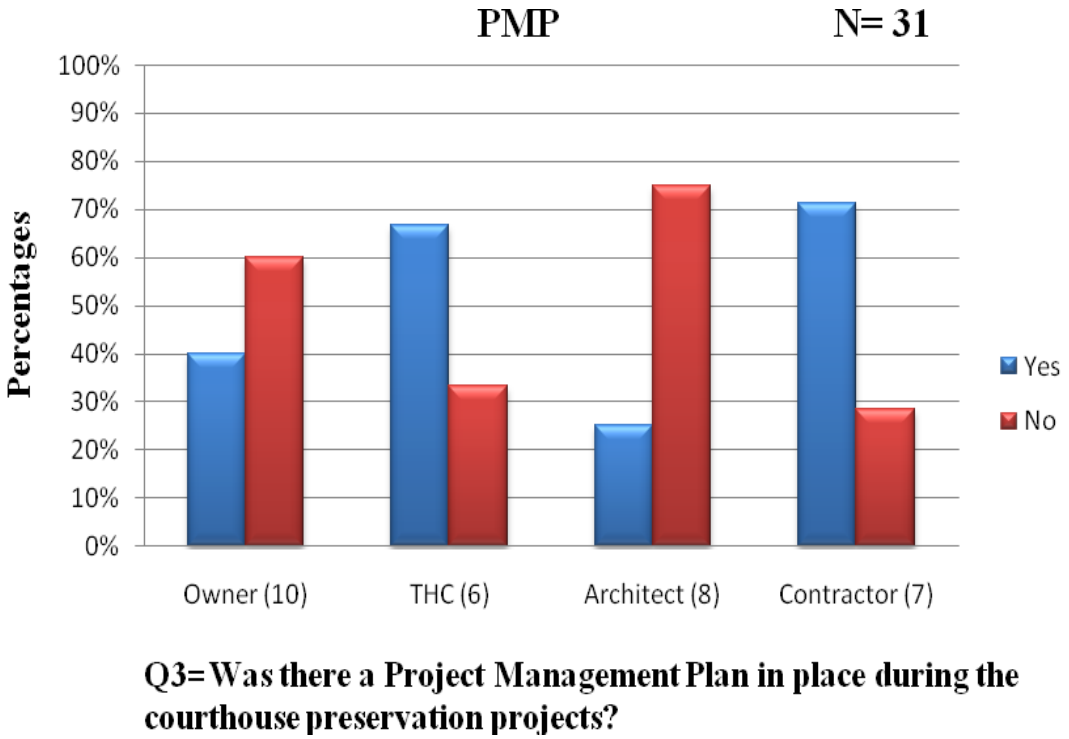


Figure 7. Results for PMP Question 3.

Question four (Q4) asked respondents to acknowledge if the PMP was a significant contributor to the courthouse preservation project success. This was the first question in the survey to introduce the topic of project success. The responses mirrored those of the previous question. The data reflected that if the respondent perceived that the PMP was in place during the construction phase, then it had a significant impact on the success of the project delivery (see Figure 8).

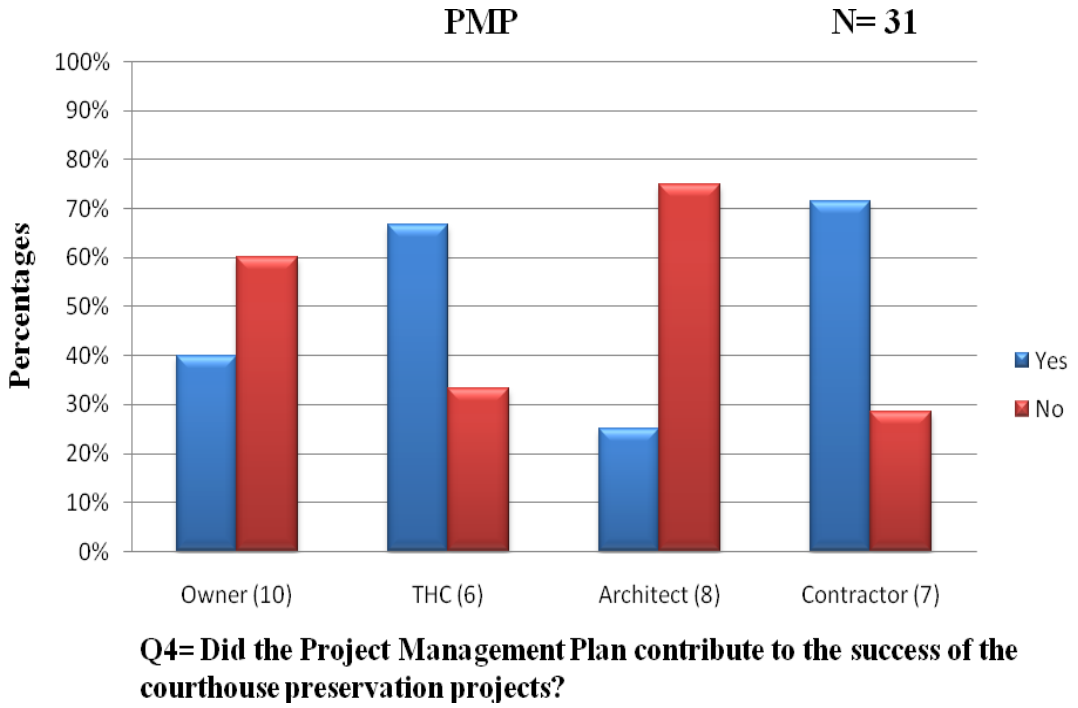


Figure 8. Results for PMP Question 4.

Conclusions for PMP – Descriptive Statistics

Conclusions were drawn from the compiled results for each of the project team member groups (THC reviewers, architects, and contractors). The individual figures presented in the previous section express the attitudes of each independent group. Each group was asked the same questions for the PMP: Q3 "Was there a Project Management Plan in place during the courthouse renovation?" and Q4 "Did the Project Management Plan contribute to the success of the courthouse renovation projects?"

The findings show that if it was perceived that a PMP was in place during the courthouse renovation, then the project team members believed that the PMP contributed

to the success of the courthouse renovation project. The contractors and THC reviewers responded with 'Yes' at a high rate followed by owners and architects.

Analysis of Success Criteria Variables Using Descriptive Statistics

To determine the perception of the contractors, architects, owners, and THC reviewers towards the Success Criteria Variables, responses to each of the questions associated with Success Criteria in the sample were collected and analyzed. From the survey questionnaire (see Appendix C), four questions were specifically focused on the significance of the success criteria that led to the successful delivery of the courthouse preservation project. In other words, this was done to establish the perception of each of the project team views on the importance of each success criteria during the courthouse preservation process. All four Likert scale questions asked the respondent to answer strongly agree, agree, disagree, or strongly disagree.

Questions 5 through 8 asked respondents to acknowledge if logistics management practices utilized to establish the Success Criteria Variables (e.g., Budget, Time, Performance, and Satisfaction) were the most significant criteria that led to an overall successful courthouse preservation project. The descriptive statistical results are graphically represented in the following charts. These charts included four separate graphs, which illustrate the respondents' roles (e.g., Owner, Texas Historical Commission, Architect, and Contractor). Figure 9 shows Owner responses.

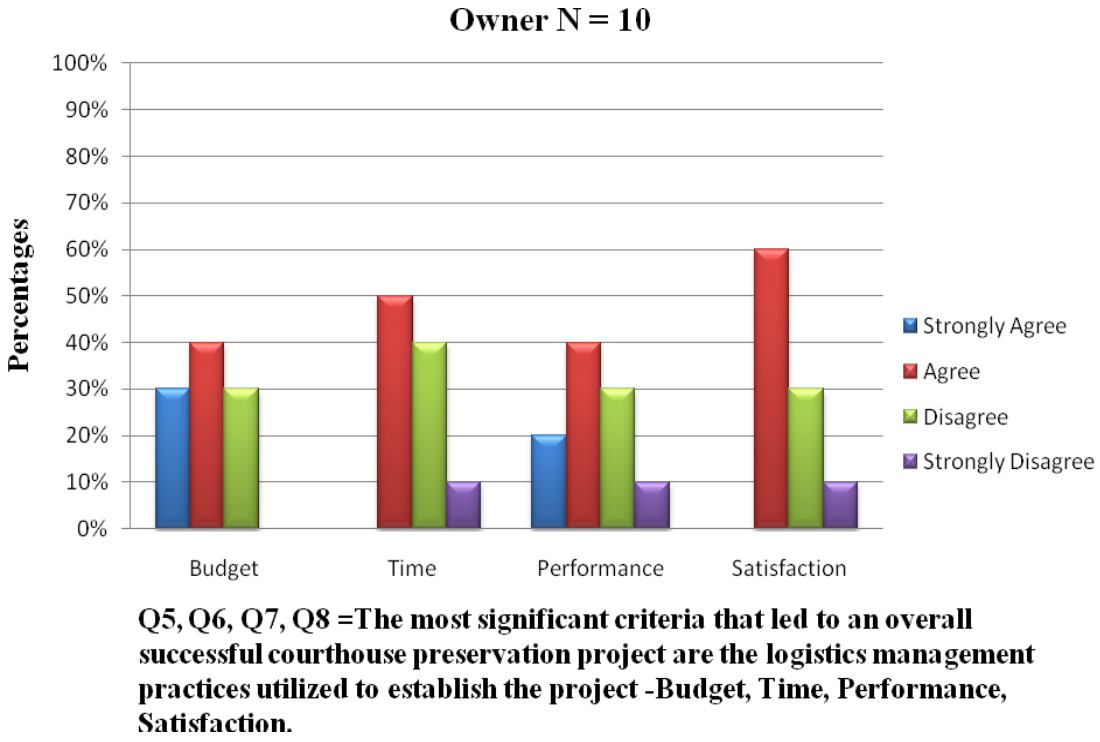


Figure 9. Descriptive analysis for owners and success criteria.

Findings show that the majority of owners (N=10) as observers had similar assessments in their perceptions of the success criteria variables (Figure 9). As a result, planning for the budget was the highest ranked success criteria variable perceived by the owner to have had the highest impact on the success of the project (20.0% strongly agreed, 40.0% agreed). Planning for performance ranked as the second most important (30.0% strongly agreed, 40.0% agreed). Planning for satisfaction ranked as the third most important (60.0% agreed). Planning for time was the success criteria variable that was perceived as being least developed during the courthouse preservation project (50.0% agreed). Figure 10 shows Texas Historical Commission responses.

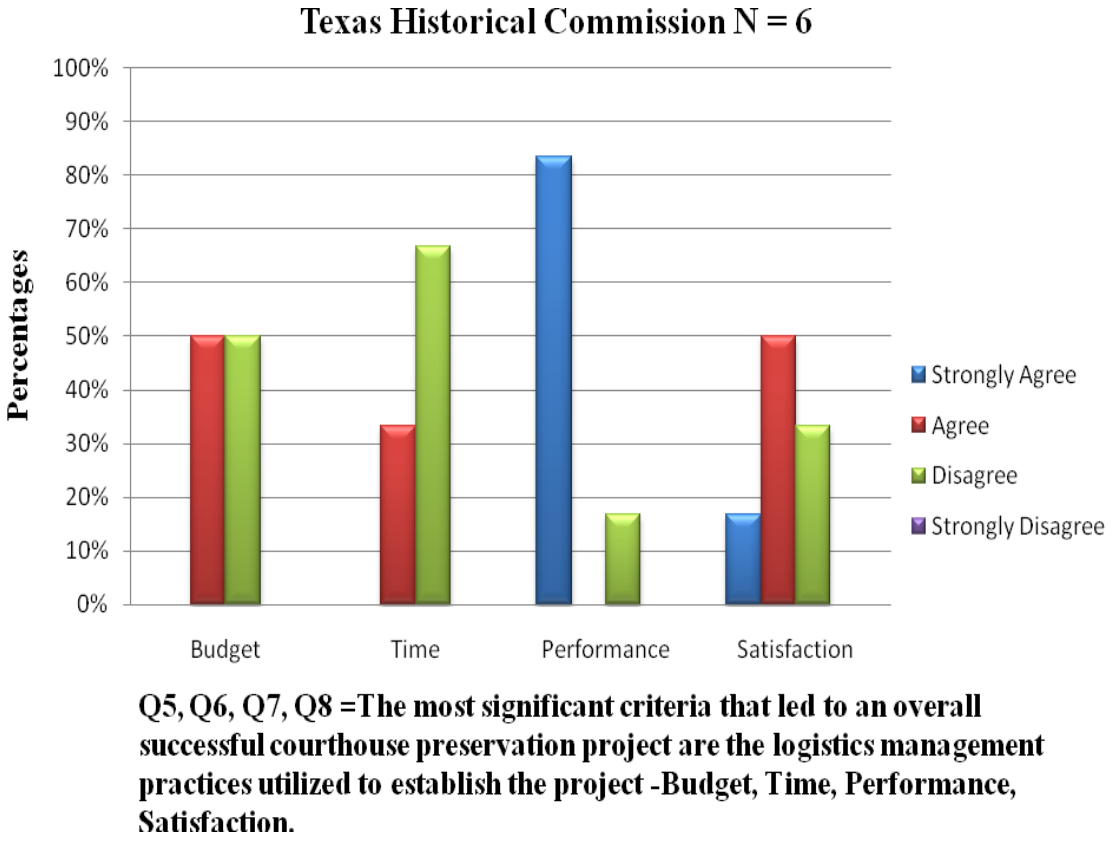


Figure 10. Descriptive analysis for THC reviewers and success criteria.

Findings show that the THC reviewers (N=6) as invested respondents had similar assessments in their perceptions of the success criteria variables (see Figure 10). As a result, planning for performance was the highest ranked success criteria variable that led to a successful courthouse preservation project (83.0% strongly agreed), followed by planning for satisfaction (17.0% strongly agreed, 50.0% agreed). Planning for budget was ranked third (50.0% agreed). Planning for time was perceived as the least developed success criteria (33.0% agreed). Figure 11 shows Architects' responses.

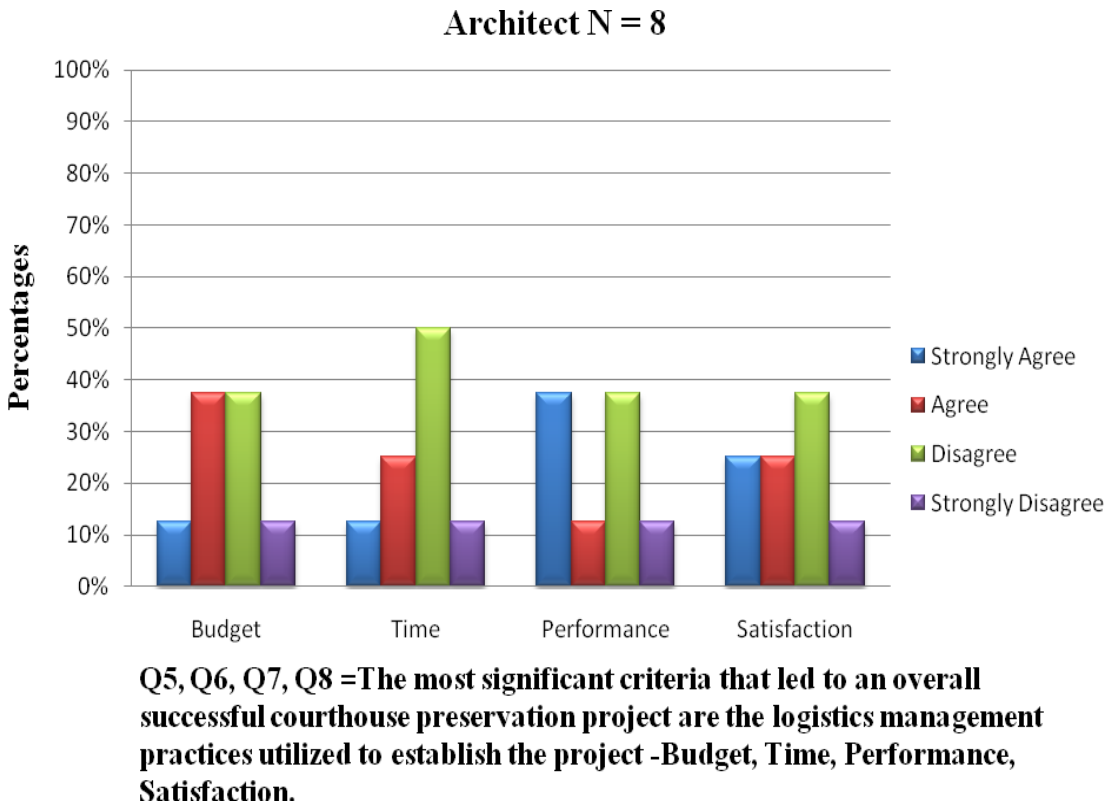


Figure 11. Descriptive analysis for architects and success criteria.

Findings show that the architects as invested respondents (N=8) were similarly divided in their perceptions of success criteria variables (see Figure 11). As a result, planning for performance was the most significant criteria that lead to an overall successful courthouse preservation project (38.0% strongly agreed, 13.0% agreed). Planning for satisfaction closely followed the performance criterion (25.0% strongly agreed, 25.0% agreed). Planning for the budget was next in rank order (13.0% strongly agreed, 38.0% agreed), while planning for time was perceived to be less developed (13.0% strongly agreed, 25.0% agreed). Figure 12 shows Contractors' responses.

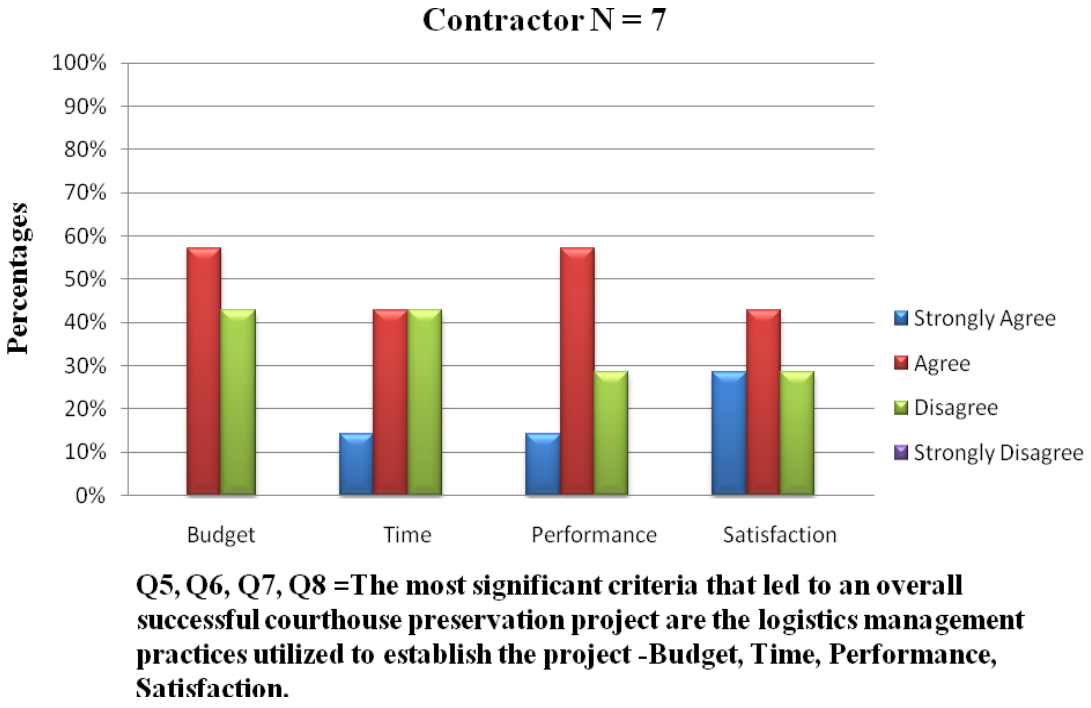


Figure 12. Descriptive analysis for contractors and success criteria.

Findings show that the contractors as invested respondents (N=7) were uniquely divided in their perceptions of success criteria variables (see Figure 12). As a result, planning for satisfaction was the most significant criteria that led to an overall successful courthouse preservation project (29.0% strongly agreed, 43.0% agreed). Planning for performance closely followed (14.0% strongly agreed, 57.0% agreed). Planning for time was third in the order of success criteria (14.0% strongly agreed, 43.0% agreed), leaving planning for the budget as the criteria that was perceived as the least developed strategies that were used during the construction phase.

Conclusions for Success Criteria – Descriptive Statistics

Conclusions were drawn from the compiled results for each of the project team member groups. The individual figures presented in the previous section express the attitudes of each independent group. Each group was asked about their perceptions regarding the success criteria variables, ranging from strongly agree to strongly disagree: "The most significant criteria that led to an overall successful courthouse preservation project are the management practices utilized to establish the project – Budget (Q5), Time (Q6), Performance (Q7), and Satisfaction (Q8)."

The following is a short summary of how this study evaluated each of the success criteria variables. Planning the budget was evaluated along the total project cost. Because the projects contained both state funds and local county money, the projects were monitored continuously to ensure the project would remain within budget. Planning for time was assessed on three general areas: total duration of the project, uniqueness of the project activities, and unforeseen issues within the project scope. Planning for performance was evaluated across a number of characteristics, such as building significance, value engineering, and quality assurance. Planning for satisfaction was the final success criteria variable. Satisfaction planning involved development and implementation of strategies to ensure a successful project. This evaluation focused on the communication and feedback between the project team and decision making efficiency. The list of evaluation specifics is by no means complete, but it serves to inform the researcher of the diverse set of conditions that the project team members work under and the complexities associated with each courthouse preservation project.

Table 3 shows the project team leaders' perceptions of the order of criteria leading to the successful completion of the renovation projects. Owners perceived the order of success criteria that lead to the successful preservation project as follows: performance, budget, satisfaction, and time. This is attributed to the role of the owner as observer in this unique preservation project. Ultimately, the owner strives for the maximum return on investment.

Table 3. Project team members' perception of the order of criteria leading to success

	Most Important	Important	Less Important	Least Important
Owners	Budget	Performance	Satisfaction	Time
THC Reviewers	Performance	Satisfaction	Budget	Time
Architects	Performance	Satisfaction	Budget	Time
Contractors	Satisfaction	Performance	Time	Budget

As invested team members, THC reviewers, architects, and contractors all have specific responsibilities. Texas Historical Commission reviewers are responsible for maintaining the historical integrity of the courthouse building during the design and construction phases. In addition, the THC enforces the National Historic Preservation guidelines to ensure the retention of the historic integrity of the building. THC reviewers perceived the order of success criteria that led to the successful preservation project as follows: performance, satisfaction, budget, and time. Architects are responsible for the development of the scope of work and design solution as determined by the owner and the THC reviewer. Furthermore, architects establish a preliminary budget and

preliminary schedule to give the owner and THC reviewers an intelligent overview of what would be required to meet the approved design scope. Architects perceived the order of success criteria that led to the successful preservation project to be: performance, satisfaction, budget, and time. Contractors are responsible for the means and methods to execute the approved scope of work. Once the award has been given and the notice to proceed has been issued, the contractor will have an approved budget and detailed schedule to serve as the basis of decision making for the project. Contractors perceived the order of success criteria that led to the successful preservation project is as follows: satisfaction, performance, time, and budget.

In summary, the results from the submitted survey instrument responses convey the differences in perception of success criteria between the individual groups as well as between project team members. Thus, the results support the research hypothesis of this study; the differences are a result of the teams' involvement in the project. It is interesting to note that the order is indicative of how each project team group views success. Owners view the most important success criteria to be budget; the money used on the courthouse renovation included funds that were raised by the county. Owners as observers are accountable for spending the money and delivering a successful project. Because both THC reviewers and architects are invested members in the delivery of the project, the performance of the design solution and construction stages of the courthouse project was perceived to be the most important success criteria. Contractors also are invested in the delivery of a successful project and perceived that satisfaction was the

most important criteria for success. Satisfaction for the contractor could mean additional work or recommendations in the future for additional services.

Analysis of Success Factors Using Descriptive Statistics

To determine the perception of the contractors, architects, owners, and THC reviewers towards the Success Factors Variables, responses to each of the questions associated with Success Factors in the sample were collected and analyzed. Eleven questions on the survey questionnaire (see Appendix C) were focused specifically on the significance of the success factors that led to the successful delivery of the courthouse preservation project. In other words, this was done to establish the perception of each of the project team members regarding the importance of each success factor that was used as a project management practice during the courthouse preservation process. Questions 9-18 were all Likert response scale types. The respondents were asked to give a fixed alternative response that could only be answered as strongly agree, agree, disagree, or strongly disagree. Question 19 was an ordinal type that asked the respondents to rank the success criteria variables from a lessons learned point of view.

Questions 9-19 asked respondents to answer a series of questions focused on the management practices utilized to establish the success criteria variables of budget, time, performance, and satisfaction. The descriptive statistical results are graphically represented in the following charts. In addition, the charts combined the project team member's perceptions of each success factors.

Building Significance

Results for Question 9 regarding building significance are shown in Figure 13. Findings show that the project team members (N=31) had similar agreement believing there was an assessment of the building significance during the pre-planning phase of the courthouse preservation projects. Architects were most convinced (100.0% strongly agreed), followed by THC reviewers (67.0% strongly agreed/33.0 agreed), contractors (43.0% strongly agreed, 57.0% agreed), and finally, owners (40.0% strongly agreed, /60.0% agreed). The building significance played a very important role in these preservation projects. The successful delivery of the preservation project for this significant courthouse building is paramount to the historic fabric of Texas history.

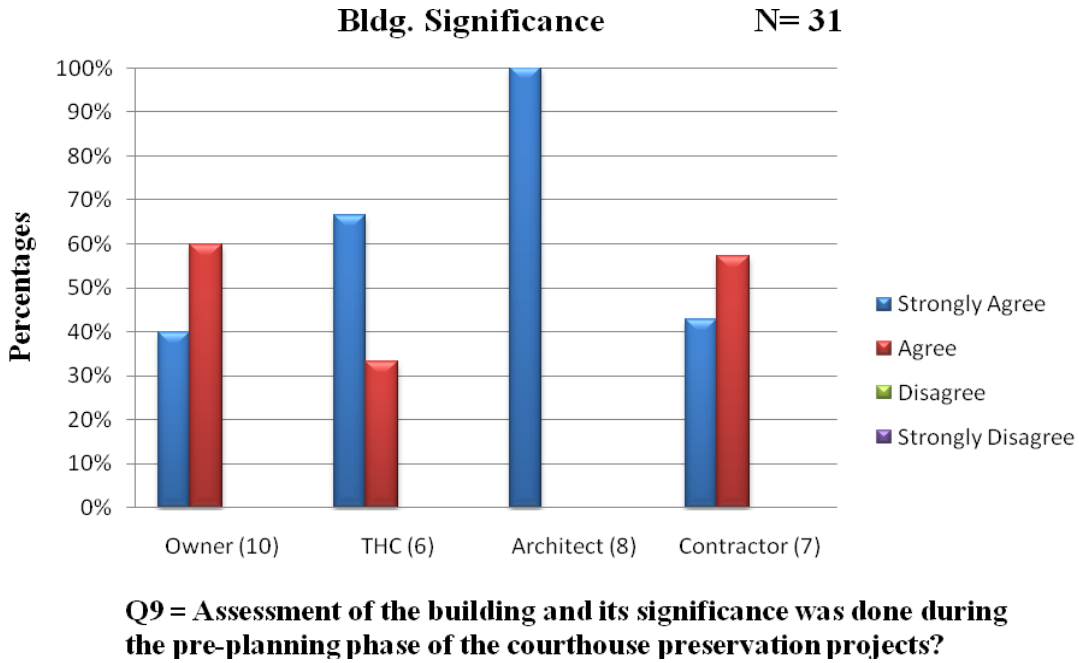


Figure 13. Descriptive Analysis for Building Significance.

Site Analysis

The results for Question 10 (site analysis) are shown in Figure 14. Findings show that the project team members (N=31) had agreement, believing that there was a comprehensive analysis of the site done prior to the construction phase. As a result, architects again were most convinced (88.0% strongly agreed, 13.0% agreed). The results continued to break down as follows: contractors (29.0% strongly agreed, 71.0% agreed), owners (20.0% strongly agreed, 33.0% agreed), and finally THC reviewers (100.0% agreed). Site analysis includes the understanding of vital site conditions that are associated with planning a construction project in an urban area with an historic context. These include but are not limited to historic significance, location, topography, climate, density of population, and circulation.

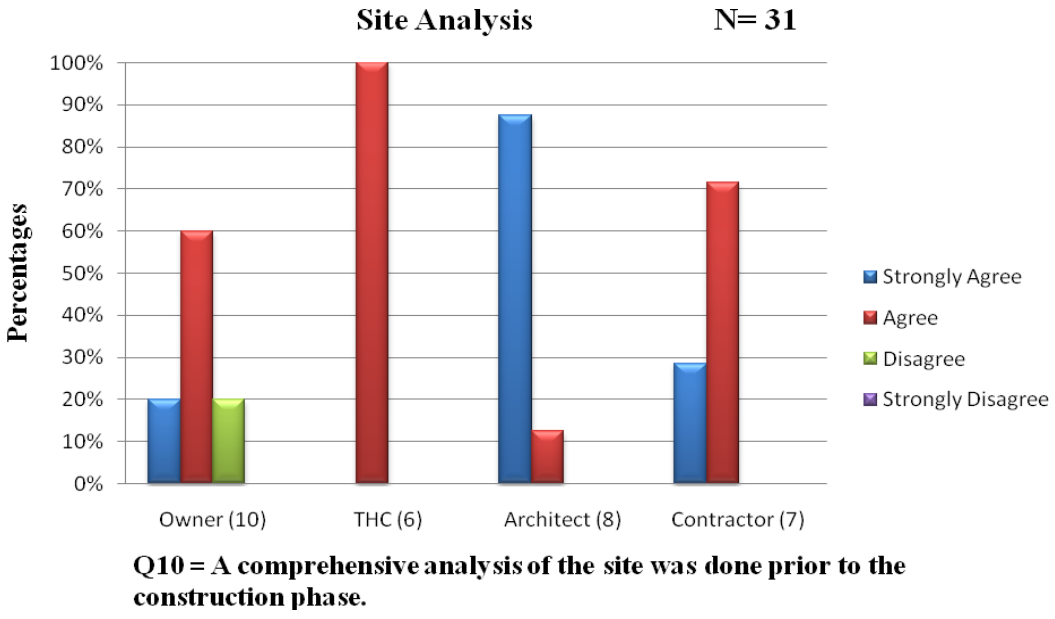


Figure 14. Descriptive analysis for site analysis.

Site Layout and Staging

Results for Question 11 regarding site layout and staging are shown in Figure 15. Findings show that the project team members (N=31) had a more diverse perception of the staging and site layout plan that was developed and implemented during the courthouse preservation. Again, architects were most convinced (50.0% strongly agreed, 38.0% agreed), followed by contractors (29.0% strongly agreed, 29.0% agreed), owners (20.0% strongly agreed, 70.0% agreed), and finally, THC reviewers (67.0% agreed). Site layout and staging of materials accounts for the design and spatial requirements needed to maintain an efficient day-to-day transition of construction activities such as access routes, security, material staging areas, temporary buildings, and waste handling.

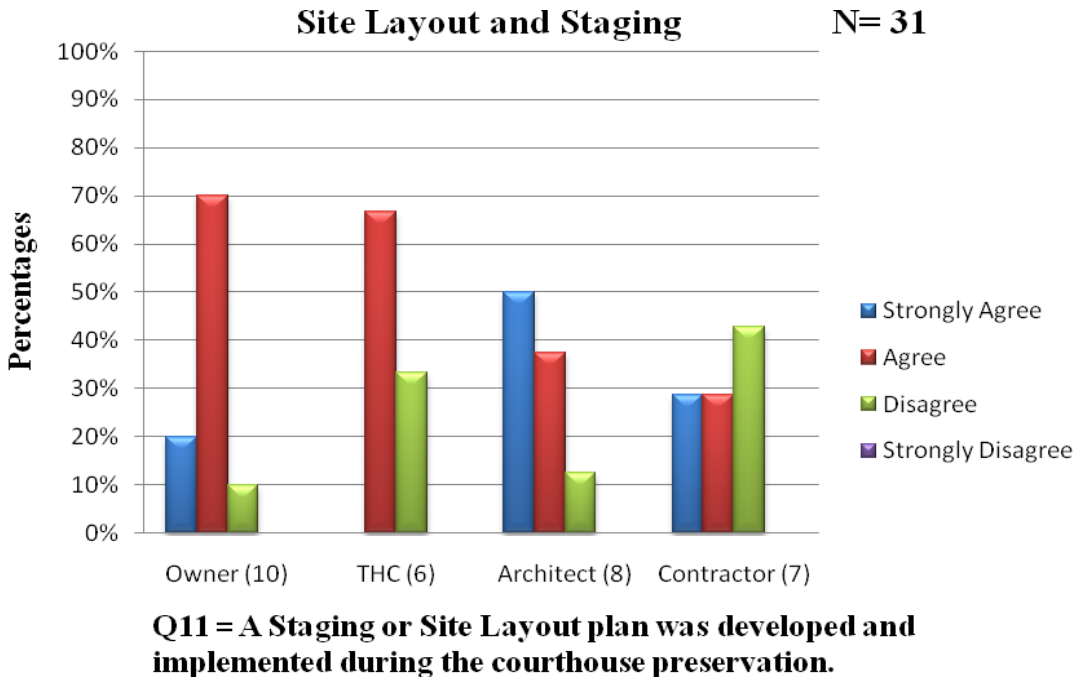


Figure 15. Descriptive analysis for site layout and staging.

Value Engineering

Results for Question 12 regarding value engineering are shown in Figure 16. Findings show that the project team members (N=31) had a more varied perception when asked if there were sufficient opportunity for value engineering throughout the courthouse preservation project. Contractors were most convinced (29.0% strongly agreed, 43.0% agreed), followed by architects (25.0% strongly agreed, 63.0% agreed), owners (20.0% strongly agreed, 30.0 agreed), and finally, THC reviewers (83.0% agreed). Value engineering is defined as an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with the required performance, reliability, quality, and safety (U.S. General Services Administration Public Buildings Service, 1992).

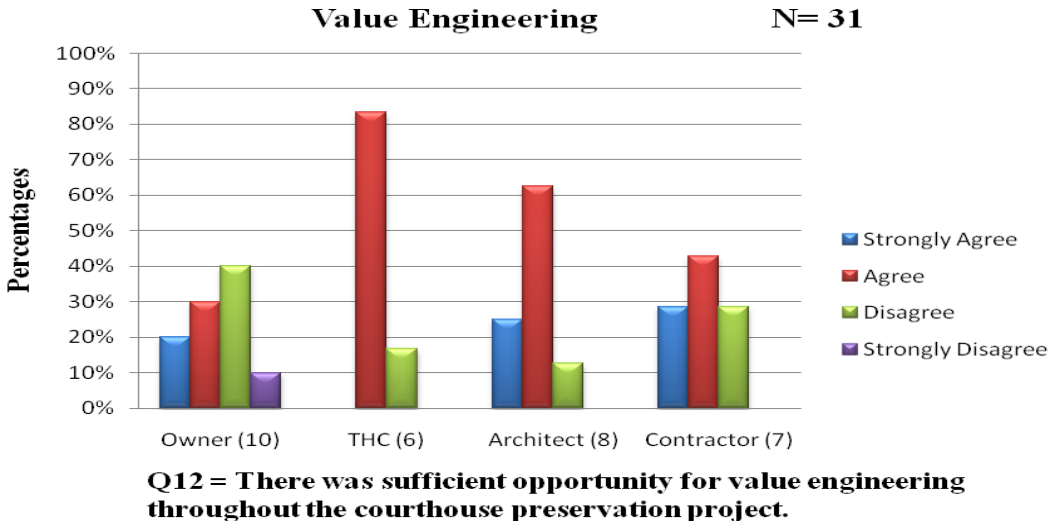


Figure 16. Descriptive analysis for value engineering.

Funding

Results for Question 13 regarding funding are shown in Figure 17. Findings show that the project team members (N=31) had more similar perceptions when asked if there was adequate funding throughout the project. Contractors were most convinced (29.0% strongly agreed, 43.0% agreed), followed by architects (25.0% strongly agreed, 50.0% agreed), THC reviewers (17.0% strongly agreed, 50.0% agreed), and finally, owners (10.0% strongly agreed, 70.0% agreed). Differences in perceptions are noted when the owners and THC reviewers are compared to the architects and contractors. Owners and THC reviewers provided the funding while the architects and contractors established the budget to complete the scope of work. Owners and THC reviewers were less convinced that the funding was adequate, while the architects and contractors were more satisfied.

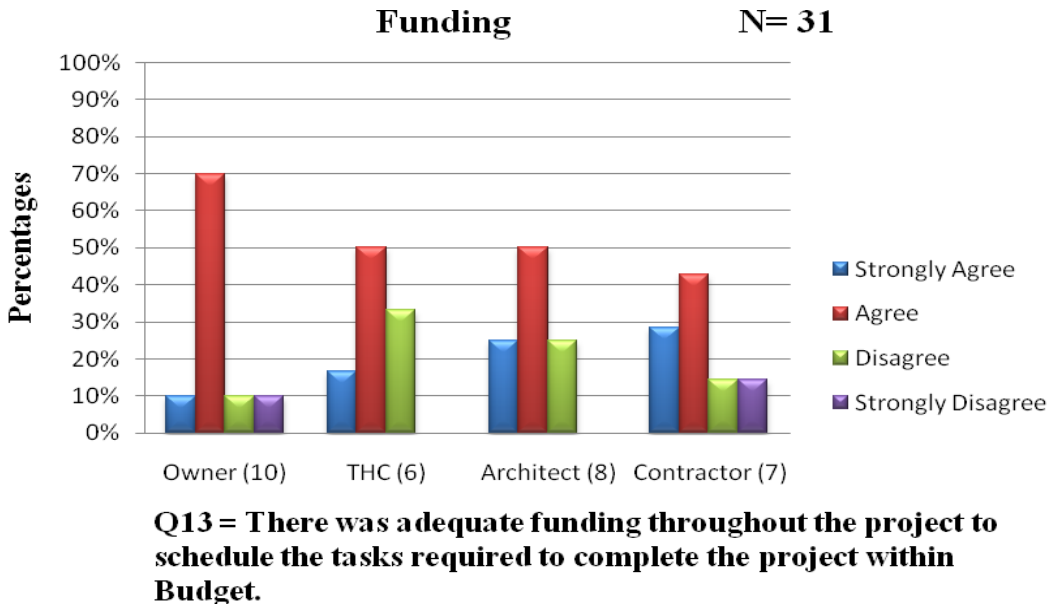


Figure 17. Descriptive analysis for funding.

Scheduling

Results for Question 14 regarding scheduling are shown in Figure 18. Findings show that the project team members (N=31) had more similar perceptions when asked if construction tasks were clearly defined during the schedule development for the courthouse preservation project. Architects were most convinced (38.0% strongly agreed, 50.0% agreed), followed by owners (10.0% strongly agreed, 70.0% agreed), contractors (86.0% agreed), and THC reviewers (67.0% agreed). The overwhelming sentiment of the project team groups was that construction tasks were clearly defined. This is at odds with the actual project data related to the success criteria 'time,' which affirms that the majority of projects were delivered with large time growth percentages.

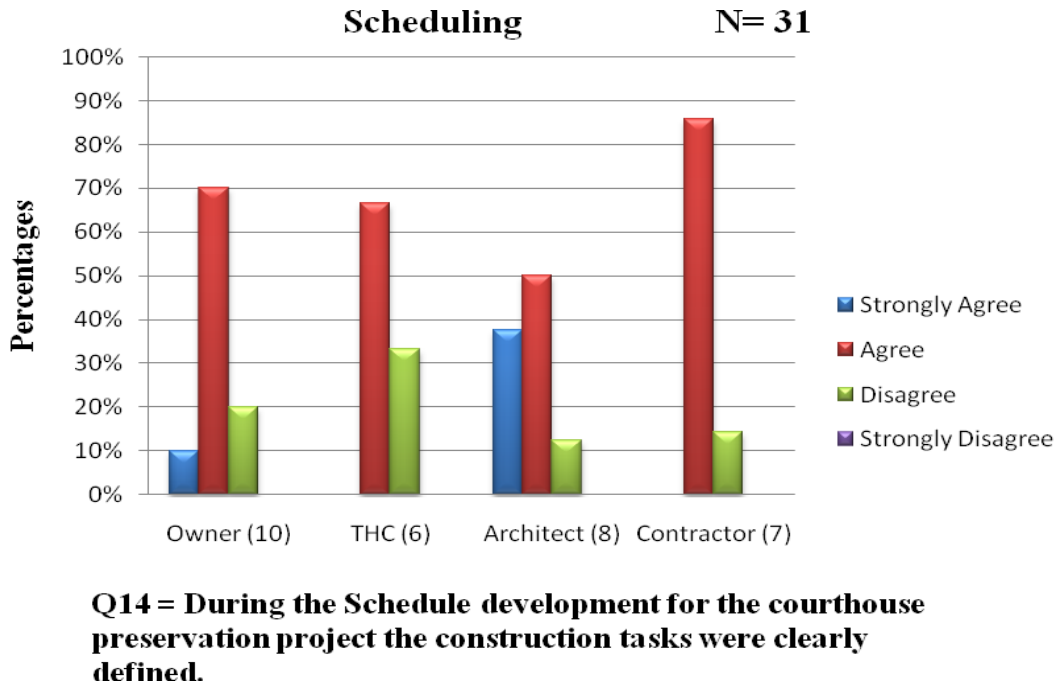


Figure 18. Descriptive analysis for scheduling.

Communication and Feedback

Results for Question 15 regarding communication and feedback are shown in Figure 19. Findings show that the project team members (N=31) had more similar perceptions when asked if there was consistent communication and feedback within the project team groups. Architects were most convinced (63.0% strongly agreed, 25.0% agreed), followed by THC reviewers (50.0% strongly agreed, 33.0% agreed), owners (40.0% strongly agreed, 50.0% agreed), and finally, contractors (29.0% strongly agreed, 43.0% agreed). As a group, contractors had more disagreement with the consistency of communication and feedback. Communication has been found to increase satisfaction (Done, 2004). Related research suggests that communication is critical to the success of construction project teams (Thomas, Tucker, & Kelley, 1998).

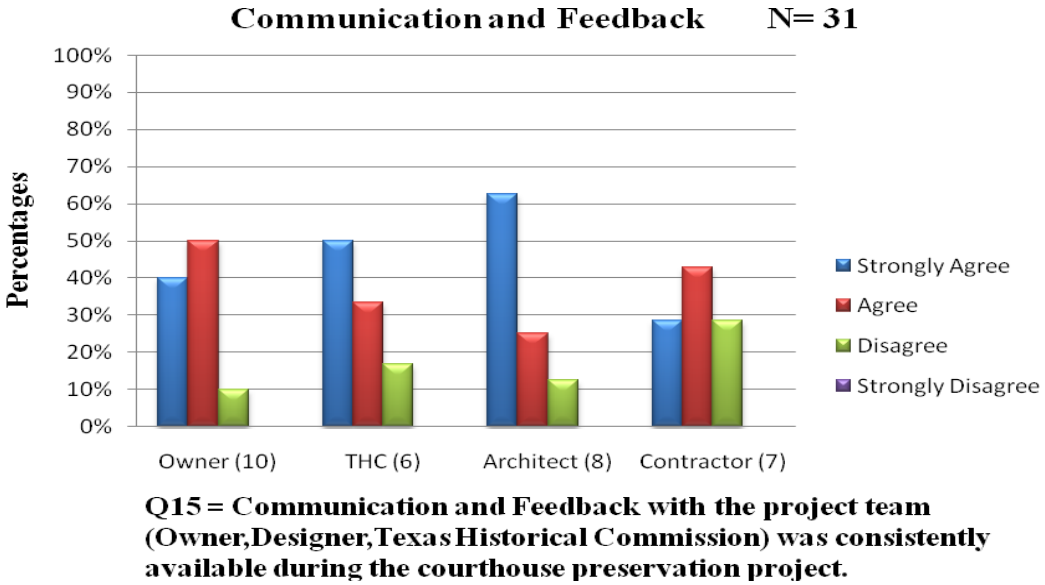


Figure 19. Descriptive analysis for communication and feedback.

Decision Tracking

Results for Question 16 regarding decision tracking are shown in Figure 20. Findings show that the project team members (N=31) had more varied perceptions when asked if requests for information and change order directives were quickly resolved to limit the impact on the courthouse preservation project. Architects were most convinced (50.0% strongly agreed, 38.0% agreed), followed by owners (30.0% strongly agreed, 50.0% agreed), contractors (14.0% strongly agreed, 43.0% agreed), and finally, THC reviewers (50.0% agreed). RFIs and COs should be made in writing with reasonable promptness in order to limit delays in time.

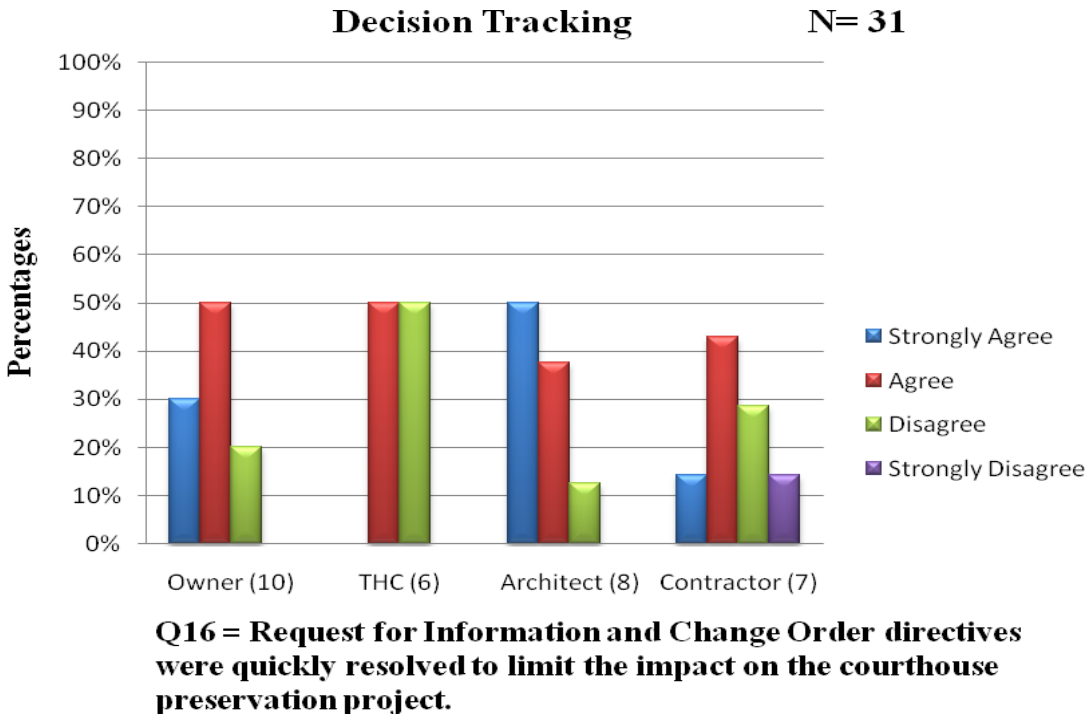


Figure 20. Descriptive analysis for decision tracking.

Quality Assurance Plan

Results for Question 17 regarding quality assurance plan are shown in Figure 21. Findings show the project team members (N=31) had significantly different perceptions when asked if a comprehensive quality assurance plan was developed during the pre-construction phase of the courthouse preservation project. Architects were most convinced (38.0% strongly agreed, 13.0% agreed), followed by owners (30.0% strongly agreed, 30.0% agreed), contractors (29.0% strongly agreed, 43.0% agreed), and finally, THC reviewers (17.0% agreed). Quality assurance involves planned and systematic actions necessary both to provide adequate confidence that a product or service will satisfy given requirements or standards and to be able to demonstrate any such compliance to that quality standard (Harris, McCaffer, & Edum-Fotwe, 2006).

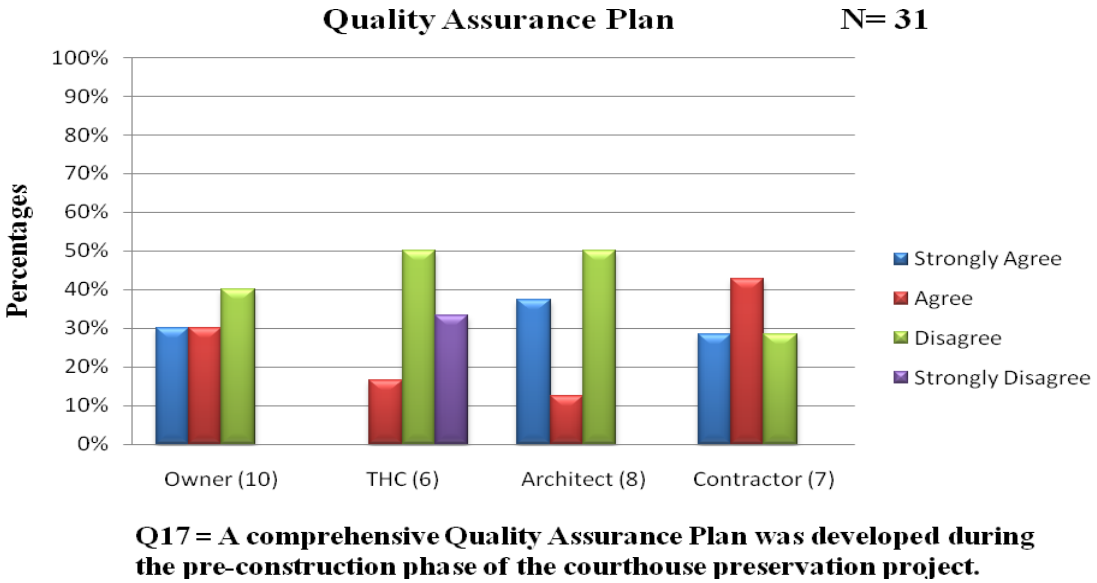


Figure 21. Descriptive analysis for quality assurance plan.

Mock-ups and Samples

Results for Question 18 regarding mock-ups and samples are shown in Figure 22. Findings show that the project team members (N=31) had more similar perceptions when asked if detailed mock-ups and samples were effective contributors in conveying the design and construction intent. Architects were most convinced (75.0% strongly agreed, 13.0% agreed), followed by THC reviewers (50.0% strongly agreed, 33.0% agreed), owners (30.0% strongly agreed, 40.0% agreed), and finally, contractors (29.0% strongly agreed, 57.0% agreed). Mock-ups ensure quality workmanship and a successful result and a mockup can reduce guesswork in scheduling by conducting a test run.

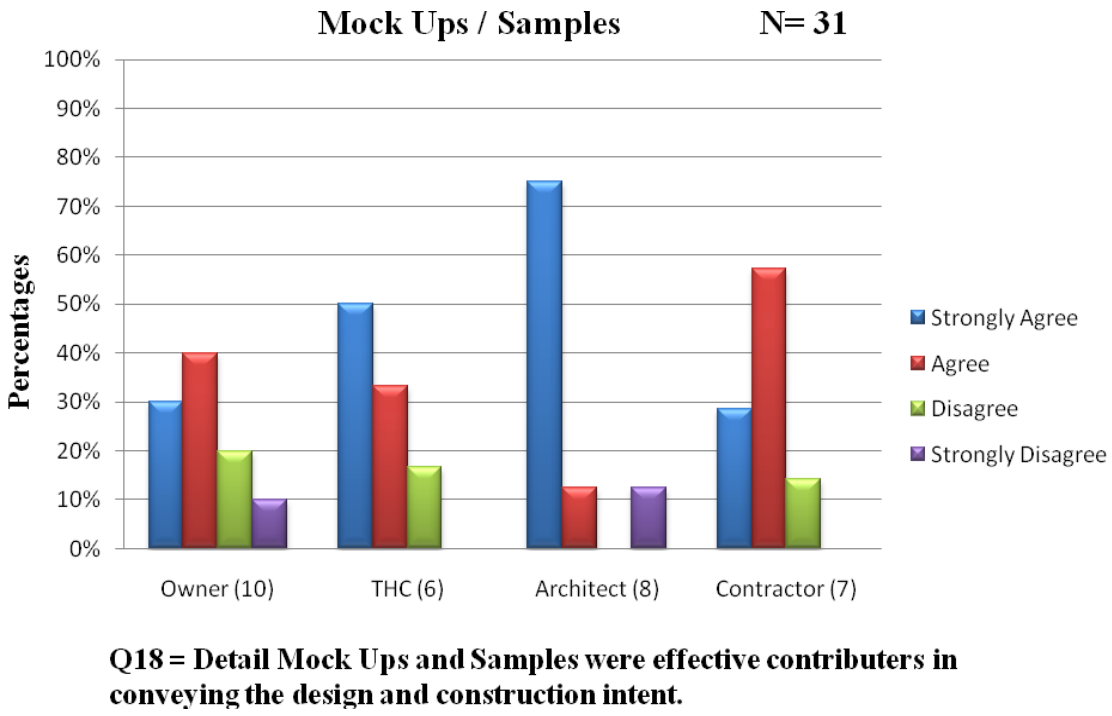
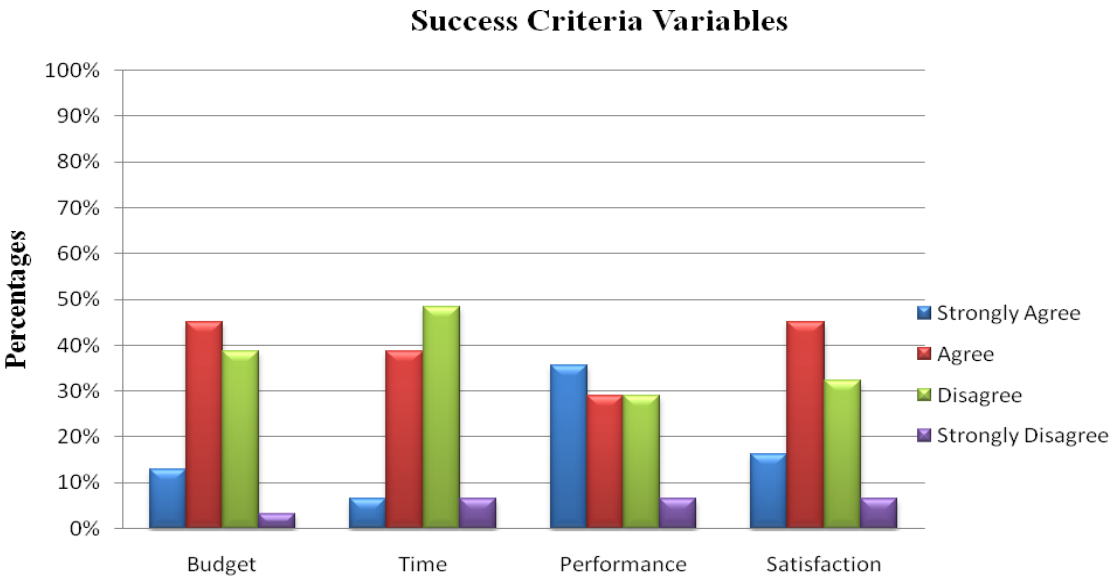


Figure 22. Descriptive analysis for decision tracking.

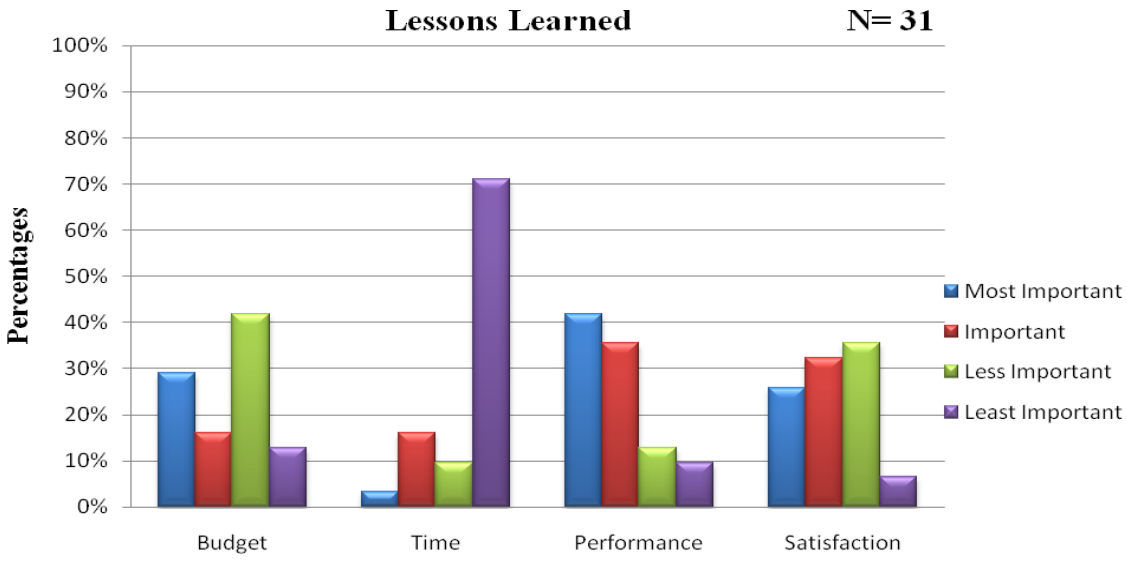
Success Criteria Variables vs. Lessons Learned

Results for Question 19 regarding success criteria variables vs. lessons learned are shown in Figure 23. This figure is a combination of two different questions asking the respondents to evaluate the success criteria variables. This was done by first asking the project team members to answer the question, "What was the most significant criterion that led to overall successful courthouse preservation?" The second question, about lessons learned, was asked of the same project team members, "Where would the project team members focus their resources to ensure a successful project?"

Results show that the success criteria question conveyed that project team members were most convinced that performance is the most significant (38.0% strongly agreed, 13.0% agreed). The results continued to break down as follows: satisfaction (25.0% strongly agreed, 25.0% agreed), budget (13.0% strongly agreed, 8.0% agreed), and finally, time (13.0% strongly agreed, 25.0% agreed). In addition, the lessons learned question depicted performance as the most important (42.0% strongly agreed, 35.0% agreed). The results continued to break down as follows: budget (29.0% strongly agreed, 16.0% agreed), satisfaction (26.0% strongly agreed, 32.0% agreed), and finally time (3.0% strongly agreed, 16.0% agreed).



Owners (10) T.H.C. (6) Architects (8) Constractos (7) N= 3 1
Q5, Q6, Q7, Q8 =The most significant criteria that led to an overall successful courthouse preservation project.



Q19 = Where would the project team members focus its resources to ensure a successful project?

Figure 23. Descriptive analysis for success criteria variables vs. lessons learned.

The objective of combining both charts in Figure 23 was to compare perceptions of which success criteria variable had the most impact on project success vs. lessons learned views, ranking the success criteria variables in order of importance for delivery of a successful courthouse preservation project. For instance, evaluating the success criteria variables in the order of importance as they are presented for both questions is as follows: according to the results depicted in the figures, the project team members should place substantial emphasis on the amount of resources allocated for the planning of the performance success criteria variable. Subsequently, planning for the budget was next in importance, followed by planning for satisfaction, and finally planning for time was once again seen as being the least important success criteria variable.

Conclusions for Success Factors – Descriptive Statistics

The individual figures presented in the previous section express the attitudes of each independent group. The compiled results for each of the survey questions had variety of responses between the groups of project team members. Even within the project team groups, there was no unanimous majority of agreement between their responses. The figures expressed how the project team members perceived those success factors that affect project success.

Analysis of Variance (ANOVA)

Using an analysis of variance (ANOVA), this study attempts to test the research hypothesis that the means among the independent project team groups (Architects,

Contractors, and THC reviewers) are not equal. Data was obtained from 21 rededicated courthouse preservation projects. The owners were not considered in the means test because of the limited number of respondents to this study (only 10 respondents). The major hypothesis tested was:

$\boldsymbol{H_2}$ *There is a difference between the project team members perception of the success criteria variables.*

The sub-hypotheses are as follows:

$\boldsymbol{H_{2A}}$ *Architect's Budget Mean ≠ Contractors' Budget Mean ≠ THC Reviewers' Budget Mean*

$\boldsymbol{H_{2B}}$ *Architect's Time Mean ≠ Contractors' Time Mean ≠ THC Reviewers' Time Mean*

$\boldsymbol{H_{2C}}$ *Architect's Performance Mean ≠ Contractors' Performance Mean ≠ THC Reviewers' Performance Mean*

$\boldsymbol{H_{2D}}$ *Architect's Satisfaction Mean ≠ Contractors' Satisfaction Mean ≠ THC Reviewers' Satisfaction Mean*

The subsequent paragraphs elaborate on the findings for each test of the success criteria (Budget, Time, Performance, and Satisfaction) followed by a detailed summary of conclusions. The testing of the means for each independent project team group was done in a four-step process. Four one-way ANOVA tests were conducted; however, because of the low number of responses; owners are not part of this analysis. Each test

took the success criteria independent variables in order to establish the relationship between the groups. A 90% confidence interval (C.I.), equal to a significance level of $\alpha = 0.10$, was used to indicate the reliability of the estimate from the analysis of the data.

$\boldsymbol{H_{2A}}$ *Architect's Budget Mean ≠Contractors' Budget Mean ≠ THC reviewers' Budget Mean*

The results for the Budget one-way ANOVA test (shown in Table 4 and Figure 24) indicate that within the groups there is significant variance in the perception of budget as a predictor of project success. The p-value of 0.081637 is less than the significance level (α=0.10) so we can reject the null hypothesis and assume that the project team views are not equal. In addition, F (2.613065) is greater than F crit. (2.393255), so again we reject the null hypothesis that the variances are equal.

Table 4. Summary of ANOVA results for budget

ANOVA: Single Factor		C.I. = 90% $\alpha = 0.10$				
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Architect's Budget	21	53	2.52381	0.561905		
Contractors Budget	21	45	2.142857	0.128571		
THC's Budget	21	51	2.428571	0.257143		
ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.650793651	2	0.825397	2.613065	0.081637	2.393255
Within Groups	18.95238095	60	0.315873			
Total	20.6031746	62				

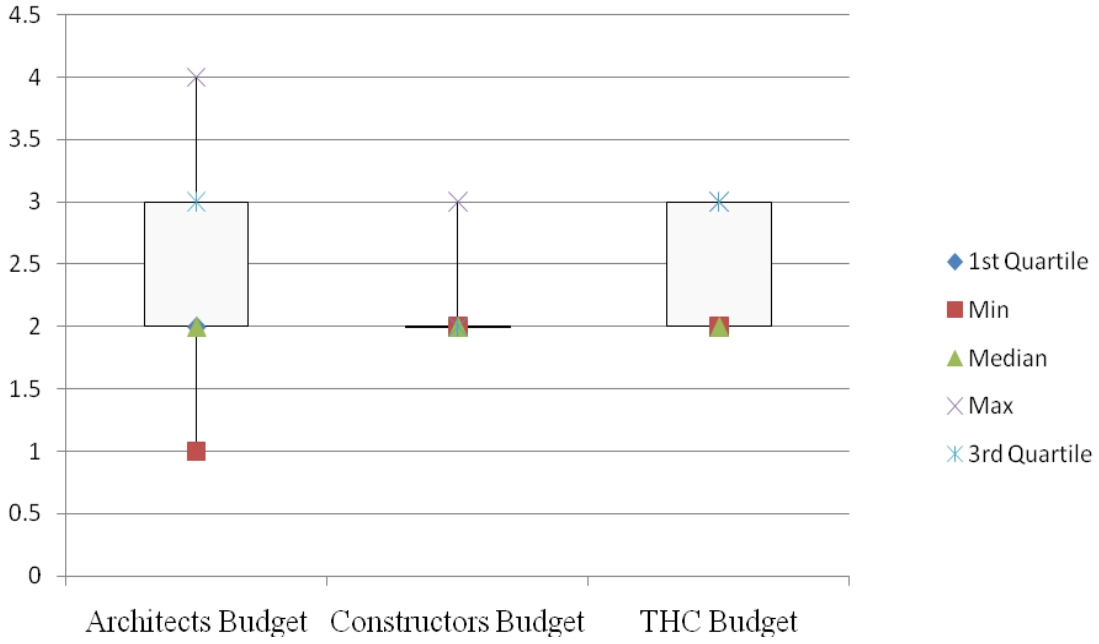


Figure 24. One-way ANOVA: Budget.

H_{2B} *Architect's Time Mean ≠ Contractors' Time Mean ≠ THC reviewers' Time Mean*

The results for the Time one-way ANOVA test show that within the groups there is significant variance in the perception of time as a predictor of project success (shown in Table 5 and Figure 25). The p-value of 0.011634 is less than the significance level (α=0.10) so we can reject the null hypothesis and assume that the project team views are not equal. In addition, F (4.801444) is greater than F crit. (2.393255), so again we reject the null hypothesis that the variances are equal.

Table 5. Summary of ANOVA results for time

ANOVA: Single Factor		C.I. = 90% α = 0.10				
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Architect's Time	21	53	2.52381	0.561905		
Contractors Time	21	42	2	0.5		
THC's Time	21	54	2.571429	0.257143		
ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4.222222222	2	2.111111	4.801444	0.011634	2.393255
Within Groups	26.38095238	60	0.439683			
Total	30.6031746	62				

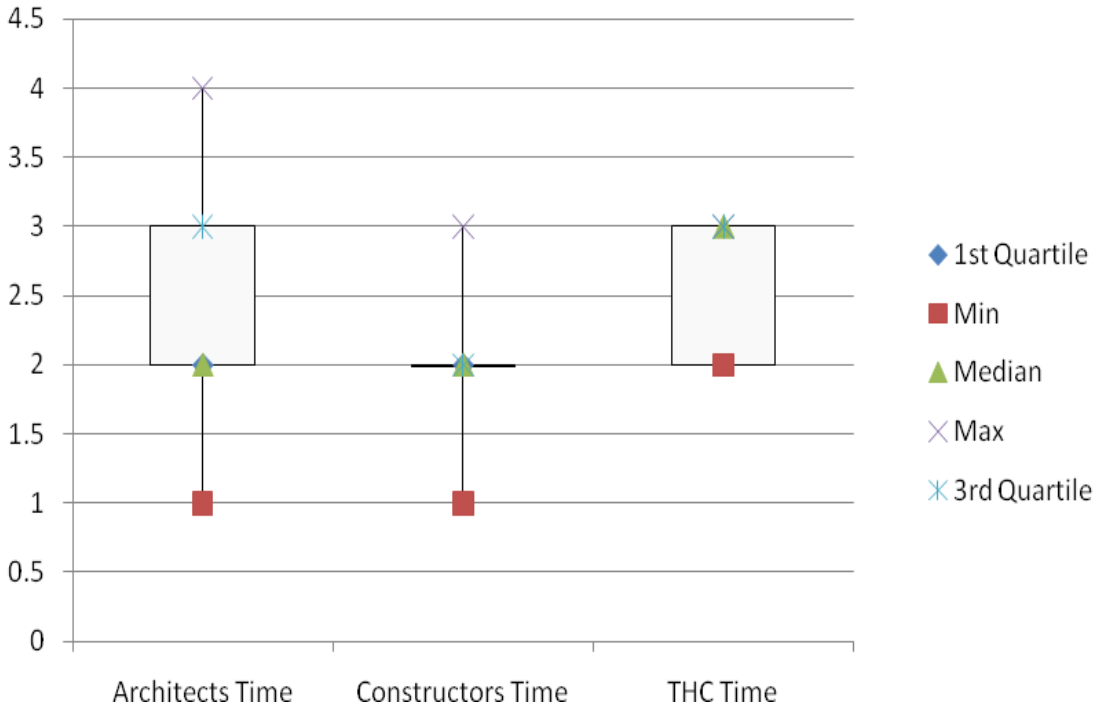


Figure 25. One-way ANOVA: Time.

H_{2C} *Architect's Performance Mean ≠ Contractors' Performance Mean ≠ THC reviewers' Performance Mean*

The results for the Performance one-way ANOVA test show that within the groups there is significant variance in the perception of performance as a predictor of project success (shown in Table 6 and Figure 26). The p-value of 0.06447 is less than the significance level (α=0.10) so we can reject the null hypothesis and assume that the project team views are not equal. In addition, F (2.870722) is greater than F crit. (2.393255), so again we reject the null hypothesis that the variances are equal.

Table 6. Summary of ANOVA results for performance

ANOVA: Single Factor		C.I. = 90% α = 0.10				
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Architect's Performance	21	45	2.142857	1.228571		
Contractors Performance	21	36	1.714286	0.514286		
THC's Performance	21	31	1.47619	0.761905		
ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4.793650794	2	2.396825	2.870722	0.06447	2.393255
Within Groups	50.0952381	60	0.83491			
Total	54.88888889	62				

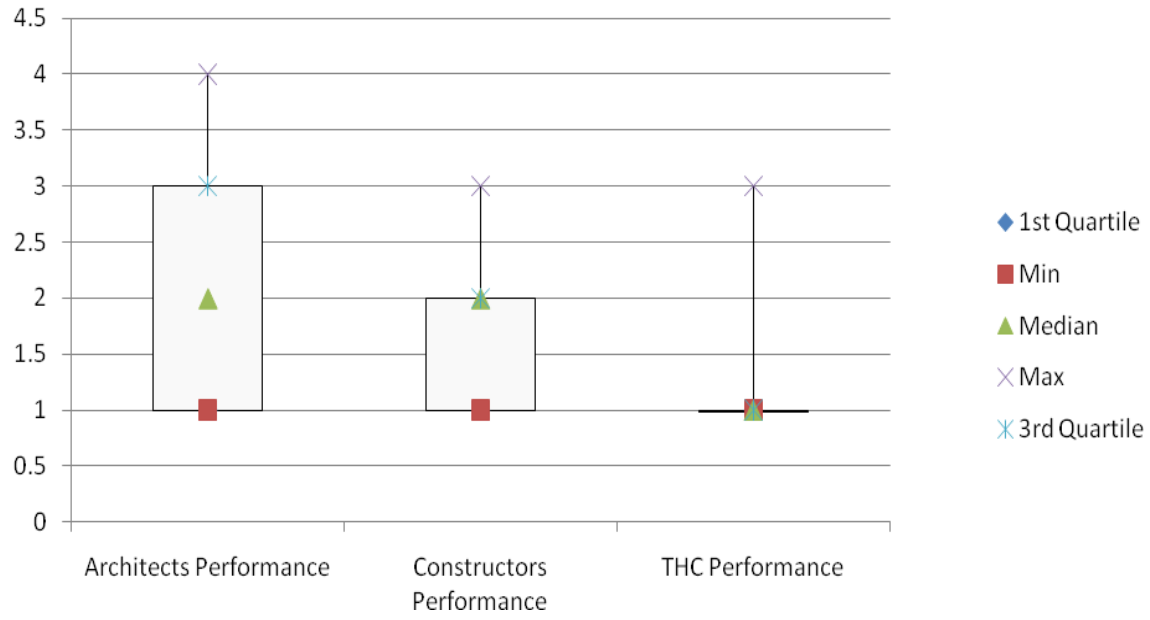


Figure 26. One-way ANOVA: Performance.

H_{2D} *Architect's Satisfaction Mean ≠ Contractors' Satisfaction Mean ≠ THC reviewers' Satisfaction Mean*

The results for the Satisfaction one-way ANOVA test show that within the groups there is significant variance in the perception of satisfaction as a predictor of project success (shown in Table 7 and Figure 27). The p-value of 0.00011 is less than the significance level (α=0.10) so we can reject the null hypothesis and assume that the project team views are not equal. In addition, F (10.64606742) is greater than F crit. (2.393255), so again we reject the null hypothesis that the variances are equal.

Table 7. Summary of ANOVA results for satisfaction

ANOVA: Single Factor		C.I. = 90% $\alpha = 0.10$				
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Architect's Performance	21	51	2.428571429	0.657142857		
Contractors Performance	21	29	1.380952381	0.347619048		
THC's Performance	21	44	2.095238095	0.69047619		
ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	12.03174603	2	6.015873016	10.64606742	0.00011	2.393255
Within Groups	33.9047619	60	0.565079365			
Total	45.93650794	62				

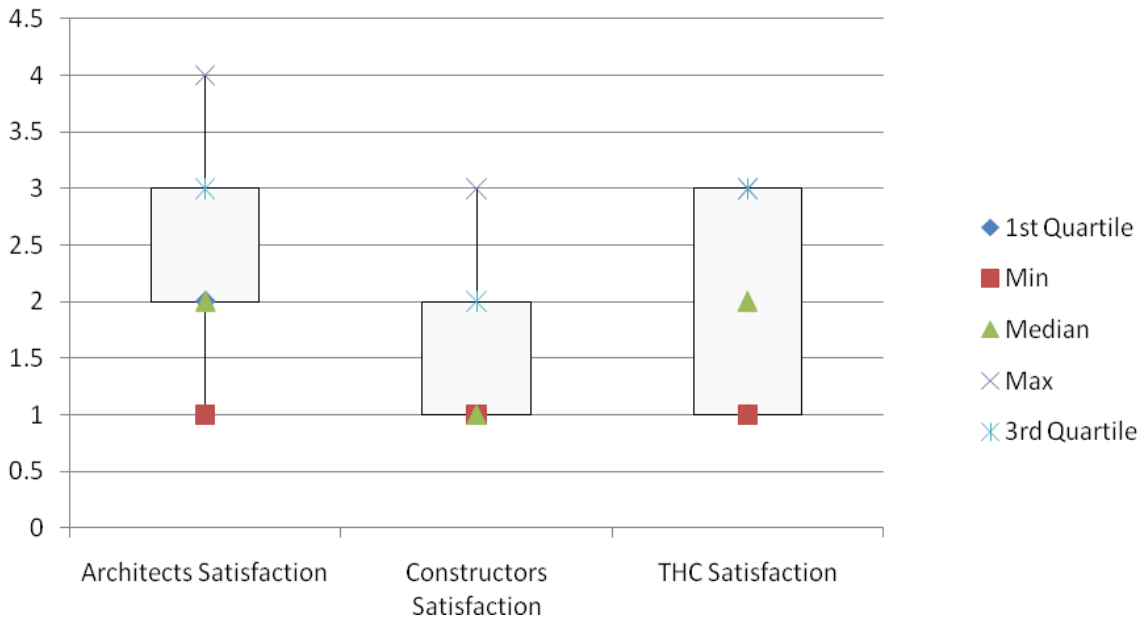


Figure 27. One-way ANOVA: Satisfaction.

Conclusions for Analysis of Variance (ANOVA)

Based on the four one-way ANOVA tests, results show that there are differences among the three group sample means for each of the success criteria variables. These findings support the research hypotheses that the results represent the diversity of position duties of each of the stakeholders. The THC reviewer's role is to ensure the project is delivered per the requirements of the stipulated contract, while maintaining vigilance of the historic integrity of the structure. Architects develop design solutions from a scope of work developed by the counties and the Texas Historical Commission. Contractors establish the means and methods to accomplish the work. Even as the roles of the stakeholders are different in their responsibilities, the final objective of all groups is to deliver the project successfully.

Analysis of Success Criteria Variables – Inferential Statistics

Multiple regression analysis allows the researcher explicit control for many other factors that simultaneously affect the dependent variable. Furthermore, multiple regression models can accommodate many explanatory variables that may be correlated, if we add more factors to our model that are useful in explaining *Y*, then more of the variation in *Y* can be explained (Dielman, 2005). Multiple regression analysis seeks to identify a model (a group of independent variables) that best explains the response of the dependent variable (budget growth).

Multiple regression analysis in this study attempts to identify the relative contribution of the criterion independent variables (Budget, Time, Performance, and

Satisfaction) on project success. This explains the variation in the dependent variable of success using Budget Growth as the actual data for each of the invested groups (THC Reviewers, Architects, and Contractors; see Figure 28).

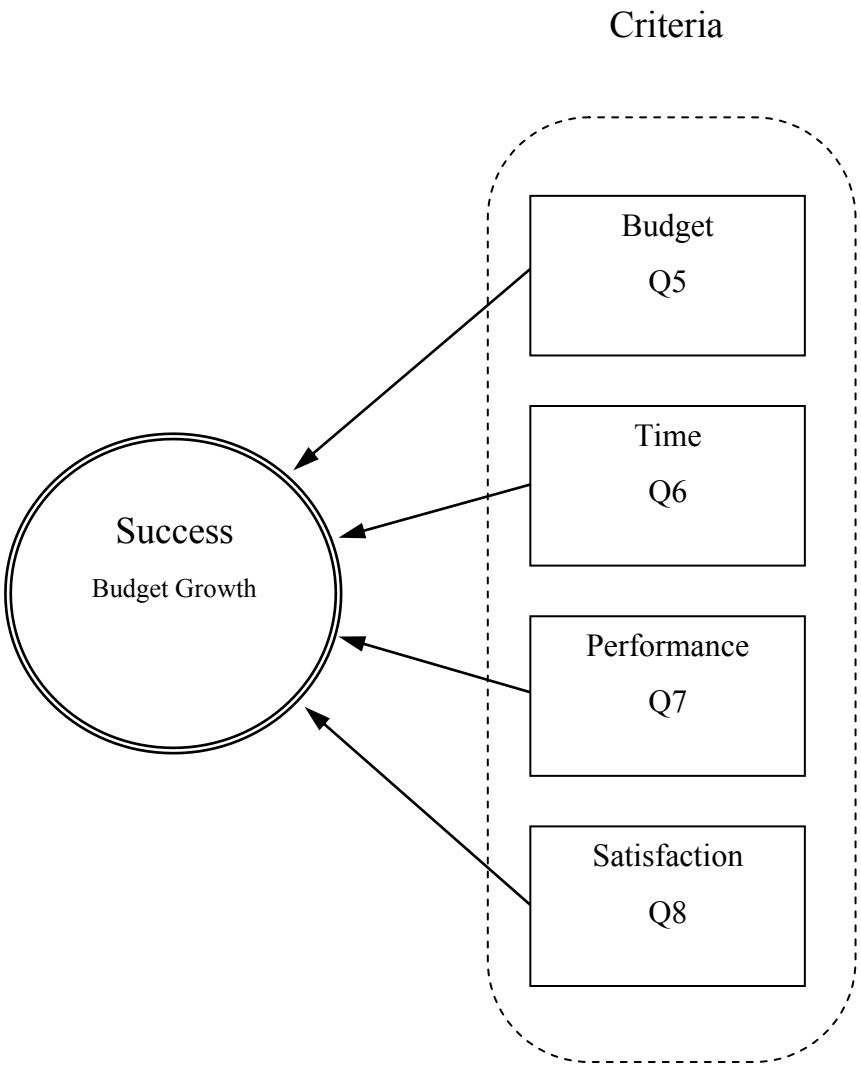


Figure 28. Conceptual model of success criteria and success.

Initially, two dependent variables explained project success. The dependent variables are Budget Growth and Time Growth. The results concluded that a larger number of projects were delivered within 5% of the estimated budget, while time was consistently over 5% of the estimated schedule. As a result, only the budget growth percentages were used as part of this study. The budget growth performance metric was established through ranking the 21 projects in order of smallest to largest budget delivery percentages. For example, the budget delivery percentages began with the negative numbers that showed the project was delivered under the estimated budget, to positive numbers that showed the project had budget growth.

Three different multiple regression tests were run using the data collected from the 31 questionnaires and from the completed 21 courthouse preservation projects. The data was taken from the submitted completion reports and it included the project team member's perceptions on success criteria variables. The three tests included a test for the THC reviewers, a test for the architects, and a test for the contractors. The owners' group was not included because of the limited number of responses and their role as observers during the construction process.

The intention of these models was to evaluate which independent success criteria variable would cause the most change in the dependent project success variable. It is important to keep in mind that these data points reflect the perceptions of the project team members towards project success after the project was complete. Therefore, the research hypothesis that was tested is a follows:

H_3 *There is a relationship between project success and the success criteria variables (Budget, Time, Performance, and Satisfaction).*

Summaries for the three multiple regression tests are delineated in the following section. This section includes summary of the findings for THC reviewers, architects, land contractors. In addition, a summary of the combined findings will serve as a comparative analysis of each group. When running these regression tests two assumptions are made: (a) there is a linear relationship between two variables (i.e. *X* and *Y*), and (b) this relationship is additive (i.e. $Y = x1 + x2 + \ldots + xN$) (Reyna, 2010).

Success Criteria Regression Analysis

Texas Historical Commission

Findings show that during the descriptive statistical analysis, the THC reviewers' perceptions towards success criteria variables were not similar. Performance was the most important followed by satisfaction, budget, and then time. The study then looked into inferring explanatory results by running a regression test to examine the Y (dependent) changes when X (independent) changes one unit.

An initial analysis on the *P-value* was done to test if the model as a whole had statistically significant explanatory capability. More formally, p-value is the *level of significance* and is defined as the probability of obtaining a value of the test statistic that is as likely or more likely to reject ***H_0*** as the actual observed value of the test statistic. This probability is computed assuming that the null hypothesis is true (Ott &

Longnecker, 2001). For the purpose of the THC reviewers' multiple regression test, the model used an alpha level of α = .05. As a result the p-value (shown in Table 8) is equal to *Prob* > *F* = 0.7831. This signifies that p-value (0.7831) is greater than the alpha level of α = .05, therefore, cannot support the research hypothesis.

Table 8. Regression Analysis for THC reviewers and success criteria

.(6 vars, 21 obs pasted into editor)
Regress (success - budget), budget, time, performance, satisfaction

Source	SS	df	MS	Number of obs =	21
				F(4, 16) =	0.43
Model	.287312889	4	.071828222	Prob > F =	0.7831
Residual	2.6562108	16	.166013175	R-squared =	0.0976
				Adj R-squared =	-0.1280
Total	2.943523689	20	.147176184	Root MSW =	.40745

Success budget	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
Budget	.0836364	.3616604	0.23	0.0820	-.6830495	.8503222
Time	.0387879	.3171972	0.12	0.904	-.6336401	.7112158
Performance	.0992727	.1400705	0.71	0.489	-.1976634	.3962089
Satisfaction	-.0181818	.2456999	-0.07	0.942	-.5390423	.5026786
_cons	-.2365455	.6535339	-.036	0.722	-1.621976	1.148885

Architects

Findings show that during the descriptive statistical analysis, the architect's perceptions towards success criteria variables were considerably varied. Table 9 is a summary table of the multiple regression analysis results testing the research hypothesis. Similar to the THC reviewers, the architect multiple regression test used an alpha level of α = .05. As a result the p-value (shown in Table 9) is equal to *Prob* > *F* = 0.7366. This signifies that

p-value (0.7366) is greater than the alpha level of α = .05. Therefore, the research hypothesis is not supported.

Table 9. Regression Analysis for architects and success criteria

.(6 vars, 21 obs pasted into editor)
Regress (success - budget), budget, time, performance, satisfaction

Source	SS	df	MS		Number of obs =	21
					F(4, 16) =	0.50
Model	.326696377	4	.081674094		Prob > F =	0.7366
Residual	2.61682731	16	.163551707		R-squared =	0.1110
					Adj R-squared =	-0.1113
Total	2.943523689	20	.147176184		Root MSW =	.40442

Success budget	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
Budget	.1769626	.3832634	0.46	0.650	-.6355195	.9894447
Time	-.1083645	.1616716	-0.67	0.512	-.4510929	.234364
Performance	.1961838	.1824028	1.08	0.298	-.190493	.5828606
Satisfaction	-.1997664	.3296632	-0.61	0.553	-.8986211	.4990884
_cons	-.048162	.7393922	-0.07	0.949	-1.615604	1.51928

Contractors

Findings show that during the descriptive statistical analysis, the contractor's perceptions towards success criteria variables were more closely aligned. Table 10 is a summary table of the multiple regression analysis results testing the research hypothesis. Again, the model used an alpha level of α = .05. As a result the p-value (shown in Table 10) is equal to *Prob. > F* = 0.8426. This signifies that p-value (0.8426) is greater than the alpha level of α = .05. Therefore, the research hypothesis is not supported.

Table 10. Regression Analysis for contractors and success criteria

.(6 vars, 21 obs pasted into editor)
Regress (success - budget), budget, time, performance, satisfaction

Source	SS	df	MS	Number of obs =	21
				F(3, 17) =	0.27
Model	.136232499	3	.045410833	Prob > F =	0.8426
Residual	2.80729119	17	.165134776	R-squared =	0.0463
				Adj R-squared =	-0.1220
Total	2.94352369	20	.147176184	Root MSW =	.40637

Success budget	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
Budget	.2433696	.398563	0.61	0.550	-.5975249	1.084264
Time	Dropped					
Performance	-.1956522	.2221732	-0.88	0.391	-.6643967	.2730923
Satisfaction	-.0020652	.2118339	0.01	0.992	-.4448651	.4489956
_cons	-.0252174	.432058	-0.06	0.954	.93678	.8863453

Summary of Multiple Regression Analysis

First, the literature review compiled an extensive assessment of the success criteria and success factors variables for delivery of a successful project. Next, the study refined the list on a number of iterations, which are detailed in the methodology chapter. The outcome was the success criteria variables of budget, time, performance, and satisfaction. The dependent variable 'project success' was derived from the actual project information obtained from the completion reports binders. However, the results show that for the three multiple regression tests, the study was unable to accept research hypothesis $\boldsymbol{H_3}$. It should be noted the even if the results show the p-value to be greater than the significance level of $\alpha = .05$, the methodology for selecting the variables was done through an additive process.

There were 75 project team managers contacted about the study, but only 31 actually returned the survey instrument completely answered (see Table 1 for details). Repeated attempts to increase the response rate were implemented, but only the 31 questionnaires were returned. In hindsight, it would have been to the study's advantage if these courthouse preservation projects were at the substantial completion milestone or if they had recently been completed. This strategy would increase the opportunities to target the project team members as the project is reaching completion. Not being able to reject the null or to support the research hypothesis introduces some concerns.

$\boldsymbol{H_3}$ *There is a relationship between project success and the success criteria variables (Budget, Time, Performance, and Satisfaction).*

First, the intent of these tests was to understand the impact of the various independent variables on the dependent variable. Large p-values could introduce the issue of multicollinearity, which occurs because two (or more) variables are correlated; this could explain why the model was not able to show significance. Multicollinearity inflates the variances of the parameter estimates. This may lead to lack of statistical significance of individual independent variables even though the overall model may be significant. This is especially true for small and moderate sample sizes (Braunstein, 2007). To reduce the impact of multicolinearity, one must increase sample size. Despite multicolinearity, more data would narrow the confidence intervals (Motulsky, 2002).

Second, the issue of a Type II error, also known as a 'false negative,' is the error of failing to reject a null hypothesis when it is in fact true. In other words, this is the

error of failing to observe a difference when in reality there is one. As with multicolinearity, controlling for Type II error when the alpha ($\alpha = .05$) is fixed can be avoided by increasing the sample size *n*. Sample size has been a reoccurring issue with this study and every attempt was made to try and resolve the problem.

Analysis of Success Factors – Inferential Statistics

Multiple Regression Analysis

Multiple regression analysis for this phase of the study attempts to identify the relative contribution of the success factors (independent variables) (Budget Q12 - Q13 - Q19B, Time Q14 - Q16 - Q19T, Performance Q9 - Q10 - Q11 - Q17 - Q19P, and Satisfaction Q15, Q18, Q19S) for explaining the variation in the dependent variable of success (Budget Growth) for each of the invested groups (THC reviewers, architects, and contractors) (see Figure 29).

Twelve different multiple regression tests were run using the 31 questionnaires and data from the 21 courthouse preservation projects that were completed. The data was once again taken from the submitted completion reports and it provided the project team members perceptions on success factor variables. The 12 tests included four tests for the THC reviewers, four tests for the architects, and four tests for the contractors. The owners group was once again not included because of the limited number of responses and their role as observers during the construction process.

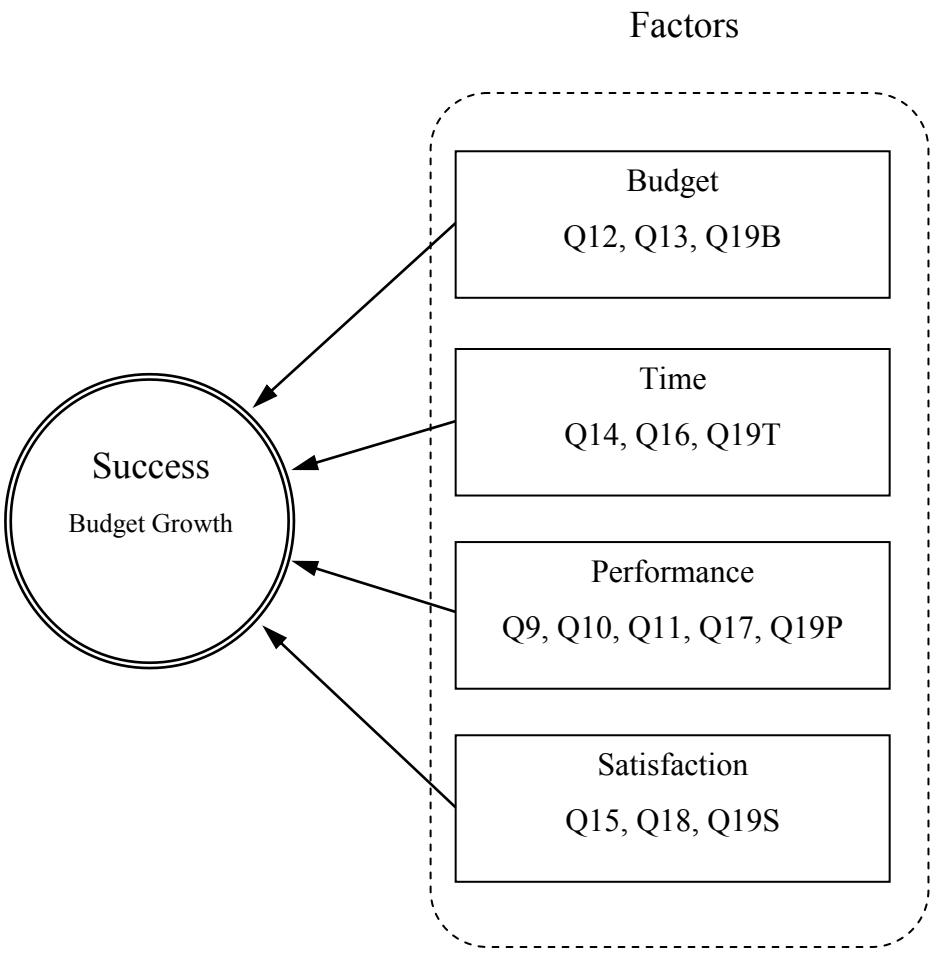


Figure 29. Conceptual model of success factors and success.

The multiple regression tests were done using the success factors data that was submitted by the THC reviewers, architects, and contractors via the survey instrument. The intention of these models was to evaluate what independent success factor variables would cause the most change in the dependent project success variable. The success factor variables emulate the success criteria; the difference is that the success factors are those project management practices that are used to develop the budget, time, performance, and satisfaction measures.

It is important to keep in mind that these data points as gathered from the completion reports reflect the perceptions of the project team members towards project success after the project was complete. Therefore, the research hypothesis that was tested is a follows:

H_4 *There is a relationship between project success and the success factor variables (Budget, Time, Performance, and Satisfaction).*

Summaries for the 12 multiple regression tests are delineated in the next section. This section includes summary of the findings for the THC reviewers, architects, and contractors. In addition, a summary of the combined findings will serve as a comparative analysis of each group.

Texas Historical Commission – Budget

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the THC-Budget multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 11) is equal to (*Prob > F)* = 0.0877. This signifies that p-value (0.0877) > the alpha level of $\alpha = .05$, so we are unable to accept research hypothesis ***H_4***. Further investigation of the two-tail ($P > |t|$) values, and using an alpha of 0.10, shows that Funding (Q13) (see Appendix C) is the only variable that has some significant impact on budget scores. In addition, by analyzing the (*Coef.*) values associated with Funding

(Q13), the results showed that for each one-point increase in Funding (Q13), the budget score decreased by 0.372.

Table 11. Regression analysis for THC reviewers' budget

.(4 vars, 21 obs pasted into editor)						
Regress budget - q5, q12, q13, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	2.58
Model	1.60797342	3	.535991141		Prob > F =	0.0877
Residual	3.53488372	17	.207934337		R-squared =	0.3127
					Adj R-squared =	0.1914
Total	5.14285714	20	.257142857		Root MSW =	.456
budgetq5	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q12	-.0697674	.3798217	-0.18	0.856	-.8711212	.7315863
q13	-.372093	.2027395	-1.84	0.084	-.7998359	.0556499
q19	-.1472868	.1572123	-0.94	0.362	-.4789758	.1844022
_cons	3.767442	.8469314	4.45	0.000	1.980573	5.554311

Architects – Budget

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Architects-Budget multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 12) is equal to (*Prob > F)* = 0.0104. This signifies that p-value (0.0104) is less than the alpha level of $\alpha = .05$, so we are to accept research hypothesis $\boldsymbol{H_4}$. Further investigation of the two-tail *(P> | t |)* values shows that Value Engineering (Q12) and Funding (Q13) (see Appendix C) are the only variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Value

Engineering (Q12) and Funding (Q13), the results showed that for each one-point increase in Value Engineering (Q12), the budget scores increased by 0.991. Funding (Q13) shows that for every one-point increase, budget scores increased 0.574. Lessons Learned-Budget (Q19) is not statistically significant in explaining budget scores.

Table 12. Regression analysis for architects' budget

.(4 vars, 21 obs pasted into editor)
Regress budget - q5, q12, q13, q19

Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	5.13
Model	5.33862582	3	1.77954194		Prob > F =	0.0104
Residual	5.89946942	17	.347027613		R-squared =	0.4750
					Adj R-squared =	0.3824
Total	11.2380952	20	.561904762		Root MSW =	.58909

budgetq5	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q12	.9907847	.4063635	2.44	0.026	.1334327	1.848137
q13	.5741413	.2069622	2.77	0.013	.1374893	1.010793
q19	.0120078	.1743005	0.07	0.946	-.3557341	.3797497
_cons	-.516057	1.28377	-0.40	0.693	-3.224576	2.192462

Contractors – Budget

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Contractors-Budget multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 13) is equal to (*Prob > F)* = 0.0000. This signifies that p-value (0.0000) is less than the alpha level of $\alpha = .05$, so we are able to accept research hypothesis $\boldsymbol{H_4}$.

Table 13. Regression analysis for contractors' budget

.(4 vars, 21 obs pasted into editor)						
Regress budget - q5, q12, q13, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	36.48
Model	2.22571069	3	.741903562		Prob > F =	0.0000
Residual	.345717884	17	.020336346		R-squared =	0.8656
					Adj R-squared =	0.8418
Total	2.57142857	20	.128571429		Root MSW =	.14261
budgetq5	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q12	.4332494	.0471142	9.20	0.000	.333847	.5326517
q13	-.2361461	.0401163	-5.89	0.000	-.3207842	-.151508
q19	-.0661209	.0629736	-1.05	0.308	-.1989836	.0667418
_cons	2.132872	.157417	13.55	0.000	1.800751	2.464992

Further investigation of the two-tail *(P> | t |)* values shows that Value Engineering (Q12) and Funding (Q13) (see Appendix C) are the only variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Value Engineering (Q12) and Funding (Q13), the results showed that for each one-point increase in Value Engineering (Q12), the budget scores increased by 0.433. Funding (Q13) showed that for every one-point increase, budget scores decreased 0.236. Lessons Learned-Budget (Q19) is not statistically significant in explaining budget scores.

Texas Historical Commission – Time

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the THC-Time

multiple regression test, the model used an alpha level of α = .05. As a result the p-value (shown in Table 14) is equal to (*Prob > F)* = 0.0005. This signifies that p-value (0.0005) is less than the alpha level of α = .05, so we are able to accept research hypothesis ***H₄***.

Table 14. Regression analysis for THC reviewers' time

.(4 vars, 21 obs pasted into editor)						
Regress time - q6, q14, q16, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	9.88
Model	3.26785714	3	1.08928571		Prob > F =	0.0005
Residual	1.875	17	.110294118		R-squared =	0.6354
					Adj-squared =	0.5711
Total	5.14285714	20	.257142857		Root MSW =	.33211
timeq6	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q14	-3.86e-15	.358715	-0.00	1.000	-.7568226	.7568226
q16	.375	.3522512	1.06	0.302	-.368185	1.118185
q19	.625	.1793575	3.48	0.003	.2465887	1.003411
_cons	-.625	.6176033	-1.01	0.326	-1.928029	.678029

Further investigation of the two-tail *(P> | t |)* values shows that Lessons Learned-Time (Q19) (see Appendix C) was the only variable to have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Lessons Learned-Time (Q19), the results showed that for each one-point increase in Lessons Learned-Time (Q19), the budget scores increased by 0.625. Scheduling (Q14) and Decision Tracking (Q16) are not statistically significant in explaining budget scores.

Architects - Time

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Architect-Time multiple regression test, the model used an alpha level of α = .05. As a result the p-value (shown in Table 15) is equal to (*Prob > F)* = 0.0009. This signifies that p-value (0.0009) is less than the alpha level of α = .05, so we are able to accept research hypothesis $\boldsymbol{H_4}$. Further investigation of the two-tail *(P> | t |)* values shows that Scheduling (Q14), Decision Tracking (Q16), and Lessons Learned-Time (Q19) (see Appendix C) are all variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Scheduling (Q14), Decision Tracking (Q16), and Lessons Learned-Time (Q19), the results show that for each one-point increase in Scheduling (Q14), the budget scores increased by 1.235. Decision Tracking (Q16) shows that for every one-point increase, budget scores decreased 1.412. Lessons Learned-Time (Q19) shows that for every one-point increase, budget scores increased 0.382.

Table 15. Regression analysis for architects' time

.(4 vars, 21 obs pasted into editor)						
Regress time - q6, q14, q16, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	8.96
Model	6.88515406	3	2.29505135		Prob > F =	0.0009
Residual	4.35294118	17	.256055363		R-squared =	0.6127
					Adj R-squared =	0.5443
Total	11.2380952	20	.561904762		Root MSW =	.50602
timeq6	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q14	1.235294	.4161898	2.97	0.009	.3572105	2.113378
q16	-1.411765	.3929202	-3.59	0.002	-2.240754	-.5827754
q19	.3823529	.1389183	2.75	0.014	.089261	.6754449
_cons	1.411765	.3929202	3.59	0.002	.5827754	2.240754

Contractors – Time

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Contractor-Time multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 16) is equal to (*Prob > F)* = 0.0000. This signifies that p-value (0.0000) is less than the alpha level of $\alpha = .05$, so we are able to accept research hypothesis $\boldsymbol{H_4}$.

Table 16. Regression analysis for contractors' time

.(4 vars, 21 obs pasted into editor)						
Regress time - q6, q14, q16, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	585.04
Model	9.90406977	3	3.30135659		Prob > F =	0.0000
Residual	.095930233	17	.005642955		R-squared =	0.9904
					Adj R-squared =	0.9887
Total	10	20	.5		Root MSW =	.07512
timeq6	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q14	-1.520349	.0412641	-36.84	0.000	-1.607409	-1.433289
q16	.7034884	.0313725	22.42	0.000	.6372981	.7696786
q19	.1918605	.0256156	7.49	0.000	.1378163	.2459046
_cons	3.06686	.1686645	18.18	0.000	2.711009	3.422711

Further investigation of the two-tail *(P> | t |)* values shows that Scheduling (Q14), Decision Tracking (Q16), and Lessons Learned-Time (Q19) (see Appendix C) are all variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Scheduling (Q14), Decision Tracking (Q16), and Lessons Learned-Time (Q19), the results show that for each one-point increase in Scheduling (Q14), the budget scores decreased by 1.520. Decision Tracking (Q16) shows that for every one-point increase, budget scores increased 0.703. Lessons Learned-Time (Q19) shows that for every one-point increase, budget scores increase 0.192.

Texas Historical Commission – Performance

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the THC-Performance multiple regression test, the model used an alpha level of α = .05. As a result the p-value (shown in Table 17) is equal to (*Prob > F)* = 0.0000. This signifies that p-value (0.0000) is less than the alpha level of α = .05, so we are able to accept research hypothesis $\boldsymbol{H_4}$.

Table 17. Regression analysis for THC reviewers' performance

.(6 vars, 21 obs pasted into editor)						
Regress performance – q7, q9, q10, q17, q19						
Source	SS	df	MS		Number of obs =	21
					F(4, 16) =	16.93
Model	12.311266	4	3.07781649		Prob > F =	0.0000
Residual	2.92682927	16	.182926829		R-squared =	0.8079
					Adj R-squared =	0.7599
Total	15.2380952	20	.761904762		Root MSW =	.4277
Performance q7	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q9	-1.10e-15	.2469324	-0.00	1.000	-.5234733	.5234733
q10	(dropped)					
q11	1.707317	.2484335	6.87	0.000	1.180662	2.233973
q17	-.2439024	.1636147	-1.49	0.155	-.5907502	.1029453
q19	1.17e-15	.3024292	0.00	1.000	-.6411212	.6411212
_cons	-1.682927	.9279518	-1.81	0.089	-3.650097	.2842432

Further investigation of the two-tail *(P> | t |)* values shows that Site Layout and Staging (Q11) (see Appendix C) is the only variable that has significant impact on budget scores. Building Significance (Q9), Quality Assurance Plan (Q17), Lessons

Learned-Performance (Q19) are not statistically significant in explaining budget scores. Site Analysis (Q10) was dropped from the test because the variable did not increase or decrease the budget scores. In addition, by analyzing the *(Coef.)* values associated with Site Layout and Staging (Q11), the results showed that for each one-point increase in Site Layout and Staging (Q11), the budget scores increased by 1.707.

Architects – Performance

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Architect-Performance multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 18) is equal to (*Prob > F)* = 0.0000. This signifies that p-value (0.0000) is less than the alpha level of $\alpha = .05$, so we are able to accept research hypothesis $\boldsymbol{H_4}$. Further investigation of the two-tail *(P> | t |)* values shows that Site Analysis (Q10), Site Layout and Staging (Q11), Quality Assurance Plan (Q17), Lessons Learned-Performance (Q19) (see Appendix C) are all variables that have significant impact on budget scores. Building Significance (Q9) was dropped from the test because the variable did not increase or decrease the budget scores. In addition, by analyzing the *(Coef.)* values associated with Site Analysis (Q10), the results depict for each one-point increase in Site Analysis (Q10), the budget scores increase by 1.699. Site Layout and Staging (Q11) depicts that for each one-point increase, the budget scores increase 1.987. Quality Assurance Plan (Q17) depicts that for each one-point increase, the budget scores increase 1.057. Lessons Learned-Performance (Q19) depicts that for

each one-point increase, the budget scores increase 4.1135. This clearly is the most significant variable that influenced the budget scores.

Table 18. Regression analysis for architects' performance

.(6 vars, 21 obs pasted into editor)						
Regress performance – q7, q9, q10, q17, q19						
Source	SS	df	MS		Number of obs =	21
					F(4, 16) =	24.71
Model	21.1478478	4	5.28696195		Prob > F =	0.0000
Residual	3.42358079	16	.213973799		R-squared =	0.8607
					Adj R-squared =	0.8258
Total	24.5714286	20	1.22857143		Root MSW =	.46257
performance q7	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q9	(dropped)					
q10	1.69869	.3729174	4.56	0.000	.9081404	2.48924
q11	1.9869	.4980751	3.99	0.001	.9310275	3.042772
q17	1.056769	.2406902	4.39	0.000	.5465281	1.567009
q19	4.113537	.6676083	6.16	0.000	2.698271	5.528804
_cons	-11.65502	2.439166	-4.78	0.000	-16.82582	-6.484221

Contractors – Performance

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Contractor-Performance multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 19) is equal to (*Prob > F)* = dropped. This signifies that p-value dropped is less than the alpha level of $\alpha = .05$, so we are unable to accept research hypothesis $\boldsymbol{H_4}$. Further investigation of the two-tail *(P> | t |)* values shows that

Building Significance (Q9), Site Analysis (Q10), Site Layout and Staging (Q11), Quality Assurance Plan (Q17), Lessons Learned-Performance (Q19) (see Appendix C) are all variables that have no significant impact on budget scores.

Table 19. Regression analysis for contractors' performance

.(6 vars, 21 obs pasted into editor)						
Regress performance – q7, q9, q10, q17, q19						
Source	SS	df	MS		Number of obs =	21
					F(4, 16) =	*
Model	10.2857143	4	2.57142857		Prob > F =	*
Residual	0	16	0		R-squared =	1.0000
					Adj R-squared =	1.0000
Total	10.2857143	20	.514285714		Root MSW =	0
performance q7	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q9	3.8	*	*	*	*	*
q10	(dropped)	*	*	*	*	*
q11	1.8	*	*	*	*	*
q17	-.8	*	*	*	*	*
q19	-.6	*	*	*	*	*
_cons	-5.2	*	*	*	*	*

Further investigation of the two-tail *(P> | t |)* values shows that Communication and Feedback (Q15), Mock-Ups/Samples (Q18), Lessons Learned-Satisfaction Q19 (see Appendix C) are all variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Communication and Feedback (Q15), the results depict for each one-point increase in Communication and Feedback (Q15), the budget scores decreased by 1.062. Mock-Ups/Samples (Q18) depicts that for each one-

point increase, the budget scores decrease 0.856. Lessons Learned-Satisfaction (Q19) depicts that for each one-point increase, the budget scores decrease 1.918.

Texas Historical Commission Reviewers – Satisfaction

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the THC-Satisfaction multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 20) is equal to (*Prob > F)* = 0.0067. This signifies that p-value (0.0067) is less than the alpha level of $\alpha = .05$, so we are able to accept research hypothesis $\boldsymbol{H_4}$.

Table 20. Regression analysis for THC reviewers' satisfaction

.(4 vars, 21 obs pasted into editor)						
Regress satisfaction – q8, q15, q18, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	5.73
Model	6.94354443	3	2.31451481		Prob > F =	0.0067
Residual	6.86597938	17	.40388114		R-squared =	0.5028
					Adj R-squared =	0.4151
Total	13.8095238	20	.69047619		Root MSW =	.63552
satisfaction q8	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q15	-1.061856	.3072096	-3.46	0.003	-1.710011	-.4137001
q18	-.8556701	.3534285	-2.42	0.027	-1.601339	-.1100012
q19	-1.917526	.5430749	-3.53	0.003	-3.063314	-.7717378
_cons	9.298969	1.876465	4.96	0.000	5.339973	13.25796

Further investigation of the two-tail *(P> | t |)* values shows that Communication and Feedback (Q15), Mock-Ups/Samples (Q18), Lessons Learned-Satisfaction Q19 (see Appendix C) are all variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Communication and Feedback (Q15), the results depict for each one point increase in Communication and Feedback (Q15), the budget scores decreased by 1.062. Mock-Ups/Samples (Q18) depicts that for each one point increase, the budget scores decrease 0.856. Lessons Learned-Satisfaction (Q19) depicts that for each one point increase, the budget scores decrease 1.918.

Architects – Satisfaction

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Architect-Satisfaction multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 21) is equal to (*Prob > F)* = 0.0113. This signifies that p-value (0.0113) is less than the alpha level of $\alpha = .05$, so we are able to accept research hypothesis $\boldsymbol{H_4}$. Further investigation of the two-tail *(P> | t |)* values shows that Communication and Feedback (Q15), Mock-Ups/Samples (Q18), Lessons Learned-Satisfaction (Q19) (see Appendix C) are all variables that have significant impact on budget scores. In addition, by analyzing the *(Coef.)* values associated with Communication and Feedback (Q15), the results depict for each one-point increase in Communication and Feedback (Q15), the budget scores decreased by 2.925. Mock-Ups/Samples (Q18) depicts that for each one-point increase, the budget scores decrease

1.709. Lessons Learned-Satisfaction (Q19) depicts that for each one-point increase, the budget scores decrease 0.601.

Table 21. Regression analysis for architects' satisfaction

.(4 vars, 21 obs pasted into editor)						
Regress satisfaction – q8, q15, q18, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	5.02
Model	6.17175888	3	2.05725296		Prob > F =	0.0113
Residual	6.97109827	17	.410064604		R-squared =	0.4696
					Adj R-squared =	0.3760
Total	13.1428571	20	.657142857		Root MSW =	.64036
satisfaction q8	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q15	-2.924855	.8088307	-3.62	0.002	-4.631339	-1.218372
q18	1.709056	.5425073	3.15	0.006	.5644655	2.853646
q19	-.6011561	.2065567	-2.91	0.010	-1.036953	-.1653595
_cons	5.741811	.9269517	6.19	0.000	3.786114	7.697508

Contractors-Satisfaction

An initial analysis on the *P-value* was done to test if the model as a whole has statistically significant explanatory capability. For the purpose of the Contractor Satisfaction multiple regression test, the model used an alpha level of $\alpha = .05$. As a result the p-value (shown in Table 22) is equal to (*Prob > F)* = 0.0860. This signifies that p-value (0.0860) is greater than the alpha level of $\alpha = .05$, so we are unable to accept research hypothesis $\boldsymbol{H_4}$.

Table 22. Regression analysis for contractors' satisfaction

.(4 vars, 21 obs pasted into editor) Regress satisfaction – q8, q15, q18, q19						
Source	SS	df	MS		Number of obs =	21
					F(3, 17) =	2.60
Model	2.1854318	3	.728477267		Prob > F =	0.0860
Residual	4.76694915	17	.280408774		R-squared =	0.3143
					Adj-squared =	0.1933
Total	6.95238095	20	.347619048		Root MSW =	.52954
satisfaction q8	Coef.	Std. Err.	T	P > |t|	[95% Conf.	Interval]
q15	-.9533898	.3653374	-2.61	0.018	-1.724184	-.1825953
q18	1.241525	.6827589	1.82	0.087	-.19897	2.682021
q19	.4533898	.3653374	1.24	0.231	-.3174047	1.224184
_cons	.0635593	1.745529	0.04	0.971	-3.619185	3.746303

Further investigation of the two-tail ($P > | t |$) values, and using an alpha of 0.10, shows that Communication and Feedback (Q15), Mock-Ups/Samples (Q18) (see Appendix C) are variables that have an impact on budget scores. Lessons Learned-Satisfaction (Q19) is not statistically significant in explaining budget scores. In addition, by analyzing the (*Coef.*) values associated with Communication and Feedback (Q15), the results depict for each one-point increase in Communication and Feedback (Q15), budget score decrease by 0.953. Mock-Ups/Samples (Q18) depicts that for each one-point increase, the budget scores decrease 1.242. Lessons Learned-Satisfaction (Q19) depicts that for each one-point increase, the budget scores decrease 1.918.

Conclusions for Success Factors – Inferential Statistics

Multiple regression analysis was used to identify the relative contribution of the success factors' independent variables. These variables include building significance (Q9), site analysis (Q10), site layout and staging (Q11), value engineering (Q12), funding (Q13), scheduling (Q14), communication and feedback (Q15), decision tracking (Q16), quality assurance plan (Q17), mock - ups and samples (Q18), and lessons learned - budget/time/performance/satisfaction (Q19) (see Appendix C). In addition, multiple regression explained the variation in the dependent variable of success (Budget Growth) for each of the invested groups (THC reviewers, architects, and contractors). Each group was asked the same questions, and then conclusions were drawn from the compiled results. As discussed in the introduction of this section, success factors are the project management practices that are used to develop the success criteria variables (budget, time, performance, and satisfaction).

Table 23 displays a summary of the multiple regression tests. The figure separates the success criteria variables and success factor variables by the individual project team member groups. The intent was to show a summary of three sets of data in table. First, data on accepting the research hypothesis was input in the form of 'Y' (yes, accepting the research hypothesis) and 'N' (no, rejecting the research hypothesis) for each of the multiple regression tests was summarized. Second, which questions are statistically significant in explaining the output variable? Third, which direction did the coefficients (Coeff.) move, positive (Pos.) or negative (Neg.)?

Table 23. Summary for Multiple Regression Tests

	Accepting H_4	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19
Budget												
THC Reviewers	N					Neg						
Architects	Y				Pos	Pos						
Contractors	Y				Pos	Neg						
Time												
THC Reviewers	Y											Pos
Architects	Y						Pos		Neg			Pos
Contractors	Y						Neg		Pos			Pos
Performance												
THC Reviewers	Y			Pos								
Architects	Y		Pos	Pos						Pos		Pos
Contractors	N											
Satisfaction												
THC Reviewers	Y							Neg			Neg	Neg
Architects	Y							Neg			Pos	Neg
Contractors	N							Neg				

The summary of the multiple regression tests depict which of the success factors had a significant impact on the dependent variable. The success criteria 'Budget' independent variable had p-values that allowed architects and contractors to accept research hypothesis. The success factor questions were analyzed to evaluate the impact on the output variable project success. For architects and contractors, both Value Engineering (Q12) and Funding (Q13) showed statistical significance in explaining output variable project success. For the THC reviewers, Funding (Q13) did show statistical significance in explaining the output variable project success.

The success criteria 'Time' independent variable had p-values that allowed THC reviewers, architects, and contractors to accept research hypothesis. The success factor questions were analyzed to evaluate the impact on the output variable project success.

For the THC reviewers, Lessons Learned-Time (Q19) showed statistical significance in explaining the output variable project success. For architects and contractors, Scheduling (Q14), Decision Tracking (Q16), and Lessons Learned-Time (Q19) showed statistical significance in explaining the output variable project success.

The success criteria 'Performance' independent variable had p-values that allowed THC reviewers and architects to accept research hypothesis. The success factor questions were analyzed to evaluate the impact on the output variable project success. For THC reviewers, Site Layout and Staging (Q11) showed statistical significance in explaining the output variable project success. For architects, Site Analysis (Q10), Site Layout and Staging (Q11), Quality Assurance Plan (Q17), and Lessons Learned-Performance (Q19) showed statistical significance in explaining the output variable project success. Contractors rejected the research hypotheses because the success factors showed statistical significance in explaining the output variable project success.

The success criteria 'Satisfaction' independent variable had p-values that allowed THC reviewers and architects to accept research hypothesis. The success factor questions were analyzed to evaluate the impact on the output variable project success. For THC reviewers, Communication and Feedback (Q15), Mock-Ups (Q18), and Lessons Learned-Satisfaction (Q19) showed statistical significance in explaining the output variable project success. For architects, Communication and Feedback (Q15), Mock-ups/Samples (Q18), and Lessons Learned-Satisfaction (Q19) showed statistical significance in explaining the output variable project success. Contractors rejected the

research hypothesis, but Communication and Feedback (Q15) showed statistical significance in explaining the output variable project success.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study depicts the impacts of the Project Management Planning (PMP) practices on success criteria variables and success factor variables for project success for historic courthouse preservation projects. In this chapter, a summary of the research is presented. The next section discusses the findings and conclusions, based on the results of the data analysis. The last section discusses the limitations of the study, makes recommendations for future research, and provides some final thoughts.

Summary of the Research

The purpose of this research was to identify PMP practices used by project team members (owners, THC reviewers, architects, and contractors) who worked with the Texas Historic Courthouse Preservation Program and determine which, if any, of these PMP practices are significant indicators of successful project. The focus of the research was a threefold process. The first objective was to develop a list of success criteria indices (budget, time, performance, satisfaction) from the literature review and refinement thorough a series of reviews and interviews. The results were then used as an index of project success. The second objective was to develop a list of project management practices used by the sample of project team members who were surveyed. The third objective was to determine which, if any, of the success criteria variables or project management practices examined in the study correlated significantly to project

success. The literature review has shown a limited focus on project success planning studies for historic renovation projects.

Research Design and Methodology

The study included project team members who were part of 37 completed Texas Historic Courthouse Preservation Projects. The small population of interest was limited to a potential sample size of 75 project team members (37 owners, 17 architects, 14 contractors, and seven THC reviewers). The goal of the study was to analyze the survey responses of at least 59 project team members in order to assure a maximum sampling error of 5% at a 95% confidence level. Despite the repeated attempts made to increase the response rate, only 31 responses were collected for inferential statistical analysis. There were two main reasons for the low response rates. The first reason was the time in which this study was done. In some cases, the projects had been completed years prior to this study. As a result, the response rates were affected by employee turnaround; many project team members had changed jobs or retired after the projects were completed. The second reason was the 'buy in' to the study. The incentive was not perceived after the project had been completed. Consequently, the project team members had rededicated their time to issues with which they were currently involved. This ad hoc approach to the study decreased the availability and motivation to respond to the survey.

The limited sample size of 31 submitted surveys were used to perform the statistical analysis tests. The 31 acceptable questionnaires represented 41% of the total

population of interest. Owners were the lowest of the respondents at 27%, followed by the architects at 47%, then contractors at 50%, and finally THC reviewers at 86%.

Two types of statistical methods were used to test the alternate hypotheses listed below. First, the descriptive statistical analysis was depicted through graphical representation. Each individual graph expressed the total responses to the survey questions. Furthermore, the graphs were representative of the perceptions of each project team member's response. In some cases, the graphs represented each group's responses, while in others the graph was a collective analysis of the perceptions as a whole. Second, the inferential statistical analysis for this study included an analysis of variance (ANOVA), multiple regression analysis.

The alternate hypotheses are:

H_1 There is a relationship between the project management planning and project success.

H_2 There is a difference between the project team members perception of the success criteria variables.

The sub-hypotheses are as follows:

H_{2A} Architect's Budget Mean ≠ Contractors' Budget Mean ≠ THC reviewers' Budget Mean

H_{2B} Architect's Time Mean ≠ Contractors' Time Mean ≠ THC reviewers' Time Mean

H_{2C} Architect's Performance Mean ≠ Contractors' Performance Mean ≠ THC reviewers' Performance Mean

H_{2D} Architect's Satisfaction Mean ≠ Contractors' Satisfaction Mean ≠ THC reviewers' Satisfaction Mean

H_3 There is a relationship between project success and the success criteria variables (Budget, Time, Performance, and Satisfaction).

H_4 There is a relationship between project success and the success factor variables (Budget, Time, Performance, and Satisfaction).

Data Analysis

Data analysis was conducted in two phases for this study. Phase I included a quantitative analysis using the dependent variable of project success, and independent variables of budget and time. Phase II included a qualitative analysis using the dependent variable of project success, four independent success criteria variables (Budget, Time, Performance, Satisfaction), and 12 independent success factor variables. The 12 independent success factor variables included PMP, project delivery method, building significance, site analysis, site layout and staging, value engineering, funding, scheduling, communication/feedback, decision tracking, quality assurance, mock-ups, lessons learned-budget, lessons learned-time, lessons learned-performance, and lessons learned-satisfaction. The hypotheses were tested for ANOVA at a ($\alpha = .10$) for a 90% confidence level and multiple regression analysis at a ($\alpha = .05$) for a 95% confidence level.

Findings and Conclusions

The descriptive statistics expressed the perceptions of the project team members. These findings were developed from the data collected and reflect a diverse summary of collective attitudes towards PMP practices and project success. In addition, when the project team members were separated in terms of observational (owners) and invested (THC reviewers, architects, and contractors), the findings indicated that the project team members' perceptions align similarly along the individual professions.

The major findings of the inferential statistical methods used to test the hypotheses for this study are shown in Table 24. The inferential statistical analysis began with an ANOVA test for three of the project team members (THC reviewers, architects, and contractors). In addition, the inferential statistical tests revealed the Project Management Planning practices (PMP) that correlated most significantly to project success for the projects completed in the Texas Historic Courthouse Preservation Program (THCPP). These are shown in Table 25. The results of the test convey the differences in the perceptions of the project team member's view of project success. A general relationship between PMP and project success could not be conclusively established by measuring project success as budget growth. However, this is an important finding that could develop into a number of hypotheses that focus on project success from the point of view of each independent project team member.

Table 24. Summary of major findings

Alternate Hypotheses	Tests & Results
$H_{1:}$ There is a relationship between the project management planning and project success.	Descriptive Analysis - The alternate hypothesis H_1 could not be rejected. Descriptive analysis was used to express the perceptions of the project team members. 71% said YES that the PMP contributed to the success of the courthouse preservation project, while 29% perceived that No the PMP did not contribute to the success of the courthouse preservation project.
$H_{2:}$ There is a difference between the project team members perception of the success criteria variables.	ANOVA; The alternate hypothesis H2 was unable to be rejected. Therefore, the perception of the project team members showed variance in the success criteria variables as described in the following hypothesis tests shown below.
H2 A: Architect's Budget Mean ≠ Contractors' Budget Mean ≠ THC reviewers' Budget Mean	ANOVA; The alternate hypothesis H2A was unable to be rejected. Therefore, the perception of the project team members showed variance in the success criteria variable; Budget (p-value of 0.081637)
$H_{2\,B:}$ Architect's Time Mean ≠ Contractors' Time Mean ≠ THC reviewers' Time Mean	ANOVA; The alternate hypothesis H_{2B} was unable to be rejected. Therefore, the perception of the project team members showed variance in the success criteria variable; Time (p-value of 0.011634)
$H_{2\,C:}$ Architect's Performance Mean ≠ Contractors' Performance Mean ≠ THC reviewers' Performance Mean	ANOVA; The alternate hypothesis H_{2B} was unable to be rejected. Therefore, the perception of the project team members showed variance in the success criteria variable; Performance (p-value of 0.06447)
$H_{2\,D:}$ Architect's Satisfaction Mean ≠ Contractors' Satisfaction Mean ≠ THC reviewers' Satisfaction Mean	ANOVA; The alternate hypothesis H_{2B} was unable to be rejected. Therefore, the perception of the project team members showed variance in the success criteria variable; Satisfaction (p-value of 0.00011)
$H_{3:}$ There is a relationship between project success and the success criteria variables (Budget, Time, Performance, and Satisfaction).	Multiple Regression Analysis; The alternate hypothesis H_3 is rejected. The success criteria variables that were tested used an alpha level of $\alpha = .05$ to test the significance of the success criteria variables. THC – *Prob* > *F* = 0.7831 Architects – *Prob* > *F* = 0.7366 Contractors – *Prob.* > *F* = 0.8426
$H_{4:}$ There is a relationship between project success and the success factor variables (Budget, Time, Performance, and Satisfaction).	Multiple Regression Analysis - The alternate hypothesis H_4 was rejected for the following independent success criteria variables. They included questions as listed below. The success factor variables used an alpha level of $\alpha = .05$ to test the H_4 hypothesis. THC: Budget (Q13) - *Prob* > *F* = 0.0877 Time (Q19) - *Prob* > *F* = 0.0005 Performance (Q11) - *Prob* > *F* = 0.0000 Satisfaction (Q15, Q18, Q19) - *Prob* > *F* = 0.0067 Architects: Budget (Q12, Q13) - *Prob* > *F* = 0.0104 Time (Q14, Q16, Q19) - *Prob* > *F* = 0.0009 Performance (Q10, Q11, Q17, Q19) - *Prob* > *F* = 0.0000 Satisfaction (Q15, Q18, Q19) - *Prob* > *F* = 0.0113 Contractors: Budget (Q12, Q13) - *Prob* > *F* = 0.0000 Time (Q14, Q16, Q19) - *Prob* > *F* = 0.0000 Satisfaction (Q15, Q18) - *Prob* > *F* = 0.0860

Table 25. PMP practices

Practice	Questions
Budget	Q12 value engineering and Q13 funding
Time	Q14 scheduling, Q16 decision tracking, and Q19 lessons learned time.
Performance	Q10site analysis, Q11 site layout and staging, Q17 quality assurance, and Q19 lessons learned performance.
Satisfaction	Q15 communication and feedback, Q18 mock-ups and samples, and Q19 lessons learned satisfaction.

The inferential statistical analysis began with an ANOVA test for three of the project team members (THC reviewers, architects, and contractors). The results of the test conveyed the differences in the perceptions of the project team members' views of project success. In addition, the inferential statistical tests revealed the Project Management Planning (PMP) practices that correlated most significantly to project success for the projects completed in the Texas Historic Courthouse Preservation Program (THCPP).

The success factors were derived from the literature review, and were tested inferentially using project success as the dependent variable. The findings show that some of the success factors did have a significant impact on project success, while the inferential statistical test conducted on success criteria variables was able to reject the alternative hypothesis and establish no significant impact on project success.

Results from the budget success factor inferential tests show that value engineering and funding have a significant impact on project success. Value engineering opportunities were perceived by the project team as sufficient throughout the courthouse preservation project. Observations taken from the descriptive analysis indicate that a

majority of the project team members agreed, but the breakdown of the findings shows that THC reviewers and architects agreed most. This was followed by the contractors expressing more disagreement and finally the owners who had the most disagreement.

In addition, funding throughout the project to schedule the tasks required to complete the project within budget indicated a significant association with project success. The descriptive analysis expressed differences of perception within the project team members. The owners and THC reviewers were the most convinced regarding the funding of the courthouse preservation project because the money was approved after architects had developed estimated project costs and after contractors who were awarded the project had to bid on the project costs. As stated previously, the architects had intimate knowledge in the required tasks to reach completion. This was a primary driver in the agreement that funding was available. Results show that even as the contractor developed the winning bid, there was more disagreement in the availability of funding. This resulted from the actual work being completed and the uniqueness of the project. Unforeseen activities were a major constraint in the progress of the construction.

Results from the time success factors show that scheduling, decision tracking, and lessons learned-time all have a significant impact on project success. Both architects and contractors perceive that the schedule development for the courthouse preservation project clearly defined the construction tasks. In addition, the THC reviewers and owners had the highest disagreement results. This could be explained by understanding the roles of the project team members. The architects and contractors work through the

process of construction to completion, while the owners and THC reviewers are in the role of monitoring the construction progress.

The perception of decision tracking was divided between the project team members. Owners and architects strongly agreed that requests for information and change order directives were quickly resolved to limit the impact on the courthouse preservation project. The THC reviewers and contractors had a much more negative view on the decision tracking process. These results could be attributed to how the requests for information and change order directives were processed. The project team members who had negative perceptions of the decision tracking process were directly affected by the time it took to work through the process of documenting and approval.

The perception of lessons learned for time expressed an inverse relationship. Results taken from the inferential statistical test indicate a strong correlation between lessons learned-time and project success. The inverse relationship is evident when the perception of the project team is considered. The perception of the lessons learned-success criteria asks the question, "Where would the project team members focus their resources to ensure a successful project?" The results place time as the least important success criteria. This result could be explained from the frustrations of monitoring time that was encountered during the construction phase of the project.

Results from the performance factors show that site analysis, site layout, and staging, quality assurance plan, and lessons learned-performance have significant correlations with project success. Site analysis shows both inferential statistical significance and a high percentage of perceived agreement concerning project success.

Owners were the only project team member to have some disagreement on the development of a comprehensive analysis of the site prior to the construction phase. The findings may be a result of ownership and sensitivity to the historic site.

Observations taken from the descriptive analysis graph for question 11 express mutual agreement that a staging or site layout plan was developed and implemented during the courthouse preservation project. The materials in some cases were unique to the historic courthouses, so extra care had to be taken to ensure minimal risk of damage. The THC reviewers and the contractors were the project team members with the largest disagreement within their respective groups. This could be explained by the roles they both serve. The contractors are responsible for the development and monitoring of the site layout and staging plan. The importance of this plan directly affects the performance of the project. The results show that 43% of the contractor respondents disagreed that such a plan was implemented during the construction phase. In addition, the THC reviewers had 33% disagreement that the site layout and staging plan was developed or implemented during the construction phase. These findings express the differences between actual inferential testing and perceptions between the project team members.

Results for quality assurance planning indicate that there was a strong correlation with project success. The project team perceived that quality assurance planning was done as part of the pre-construction activities to ensure a quality deliverable that met the specification of the project. The THC reviewers were the only group to have a large percentage of disagreement. The findings are a result of the role the THC review serves. The quality assurance plan is developed and implemented by the invested project team

members, which include the architects and contractors. The THC reviewers had the largest percentage of disagreement within their group. This could be attributed to the THC reviewer's responsibility of using the quality assurance plan and conducting the progress inspections during the construction phase. The results indicate that even if the quality assurance plan was developed during the pre-construction phase, the THC reviewers had a negative response to the survey question.

Results taken from the inferential statistical test depict a strong correlation of lessons learned-performance and project success. The homogeneous relationship is evident when the result from the statistical analysis is compared to the perception of the project team. Performance is strongly perceived as significantly affecting project success. This finding is a result of the project team's goal of delivering a successful project and satisfying the specifications that approved at the pre-planning phase. These courthouse preservation projects are a significant value to the county, therefore the majority of the focus by the project team members was spent on performance delivery.

Results from the inferential statistics test for satisfaction factors show that communication and feedback, mock-ups/samples, and lessons learned-satisfaction have a significant correlation with project success. The descriptive analysis depicted from the findings that communication and feedback were seen by owners, THC reviewers, and architects as being consistently available during the courthouse preservation project. The exception was evident in the responses submitted from the contractors. The observations show a larger percentage of disagreement among the contractors. This resulted from the role the contractor served during the construction phase. The focus is directed to the

contractor to ensure a successful project where the project team is satisfied with the final project delivery.

The findings for mock-ups/samples reveal the predominant agreement between the project team members' perceptions that they were effective contributors in conveying the design and construction intent. Owners were the only project team group that had a large percentage of disagreement. This could be attributed to the lack of construction understanding and observational analysis that was done at a visual level. The design professionals overwhelmingly perceived the mock-ups/samples as very effective.

Results taken from the inferential statistical test indicate a strong correlation of lessons learned-satisfaction and project success. There was unanimous agreement among the project team members. For example, the results show a similar view of project satisfaction. The results show a homogeneous perception between project team members when they were asked, "Was satisfaction the most significant criteria that led to an overall successful courthouse preservation project?" and "Where would the project team members focus its resources to ensure a successful project?"

Limitations of the Study

The main purpose of this study is to ascertain the relationship between project management planning ((PMP) and project success for preservation projects of historical significance that are located in an urban context. The study was also intended to focus on the perceptions of success criteria variables and the success factor variables taken from

the project team members (Owners, THC reviewers, Architects, and Contractors) that were directly involved in the Texas Historic Courthouse Preservation Program.

This study was limited in three ways. First, only completed renovation projects of historic courthouses in Texas were included in the study. Second, the sample included some project team members who worked on more than one project. Third, this study was intended to explain only the success criteria variables (budget, time, performance, and satisfaction) and those project management success factors that are significant indicators of project success. Because there are so many project management planning practices and non-controllable outside influences that may affect project success, it is beyond the scope of this study to try to address all the possible issues in one study. Project management practices not addressed in this study, and those confounding factors that might affect project success, including such items as safety, experience, leadership, and contractual delivery method, may be a basis for future research opportunities.

Benefits of the Study and Recommendations for Further Research

The findings of this study have established the framework for future research into Project Management Planning (PMP) practices for project team members (Owners, Other State Agencies, Architects, and Contractors) in the construction industry. The findings from this research may apply to other project types in the construction industry. For example, project management planning of new and existing construction projects may benefit from the results, but it cannot be stated with any degree of certainty whether or not that is the case. Currently, project team members rely on past project experience

to achieve project success. The findings of this research, in addition to future research, may provide data allowing project team members to focus their project management planning practices across a broad spectrum of project types and deliver future successful projects.

This study also establishes a benchmark of PMP practices that was derived through a current literature review, developed through personal interviews, and tested with a survey instrument that was given to the project team members. The findings depicted the correlations between specific success factor project management practices and project success. This data is available to project team members as a form of comparison between their current project management practices and those of successful project team members. Furthermore, the value of this research provides project team members an opportunity to improve their planning practices and to become more effective and competitive when working on a historical preservation project.

Several future directions for this research are suggested by the results of this study. Primarily this research should continue to test other types of construction projects, including new construction projects, existing renovation projects, and other historical preservation projects. In addition, future research should focus on expanding the location of the construction projects to include national and international sites. Another area of future research would be to introduce the survey instrument during the final stages of the construction phase; this would ensure that the project team members are still bound and engaged in the delivery of the project. Problems of locating the project team members

arose during this study because of the ad hoc approach to survey instrument implementation.

Ultimately, including different types of construction projects, expanding the locations of the work being done, and revising the methodology that was used during this study to express the altered time of data collection would certainly advance generalization of PMP practices and project success between different segments of the project team members. Future outcomes could show that there are PMP practices that predict project success between the different types of construction.

Future research could also expand to areas of decision-making and leadership qualities of the project team members. For example, it is possible to depict factors that significantly affect project success. By identifying methods of measuring these factors, it could be possible to draw correlations between decision making/leadership and project success. By continuously building on the studies theory, there could be opportunities to affect a variety of research areas. In addition, future research is needed on facility management practices that include areas of condition assessment, maintenance of historic buildings after renovation, and development of training programs for facility managers that work with historic buildings. These are but a few potential high impact areas that will require further research.

Final Thoughts

It should be noted that this study has been an investigation into a complex problem that faces every construction project. It appears from the research that there is no unanimous

agreement in previously published studies or in the perceptions of the project team members on what PMP practices predict project success. To state with any degree of certainty that one, or even a combination of PMP practices, is solely responsible for project success does not seem possible, given the results of this study. However, the research study that was developed was able to test, analyze, and report on the PMP practices of project team members that worked on the Texas Historic Courthouse Preservation Project, and thus has added a better understanding of the perceptions of project success.

This study also developed three unique contributions to the design and construction industry. First, the study combined three bodies of literature; project management, historic preservation, and facility management. Second, a theoretical framework of SCIs was developed by using the three bodies of literature. Third, the PMP practices were applied to the THCPP projects.

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APPENDIX A

Rededicated Courthouse List

	Courthouse County	Rededicated
1	Archer	May 12, 2005
2	Atascosa	June 14, 2003
3	Bee	May 20, 2006
4	Bexar Phase I	April 4, 2003
5	Bosque	September 22, 2007
6	Cameron	October 17, 2006
7	Cooke	October 14, 2006
8	Denton	November 6, 2004
9	DeWitt	October 27, 2007
10	Dimmit	November 18, 2004
11	Donley	July 4, 2003
12	Ellis	October 4, 2003
13	Erath	August 20, 2002
14	Fayette	June 25, 2005
15	Goliad	December 4, 2003
16	Gray	April 12, 2003
17	Grimes	March 2, 2002
18	Harrison Phase II	June 20, 2009
19	Hopkins Phase I and II	December 7, 2002
20	Hudspeth	July 3, 2004
21	Jeff Davis	November 8, 2003
22	Johnson	December 1, 2007

	Courthouse County	Rededicated
23	La Vaca	July 2, 2005
24	Lamar	September 3, 2005
25	Lampasas	March 2, 2004
26	Lee	October 8, 2004
27	Llano - Phase I	July 15, 2002
28	Menard	November 11, 2006
29	Milam	July 4, 2002
30	Parker	June 4, 2005
31	Presidio	January 5, 2002
32	Red River	October 26, 2002
33	Shackelford	June 30, 2001
34	Sutton Phase II	June 11, 2002
35	Val Verde	July 23, 2004
36	Wharton	August 4, 2007
37	Wheeler	October 16, 2004

APPENDIX B

Courthouse Data File

ID		Courthouse County	Courthouse City	Courthouse Address	Courthouse Zip	THC Project Reviewer
6	1	Archer	Archer City	100 South Center	76351	Susan Gammage
7	2	Atascosa	Jourdanton	Circle Drive	78026	Sharon Fleming
8	3	Bee	Beeville	105 West Corpus Christi Street	78102	Sharon Fleming
53	4	Bexar Phase I	San Antonio	100 Dolorosa	78205	Sharon Fleming
44	5	Bosque	Meridian	201 S Main	76665	Bess Althaus Graham
42	6	Cameron	Brownsville	1100 East Monroe Street	78520	Sharon Fleming
50	7	Cooke	Gainesville	100 South Dixon	76240	Susan Gammage
	8	Dallas	Dallas	509 Main Street	75202	Susan Gammage
11	9	Denton	Denton	110 West Hickory	76201	Susan Gammage
45	10	DeWitt	Cuero	115 North Gonzales Street	77954	Mark Cowan
12	11	Dimmit	Carrizo Springs	103 North Street	78834	Sharon Fleming
39	12	Donley	Clarendon	300 South Sully	79226	Lyman Labry
46	13	Ellis	Waxahachie	101 West Main	75165	Susan Gammage
13	14	Erath	Stephenville	100 West Washington	76401	Bess Althaus Graham
14	15	Fayette	La Grange	151 North Washington	78945	Mark Cowan
15	16	Goliad	Goliad	127 North Courthouse Square	77963	Mark Cowan
51	17	Gray	Pampa	205 North Russell	79065	Lyman Labry
29	18	Grimes	Anderson	100 Main Street	77830	Bess Althaus Graham
52	19	Harrison Phase II	Marshall	200 West Houston Street	75670	Susan Gammage
47	20	Hopkins Phase I and II	Sulphur Springs	118 Church Street	75482	Susan Gammage
16	21	Hudspeth	Sierra Blanca	139 Millican Street P.O. Box 68	79851	Lyman Labry
17	22	Jeff Davis	Fort Davis	P.O. Box 398	79734	Lyman Labry
48	23	Johnson	Cleburne	1 Main Street	76033	Susan Gammage
20	24	La Vaca	Hallettsville	119 North Main	77964	Mark Cowan
49	25	Lamar	Paris	119 North Main	75460	Susan Gammage
18	26	Lampasas	Lampasas	431 South Live Oak	76550	Bess Althaus Graham
19	27	Lee	Giddings	200 South Main Street	78942	Mark Cowan
21	28	Llano - Phase I	Llano	801 Ford Street	78643	Mark Cowan
22	29	Menard	Menard	210 East San Saba Street	76859	Lyman Labry
38	30	Milam	Cameron	107 West Main Street	79843	Bess Althaus Graham
23	31	Parker	Weatherford	One Courthouse Square	76086	Susan Gammage
34	32	Presidio	Marfa	103 West Lincoln Street	79843	Lyman Labry
24	33	Red River	Clarksville	200 North Walnut Street	75426	Susan Gammage
32	34	Shackelford	Albany	225 South Main Street	76430	Lyman Labry
26	35	Sutton Phase II	Sonora	101 NorthEast Water Street	76950	Mark Cowan
31	36	Val Verde	Del Rio	400 Pecan Street	78840	Sharon Fleming
27	37	Wharton	Wharton	309 East Milam	77488	Mark Cowan
40	38	Wheeler	Wheeler	100 N. Main Street	79096	Lyman Labry

Client Representative	Client Job Title	Client Address	Client City	Client Zip
Paul O. Wylie Jr.	County Judge	P.O. Box 458	Archer City	76351
Joe Garza	Project Manager	Circle Drive No. 41	Jourdanton	78026
Jimmy Martinez	Judge	105 W. Corpus Christi St. Rm 105	Beeville	78102
Nelson Wolff	Judge	100 Dolorosa	San Antonio	78205
Cole Word	Judge	P.O. Box 617	Meridian	76665
Eddie Salazar	Construction Manager	1100 East Monroe	Brownsville	78520
Bill Freeman	Judge	100 South Dixon	Gainesville	76240
Jim Foster	Judge	411 Elm Street, Suite 200	Dallas	75202
Scott Armey	Judge	110 W. Hickory, 2nd Floor	Denton	76201
Peggy Ledbetter	Project Coordinator	307 North Gonzales Street	Cuero	77954
Francisco G. Ponce	Judge	103 North 5th Street	Carrizo Springs	78834
Jack Hall	Judge	300 South Sully	Clarendon	79226
Al Cornelius	Judge	101 West Main	Waxahachie	75165
Tab Thompson	Judge	100 W. Washington	Stephenville	76401
Edward F. Janecka	Judge	151 N. Washington	La Grange	78945
Harold F. Gleinser	Judge	127 North Courthouse Square	Goliad	77963
Richard Peet	Judge	205 North Russell	Pampa	79065
Ira E. (Bud) Haynie	Judge	P.O. Box 160	Anderson	77830
Wayne McWhorter	Judge	200 West Houston	Marshall	75670
Cletis Millsap	Judge	118 Church Street	Sulphur Springs	75482
Becky Dean Walker	Judge	P.O. Box 68	Sierra Blanca	79851
George Grubb	Judge	P.O. Box 836	Fort Davis	79734
Rober Harmon	Judge	1 Main Street, Johnson County Annex, Rm. 304	Cleburne	76033
Ronald L. Leck	Judge	P.O. Box 243	Hallettsville	77964
M.C. Superville, Jr.	Judge	119 North Main	Paris	75460
Virgil Lilley	Judge	P.O. Box 231	Lampasas	76550
Robert B. Lee	Commissioners Court	200 South Main Street	Giddings	78942
J.P. Dodgen	Judge	801 Ford Street	Llano	78643
Richard Cordes	Judge	206 East San Saba Avenue	Menard	76859
Frank Summers	Judge	P.O. Box 1008	Cameron	79843
Mark Riley	Judge	One Courthouse Square	Weatherford	76086
Jerry Agan	Judge	P.O. Box 606	Marfa	79843
L.D. Williamson	Judge	200 North Walnut Street	Clarksville	75426
Ross Montgomery	Judge	225 South Main	Albany	76430
Carla Garner	Judge	P.O. Box 1212	Sonora	76950
Mike L. Fernandez	Judge	400 Pecan Street	Del Rio	78840
John Murrile	Judge	309 East Milam, Suite 600	Wharton	77488
Jerry Dan Hefley	Judge	100 North Main Street	Wheeler	79096

Architect Company	Architect Address	Architect City	Architect Zip	Architect Project Manager
Harper Perkins Architect, Inc	4724 Old Jacksboro Highway	Wichita Falls	76302-3599	Ralph Perkins
Fisher - Heck Architects	915 South St. Mary's St.	San Antonio	78205	Lewis Fisher
Bailey Architect	4100 S. Sheperd	Houston	77098	James Knight
3d/International	219 East Houston Street Suite 350	San Antonio	78205	Betty Bueche
Architexas	3601 South Congress	Austin	78704	James Spanelli
Roberto J. Ruiz, Inc.	615 West Tandy Road	Brownsville	78520	Roberto J. Ruiz
Komatsu Architecture Inc.	550 Bailey Avenue, Suite 102	Fort Worth	76107	Gordon Marchant
James Pratt Arch. Urban Design, Inc.	P.O. Box 190647	Dallas	75219	James R. Pratt
Architexas	3601 S. Congress, Suite D101	Austin	78704	Larry Irsik
Twc Architects	3636 Executive Center Drive, Suite 254	Austin	78731	Glenn H. Reed
Frank Architects Inc.	901 Victoria Street, Suite A	Laredo	78040	Frank Rotnofsky
Volz & Associates, Inc.	1105 West 42nd Street	Austin	78756	Chris Hutson
Architexas	1907 Marilla	Dallas	75201	Craig Melde
Norman Alston Architects	6220 Gaston Ave., Suite 304	Dallas	75214	Norman Alston
Volz & Associates, Inc.	1105 West 42nd Street	Austin	78756	Tere O' Connell
The Williams Company	P.O. Box 27294	Austin	78755	Jason Jennings
Architexas	3601 South Congress, Suite D101	Austin	78704	Larry Irsik
Volz & Associates, Inc.	1105 West 42nd Street	Austin	78756	Joan Cabaniss
Architexas	1907 Marilla	Dallas	75201	Elizabeth Cummings
Architexas	1907 Marilla	Dallas	75201	David Chase
Boyd And Associates, Inc	508 Regency Drive	El Paso	79912	William D. Boyd, AIA
The Williams Company	P.O. Box 27294	Austin	78755	Glenn H. Reed
Architexas	1907 Marilla Street 2nd Floor	Dallas	75201	Jay Firshing / Craig Melde
The Williams Company	P.O. Box 27294	Austin	78755	Jason Jennings
Architexas	1907 Marilla, 2nd Floor	Dallas	75201	Craig Melde
Komatsu Architecture, Inc.	550 Bailey Avenue Suite 102	Fort Worth	76107	Gordon Marchant
Rabe + Partners	200 East 32nd Street	Austin	78705	Dale Rabee
Volz & Associates, Inc.	1105 West 42nd Street	Austin	78756	Tere O'Connell
Wagner & Klein, Inc.	208 South Llano Street	Fredericksburg	78624	Stan Klein
The Williams Company	P.O. Box 27294	Austin	78755	Glenn H. Reed
Cauble Hoskins & Loose Architects	555 South Summmit Ave	Fort Worth	76014	Larry Hoskins
The Williams Company	P.O. Box 27294	Austin	78755	Jason Jennings
Architexas, Inc.	3601 South Congress, Suite D101	Austin	78704	Larry Irsik
The Williams Company	P.O. Box 27294	Austin	78755	Kim A. Williams
Volz & Associates, Inc.	1105 West 42nd Street	Austin	78756	John Volz
Volz & Associates, Inc.	1105 West 42nd Street	Austin	78756	Chris Hutson
Bailey Architects	4100 South Shepherd	Houston	77054	Jaime Knight
Wharrey Engineering	P.O. Box 550263	Dallas	75355	Forrest D. Whitescarver

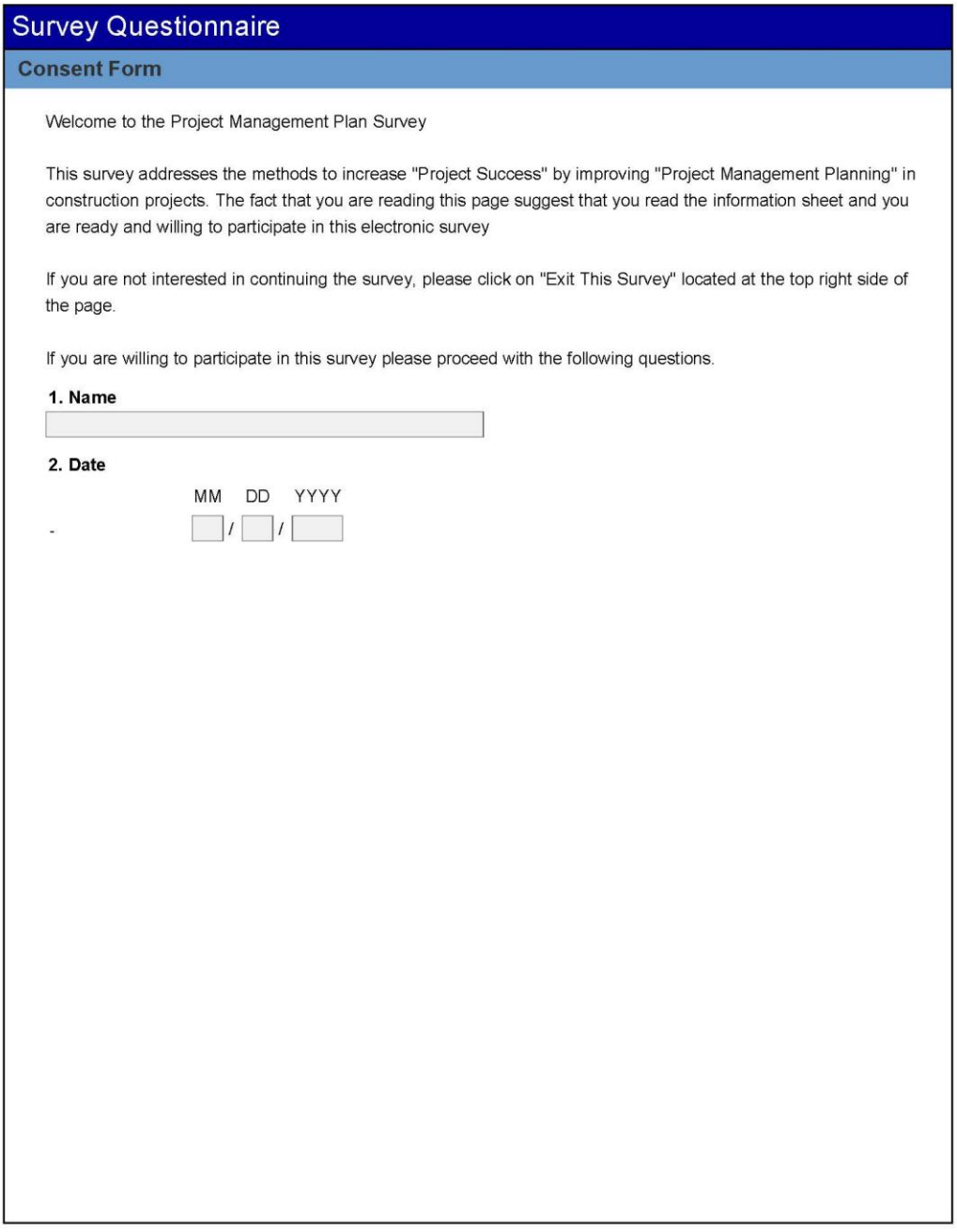
Contractor Company	Contractor Address	Contractor City	Contractor Zip	Contractor Project Manager	Contractor Superintendant	Original Contract Sum
Joe R. Jones Construction, Inc	P.O. Box 873 1756 Ranger Rd.	Weatherford	76088	Lee Evans	Donny Griffin	$2,873,427.00
Browning Construction Co.	903 Basse Road	San Antonio	78212	Alton S. "Bubba" Moeller Jr.		$2,650,138.00
J.C. Stoddard Construction Company	30665 N. U.S. Highway 281	Bulverde	78163	Keith Stoddard	Gary Morris	$5,683,000.00
3D/International	219 East Houston Street Suite 350	San Antonio	78205	Pat Vance		$3,655,361.00
Harrison, Walker & Harpe, LP	222 East Hickory Street	Paris	75460	Tommy Fulford		$4,142,809.00
Joe R. Jones Construction, Inc.	P.O. Box 873	Weatherford	76086	Stephen Dodge		$7,688,734.00

Contractor Company	Contractor Address	Contractor City	Contractor Zip	Contractor Project Manager	Contractor Superintendant	Original Contract Sum
Pheonix 1 Restoration and Construction, Ltd	9411 Hargrove Drive	Dallas	75220	Dale Sellers	Charlie Wilson	$1,671,000.00
Thos. S. Byrne, Ltd.	P.O. Box 190647	Fort Worth	76102	Barry Miller		$12,692,741.00
Joe R. Jones Construction, Inc.	P.O. Box 873	Weatherford	76806	Lee Evans		$2,579,213.00
J.T. Michel, Ltd.	P.O. Box 17662	San Antonio	78217	Jerry Kissling	Jim Michel	$6,455,182.00
J.C. Stoddard Construction Company	P.O. Box 33128	San Antonio	78265	Curtis Stoddard		$2,643,000.00
Phoenix I Resotriation and Construction, Ltd.	9411 Hargrove Drive	Dallas	75220	Stephen Dodge		$2,780,180.00
Thos. S. Byrne, Inc	114 South Rogers, 2nd Floor	Waxahachie	75168	T.O. Shearer		$7,242,799.00
Joe R. Jones Construction, Inc.	P.O. Box 873	Weatherford	76086	Lee Evans	Keith Daniels	$1,875,658.00
C.P. Snider Construction Company, Inc.	P.O. Box 846	San Marcos	78667	Greg Ward	Bobby Dodd	$5,125,000.00
J.T. Michel, Ltd.	2115 Anchor Drive, Suite 1	San Antonio	78213	Jim Michel	Jerry Kissling	$3,150,000.00
Phoenix 1 Restoration & Construction, Ltd.	9411 Hargrove Drive	Dallas	75220	Frazer Gorell		$4,268,415.00
Big M Contractors, Inc.	10200 Windfern Road	Houston	77064	Bruno Maciejeski		$1,467,525.00
Slone Construction Company	P.O. Box 1344	Marshall	75671	Jim Huckeba		$1,138,235.00
Harrison Walker & Harper	222 East Hickory Street	Paris	75460-2698	Mike Burkett		$4,397,151.00
ESA Construction Co. of Texas, Inc.	120 Paragon Lane, Suite 103	El Paso	79912	Al Miller	Arturo La Fuente	$1,882,901.00
F.T. James Construction, Inc.	700 West Paisano	El Paso	79901	Rick Miller	Michael Moore	$2,233,111.00
Harrison, Walker, and Harperl, LP	222 East Hickory Street	Paris	75460	Brad Archer	Tommy Fulford	$6,821,137.00
Joe R. Jones Construction, Inc.	1756 Ranger Highway	Weatherford	76088	Lee Evans	Donny Griffin	$899,000.00
Harrison, Walker, Harper L.P.	222 East Hickory	Paris	75460	Charlie Wilson	Ricky Taylor	$7,273,523.00
Pheonix I Restoration & Construction, Ltd.	9411 Hargrove	Dallas	75220	Dave Young		$3,025,600.00
Pheonix I Restoration & Construction, Ltd.	9411 Hargrove Drive	Dallas	75220	Dale Sellers	Mike Owens	$3,608,645.00
Phoenix I Restoration	9411 Hargrove Drive	Dallas	75220	Dale C. Sellers	Keith Nichols	$3,311,036.00
J.C. Stoddard Construction Company	12445 Old O'Connor Rd.	San Antonio	78265	Jeron and Curtis Stoddard	Dwight Rapp	$2,439,924.00
Baird, Williams Construction, Inc.	900 West Irvin	Temple	76503	Dallas Everett	Bo Owens	$3,657,331.00
Pheonix I Restoration & Construction, Ltd.	9411 Hargrove Drive	Dallas	75220	Dale Sellers	Kenauth Hawkins	$3,296,000.00
Phoenix I Restoration & Construction, Ltd.	6822 Maple Avenue	Dallas	75235	Alan Odem	Kenath Kawkins	$2,276,188.00
Harrison, Walker & Harper	222 East Hickory Street	Paris	75460	Steve Dunn		$1,419,358.00
Phoenix I Restoration & Construction, Ltd.	6822 Maple Avenue	Dallas	75235	Dale Sellers		$1,770,420.00
J.T. Michael Ltd.	2115 Anchor Drive, Suite 1	San Antonio	78213	Jim Michel	Keith King	$2,012,436.00
Phoenix I Restoration and Construction, Ltd.	9411 Hargrove Drive	Dallas	75220	Dale Sellers	Bill Wilson	$1,342,200.00
Stoddard Construction Management, Inc.	30665 North US Highway 281	Bulverde	78163	Roy Krametbauer	Gary Morris	$2,783,000.00
Phoenix I Restoration and Construction Ltd.	9411 Hargrove Drive	Dallas	75220	Stephen Dodge	Daniel Ledbetter	$4,100,000.00

Total Contract Sum	Cost Growth	Estimated Construction Start	Estimated Construction Complete	Substantial Completion	Estimated Days	Actual Days	Additional Days Granted	Time Growth
$2,799,632.71	($0.03)	01-Jan-02	30-Jun-04	13-Jan-05	911	1,108	197	198
$2,691,382.00	$0.02	07-Aug-00	08-Feb-02	13-Jun-03	550	1,040	490	491
$6,163,213.97	$0.08	13-Jul-04	15-Sep-06	10-Jul-06	794	727	-67	-66
$4,132,731.00	$0.13	01-May-01	01-Feb-02		276	-37,012	-37,288	-37,288
$4,344,204.69	$0.05	01-Sep-04	01-Mar-06	31-May-07	546	1,002	456	457
$8,586,471.86	$0.12	05-Jul-02	01-Jan-04	12-Sep-06	545	1,530	985	985
$1,761,245.93	$0.05	14-Feb-05	12-Dec-05	03-May-07	301	808	507	507
	($1.00)	15-Sep-04	18-Jul-06		671	-38,245	-38,916	-38,916
$3,202,574.67	$0.24	15-Aug-02	16-Aug-03	03-May-04	366	627	261	262
$6,557,256.60	$0.02	01-Feb-05	01-Apr-06	01-Jul-08	424	1,246	822	822
$2,592,204.78	($0.02)	08-Jul-02	31-Jul-03	12-Dec-04	388	888	500	500
$3,472,959.53	$0.25	15-Aug-01	16-Aug-02	28-Jul-03	366	712	346	347
$6,926,263.90	($0.04)	29-Dec-00	22-Feb-02	05-Sep-02	420	615	195	196
$1,980,741.36	$0.06	02-Jan-01	30-Sep-01	8/20/2002	271	595	324	324
$4,957,001.00	($0.03)	01-Mar-03	01-Mar-04	28-Dec-05	366	1,033	667	667
$3,360,061.00	$0.07	28-May-02	01-Jun-03	14-Jan-04	369	596	227	228
$4,319,999.13	$0.01	01-May-02	30-Dec-02	07-Apr-03	243	341	98	99
$1,632,993.41	$0.11	31-Jan-01	31-Jan-02	03-Jul-02	365	518	153	154
$1,655,199.27	$0.45	10/1/2002	10/1/2003	5/29/2009	365	2,432	2,067	2,067
$4,440,760.20	$0.01	01-Oct-01	8/1/2002	15-Aug-03	304	683	379	379
$2,014,805.00	$0.07	10-Jun-02	06-Mar-03	01-Apr-04	269	661	392	392
$2,500,581.00	$0.12	15-May-02	5/1/2003	31-Oct-03	351	534	183	184
$7,125,504.75	$0.04	01-Aug-05	01-Mar-07	09-Jun-08	577	1,043	466	467
$1,090,777.80	$0.21	5/13/2002	11/15/2002	17-Feb-03	186	280	94	95
$7,745,410.00	$0.06	01-Jul-02	01-Dec-05	26-Apr-06	1,249	1,395	146	147
$3,934,400.29	$0.30	06-Aug-02	19-Aug-03	05-Dec-03	378	486	108	109
$3,960,252.32	$0.10	1/1/2001	7/31/2002	21-May-04	576	1,236	660	660
$3,150,185.16	($0.05)	01-Apr-01	04-Jun-02	06-Aug-02	429	492	63	64
$2,428,247.00	($0.00)	10/1/2004	6/1/2006	16-Jan-07	608	837	229	230
$3,886,048.92	$0.06	11-Apr-01	30-May-03	30-Jul-02	779	475	-304	-302
$4,374,271.52	$0.33	21-May-02	08-Mar-03	03-Mar-04	291	652	361	361
$2,356,157.00	$0.04	01-Sep-01	01-Jul-02	20-Mar-02	303	200	-103	-101
$3,956,208.22	$1.79	12/1/2000	8/1/2002	5/1/2004	608	1,247	639	639
$1,819,266.09	$0.03	02-Oct-00	15-May-01	19-Jun-01	225	260	35	36
$2,062,058.14	$0.02	18-Aug-04	23-Jun-05	19-May-06	309	639	330	330
$1,632,448.00	$0.22	01-Jul-02	01-Apr-03	28-Jul-04	274	758	484	484
$3,227,795.64	$0.16	01-Nov-04	01-Dec-05	30-Aug-07	395	1,032	637	637
$4,010,559.99	($0.02)	09-Sep-02	07-Aug-05	10/18/2004	1,063	770	-293	-292

APPENDIX C

Survey



Survey Questionnaire

Consent Form

Welcome to the Project Management Plan Survey

This survey addresses the methods to increase "Project Success" by improving "Project Management Planning" in construction projects. The fact that you are reading this page suggest that you read the information sheet and you are ready and willing to participate in this electronic survey

If you are not interested in continuing the survey, please click on "Exit This Survey" located at the top right side of the page.

If you are willing to participate in this survey please proceed with the following questions.

1. Name

2. Date

MM DD YYYY

- / /

Page 1

Survey Questionnaire

Success Criteria

3. Was there a Project Management Plan in place during the courthouse renovation projects?

Project Management Plan:

This plan contains strategies to be followed during the building project's planning phase. In the broadest sense, pre-planning for on-site construction provides the plans; for the necessary elements; it establishes requirements; and develops the operating rules for all that happens at the work place.

◯ Yes

◯ No

4. Did the Project Management Plan contribute to the success of the courthouse renovation projects?

◯ Yes

◯ No

5. Budget Success

	Strongly Agree	Agree	Disagree	Strongly Disagree
The most significant factor that led to an overall successful courthouse renovation project are the Project Management Planning practices utilized to establish the project "Budget".	◯	◯	◯	◯

6. Time Success

	Strongly Agree	Agree	Disagree	Strongly Disagree
The most significant factor that led to an overall successful courthouse renovation project are the Project Management Planning practices utilized to establish the project "Time".	◯	◯	◯	◯

7. Performance Success

	Strongly Agree	Agree	Disagree	Strongly Disagree
The most significant factor that led to an overall successful courthouse renovation project are the Project Management Planning practices utilized to establish the project "Performance".	◯	◯	◯	◯

8. Satisfaction Success

	Strongly Agree	Agree	Disagree	Strongly Disagree
The most significant factor that led to an overall successful courthouse renovation project are the Project Management Planning practices utilized to establish the project "Satisfaction".	◯	◯	◯	◯

Survey Questionnaire

Bidding / Pre-Construction / Construction

9. Building Significance

	Strongly Agree	Agree	Disagree	Strongly Disagree
Assessment of the building and its significance was done during the pre-planning phase of the courthouse renovation projects?	◯	◯	◯	◯

10. Site Analysis

	Strongly Agree	Agree	Disagree	Strongly Disagree
A comprehensive analysis of the site was done prior to the construction phase.	◯	◯	◯	◯

11. Site Layout and Staging

	Strongly Agree	Agree	Disagree	Strongly Disagree
A Staging or Site Layout plan was developed and implemented during the courthouse renovation.	◯	◯	◯	◯

12. Value Engineering

	Strongly Agree	Agree	Disagree	Strongly Disagree
There was sufficient opportunity for value engineering throughout the courthouse renovation project.	◯	◯	◯	◯

13. Funding

	Strongly Agree	Agree	Disagree	Strongly Disagree
There was adequate funding throughout the project to schedule the tasks required to complete the project within Budget.	◯	◯	◯	◯

14. Scheduling

	Strongly Agree	Agree	Disagree	Strongly Disagree
During the Schedule development for the courthouse renovation project the construction tasks were clearly defined.	◯	◯	◯	◯

15. Communication and Feedback

	Strongly Agree	Agree	Disagree	Strongly Disagree
Communication and Feedback with the project team (Owner,Designer,Texas Historical Commission, and Contractor) was consistently available during the courthouse renovation project.	◯	◯	◯	◯

Survey Questionnaire

16. Decision Tracking

	Strongly Agree	Agree	Disagree	Strongly Disagree
Request for Information and Change Order directives were quickly resolved to limit the impact on the courthouse renovation project.	◯	◯	◯	◯

17. Quality Assurance Plan (Testing, Inspection, TAB, Commissioning)

	Strongly Agree	Agree	Disagree	Strongly Disagree
A comprehensive Quality Assurance Plan was developed during the pre-construction phase of the courthouse renovation project.	◯	◯	◯	◯

18. Mock Ups / Samples

	Strongly Agree	Agree	Disagree	Strongly Disagree
Detail Mock Ups and Samples were effective contributers in conveying the design and construction intent.	◯	◯	◯	◯

19. Applying Lessons Learned in the future, where would your _____ focus its resources to ensure a successful project? - (Please Rank in order of importance; 1 being the most important, 4 being the least important)

	1 Most Important	2	3	4 Least Important
Budget	◯	◯	◯	◯
Time	◯	◯	◯	◯
Performance	◯	◯	◯	◯
Satisfaction	◯	◯	◯	◯

APPENDIX D

Interview Questions of Project Management Activities

Interview - Formal Procedures

1. Project Management Activities

1. Bidding Activities - H1

	Yes	No
Developing an Appropriate Organizational Structure (OBS)-[S]	◯	◯
Obtaining and Review of Plans & Specifications-[B,T,P,S]	◯	◯
Visiting Site and Documenting Questions / Pre-Bid Conference-[B,T,P]	◯	◯
Assessment of the Building and its Significance-[B,T,P,S]	◯	◯
Identification of Long Lead Materials-[B,T,P]	◯	◯
Prepare the Preliminary Estimate-[B]	◯	◯
Present Qualifications / References-[P,S]	◯	◯
Evaluate Contract Time Limitations / Schedule-[T]	◯	◯

2. Pre-Construction Activities - H2

	Yes	No
Sub-Contractor Coordination and Phasing Procedures-[T,S]	◯	◯
Development of Proposed Schedule-[T]	◯	◯
Preparation and Submission of Project Submittals-[B,T]	◯	◯
Management Systems for Improvement of Quality-[P]	◯	◯
Selection/Contracting of Specialized Labor Trades-[B,T,P]	◯	◯
Selection/ Procurement of Specialized Equipment Rental-[B,T,P]	◯	◯
Assigning the Project Team-[S]	◯	◯
Development of Start Up Plan / Commissioning-[B,T]	◯	◯
Development of a Mobilization Plan-[B,T]	◯	◯
Development of a Staging or Layout Plan-[B,T,P]	◯	◯
Value Engineering Processes-[B,T,P]	◯	◯
Development of Work Breakdown Structure (WBS)-[T]	◯	◯

3. Construction Activities - H3

	Yes	No
Project Management processes for Procurement-[B,T,P]	◯	◯
A/E Communication Policy/Plan/Report/Feedback-[P,S]	◯	◯
Owner Communication Policy/Plan/Report/Feedback-[P,S]	◯	◯
Texas Historical Commission Communication Policy/Plan/Report/Feedback-[P,S]	◯	◯
RFI Tracking-[B,T,P]	◯	◯
Change Orders and Change Order Tracking-[B,T,P]	◯	◯
Updating the Budget-[B]	◯	◯
Updating the Schedule-[T]	◯	◯
Quality Assurance Plan (Testing, Inspec, TAB, Commissioning)-[P]	◯	◯
Mock Ups / Samples (A/E / Owner-Quality Assurance)-[B,T,P,S]	◯	◯
Documentation of Delays for Contract Modification-[B,T,P,S]	◯	◯
Project Punch List Strategy-[B,T,P]	◯	◯

Interview - Formal Procedures

4. Project Outcomes - H0

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Project has been Successful in Terms of Time-[T]	◯	◯	◯	◯	◯
Project has been Successful in Terms of Cost-[B]	◯	◯	◯	◯	◯
Project has been Successful in Terms of Performance-[P]	◯	◯	◯	◯	◯
Project has been Successful in Terms of Satisfaction-[S]	◯	◯	◯	◯	◯

5. Applying Lessons Learned, In the future where would your Construction Firm focus their resources to ensure a successful project?-[B,T,P,S]

	1	2	3	4
Budget	◯	◯	◯	◯
Time	◯	◯	◯	◯
Performance	◯	◯	◯	◯
Satisfaction	◯	◯	◯	◯

APPENDIX E

Phone Script

Hello, this is **{NAME}** a Ph.D. candidate calling from **{Texas A&M University, College Station}**. May I please speak to **{PROJECT TEAM MEMEBER}**?

[IF SPEAKING WITH SAMPLE MEMBER, GO TO INTRO1.]
[IF SAMPLE MEMBER IS NOT AVAILABLE, GO TO INTRO2.]

INTRO1. {TEXAS A&M UNIVERISTY - CONSTRUCTION SCIENCE DEPT.} is conducting a study to learn about your experiences with **{TEXAS COURTHOUSE PRESERVATION PROGRAM}.** The results of this study is to identify the current management planning practices used by construction companies that work in the renovation of the Texas Courthouse Preservation Program, and to determine which, if any, of these pre - planning management practices are significant indicators of successful projects.

[GO TO CONSENT STATEMENTS BELOW.]

INTRO2. [SCHEDULE TIME TO CALL BACK:]

Can you tell me a convenient time to call back to speak with (him/her)?

[RECORD CALLBACK TIME ON CALL RECORD]

[CONSENT STATEMENTS:]

If you agree to complete the questionnaire, we will then send you an email with an embedded website address to the survey. At this time I would like to verify your current contact information. I have initially taken the contact information from the completion reports that have been submitted to the Texas Historical Commission.

[NAME OF PROJECT TEAM MEMBER]

[EMAIL ADDRESS]

Let me take this opportunity to tell you a little about the study before we continue. We have selected you and other project team members to represent the key informants that worked on the **{Texas Courthouse Preservation Program}.** Your answers are very important to our study.

Your participation is voluntary. You may decide not to answer partially or fully one or both questions of the survey without your current or future relations with Texas A&M University being affected. The questions should take about **{5 - 10 minutes}** to answer.

I will ask questions specific to the **{ Management Planning Practices}** and how you perceive how these practices led to the success of the Texas Courthouse Preservation Project. Project team members of other courthouse projects will be asked the same questions. In this way, we are able to do a comparative analysis of project management practices used during the project duration**.**

Those are all the questions that I have. I will be sending you an email with the embedded survey link shortly.

Thank you very much for your help with this study. Have a nice **(day).** Goodbye**.**

APPENDIX F

Completion Report Requirements

I. Purpose

a. To document the changes that occurred to the property as a result of this project and why they were made. This information will assist caretakers of the property in the future to understand which elements of the building are original, which have been reconstructed based on historic evidence and which were inserted to serve current functional needs. Thus, in the future when functional requirements change again or in additional historic documentation becomes available, the existing elements may be understood in terms of their historic significance. The reports will also provide a record of the decisions and design revisions made during construction.
b. To provide a record of the substantive investment of state funds made in the property. The condition of the building prior to work, work undertaken and the final result should be clearly documented.

II. When Required

a. All THCPP funded construction activities will require a completion report.
b. Planning projects with no construction activity do not require completion reports. The completed planning documents substitute for the completion reports.

III. Report Format & Duplication Requirements

a. All three copies of the report are to be provided to THC and redistributed by THC.
    i. One copy for THCPP grant archive
    ii. One copy for THC office files
    iii. One copy for county to be housed at courthouse of local library
b. Written data & photographic documentation: three copies, 8 ½”x11” format, 3 ring binder, tab divided by major sections, photographs included in clear sleeves.
c. Record drawings: one unbounded record set of drawings at full size (architectural only) and three bound reduced - size record sets of all drawings (1/2 size or ¼ size if legible)
d. Specifications: one copy, bound 8 ½” x 11” format
e. Photographs: three copies of prints, one copy of negatives or digital electronic files on an archival quality computer disk.

IV. Minimum content requirements (may be adjusted by THC to suit the individual project)

a. Completion report requirements
   i. Title page
   ii. Project name;
   iii. Address;
   iv. City, county;
   v. THCPP grant number, award amounts(s) and date of award(s);
   vi. Date of project final completion.
b. Table of contents
c. Project synopsis/scope of work (1 page narrative)
d. Identification of project personnel: name, address and telephone number
   i. County officials: county judge, commissioners, auditor, treasurer and county historical commission chair
   ii. State agency representatives: THC executive director, Division director and staff architect/project reviewer
   iii. Professional consultants: architect, engineers, and other consultants
   iv. Construction contractors: general contractor and/ or construction manager, all subcontractors
e. Grant program documents
   i. Copy of Funding Agreement with attachments executed between THC and county
   ii. Copy of Property Easement granted to THC by the county
   iii. Copy of Contract between the Owner and Architect
   iv. Copy of Property Insurance
f. Project narrative
   i. Existing conditions: description of the as - found conditions, emphasizing historic features of the property
   ii. Master plan proposal: summary of the initial proposal at the master plan stage, discussing condition of historic fabric slated for removal and documentary evidence of features to be reconstructed.
   iii. Project development: detailed recounting of how the proposal may have changed as the plans were developed
   iv. Work completed: summary of work performed including unique processes or products.
   v. Future work required: discuss work recommended in the master plan but not completed and/or additional improvements determined during course of this project.
g. Project cost data
   i. List of final project funding by donor name, source of donation, kind and amount
   ii. Preliminary cost estimate: copy from master plan

iii. Project cost estimate worksheet: copy from successful grant application
iv. Tally of actual construction cost: organized to parallel to application worksheet
v. Total cost per gross square foot and cost per square foot of major public spaces
vi. Approved contractor's final application for payment with schedule of values
vii. Reimbursement summary documentation (provided by THC)

h. Construction administration documentation
   i. Document index
   ii. Bidding tally sheets
   iii. Progress meeting reports
   iv. Change orders, construction directives
   v. Certificate of substantial completion
   vi. Other applicable documentation

i. Project record documents
   i. Document index
   ii. Title, date and index of drawings
   iii. Title, date and index for specifications
   iv. Final drawings (attached separately)
   v. Final Specifications (attached separately)

V. Photographic documentation requirements

a. Progress photographs (THC to also receive progress photographs during construction at the same time as the architect)
   i. Index of progress photos
   ii. Photographic format for progress photos: 35mm color prints or digital images at 1600x 1200 dpi resolution equivalent to a 2 megapixel image or better
   iii. Print format: Standard color print size, 3 ½ x 5 or 4 x 6 at 600 dpi or better, printed on archival quality paper if digital images, inserted into photographic sleeves, and incorporated into the completion report binder.
   iv. Content: showing conditions encountered during the work, work in progress, etc. correlate to views taken before construction began
   v. Labels: subject and date
   vi. Organization: Numbered and keyed to drawings
   vii. Negatives: One copy of negatives or one copy of digital images on archival quality computer disk in jpeg format.

b. Record photographs
   i. Index to record photographs
   ii. Photographic format for record photos: professional quality, medium format (2.25"x2.25") for black and white/5 megapixel digital camera

set at highest resolution or better. Perspective corrected lens preferred. Some color images of professional quality are also required, see below for content.

iii. Print format: 8x10 photographic quality print on archival or well - washed resin - coated paper inserted into photographic sleeves and incorporated into the completion report binder.

iv. Content: Each elevation, elevation details and not less than 12 interior views showing at a minimum: courtroom(s), public corridor, typical office, stair, and vault. The views should duplicate earlier before the progress images when possible. The content of the color images is up to the architect; however we suggest choosing locations where color is informative. Perhaps at least one color shot of the overall exterior and any exterior details in which color plays and important part. A few representative color images of the major interior spaces are needed. Again, the professionals involved will need to decide where it is important to record the color information.

v. Intervals: upon completion. The inclusion of "before" type photographs is required. These may be reprints of the application photographs or enlargements from the progress photographs if they meet these standard requirements.

vi. Labels: Subject, date and photographer

vii. Negatives: One copy of photographic negatives or digital images scanned at 5000 dpi onto an archival quality computer disk in jpeg format is required.

APPENDIX G

Budget Growth

	Budget Growth				
#	Courthouse County	Courthouse City	Original Contract Sum	Total Contract Sum	Cost Growth
15	Llano - Phase I	Llano	$3,311,036.00	$3,150,185.16	- 5%
7	Ellis	Waxahachie	$7,242,799.00	$6,926,263.90	- 4%
21	Wheeler	Wheeler	$4,100,000.00	$4,010,559.99	- 2%
9	Hopkins Phase I and II	Sulphur Springs	$4,397,151.00	$4,440,760.20	1%
8	Gray	Pampa	$4,268,415.00	$4,319,999.13	1%
18	Shackelford	Albany	$1,770,420.00	$1,819,266.09	3%
16	Presidio	Marfa	$2,276,188.00	$2,356,157.00	4%
11	Johnson	Cleburne	$6,821,137.00	$7,125,504.75	4%
2	Bosque	Meridian	$4,142,809.00	$4,344,204.69	5%
4	Cooke	Gainesville	$1,671,000.00	$1,761,245.93	5%
13	Lamar	Paris	$7,273,523.00	$7,745,410.00	6%
1	Bee	Beeville	$5,683,000.00	$6,163,213.97	8%
3	Cameron	Brownsville	$7,688,734.00	$8,586,471.86	12%
10	Jeff Davis	Fort Davis	$2,233,111.00	$2,500,581.00	12%
20	Wharton	Wharton	$2,783,000.00	$3,227,795.64	16%
12	La Vaca	Hallettsville	$899,000.00	$1,090,777.80	21%
19	Val Verde	Del Rio	$1,342,200.00	$1,632,448.00	22%
5	Denton	Denton	$2,579,213.00	$3,202,574.67	24%
6	Donley	Clarendon	$2,780,180.00	$3,472,959.53	25%
14	Lampasas	Lampasas	$3,025,600.00	$3,934,400.29	30%
17	Red River	Clarksville	$1,419,358.00	$3,956,208.22	179%

APPENDIX H

E-Mail Script

Subject:

Management Planning Practices

Body:

Welcome to the Management Practices survey, your response is greatly appreciated. You have been asked to participate in a research study to improve the Management Planning Practices. The purpose of this study is to identify the current management planning practices used by construction companies that work in the renovation of the Texas Courthouse Preservation Program, and to determine which, if any, of these management planning practices are significant indicators of a successful project.

You were selected to be a participant because you are currently or have worked on the Texas Courthouse Preservation Program. If you agree to participate in this study, you will be asked to answer questions concerning management planning practices used during the project duration. Questions will be specific to budget, time, performance, satisfaction, and management planning practices. The study will take you approximately 5-10 minutes to complete.

This study is confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Edelmiro Escamilla will have access to the records. If you have questions regarding this study, you may contact Edelmiro Escamilla at 979 - 862 - 4430, mescamilla@ppgw.tamu.edu

This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Texas A&M University. For research - related problems or questions regarding your rights as a research participant, you can contact these offices at (979)458 - 4067 or irb@tamu.edu.

Thanks for your participation and quick response!

Click link below to begin survey:

This link is uniquely tied to this survey and your email address. Please do not forward this message.

APPENDIX I

E-Mail Reminder

Texas A&M - Courthouse Preservation Program

Recently a questionnaire seeking your opinions about Management Planning Practices was emailed to you. You were selected to be a participant because you are currently or have been associated with the Texas Courthouse Preservation Program.

If you have already completed and returned the questionnaire, please accept my sincere thanks. If not, please do so if possible this upcoming week. I am trying to conclude my survey collection so I can continue with the analysis. I am especially grateful for your help because it is only by asking people like you to share your views that I can better understand planning practices that attribute to success.

If you did not receive a questionnaire, or if it was misplaced, I have taken the opportunity to enclose the link to the survey.

Please call me at XXX - XXX - XXXX or email me at XXXXXX@XXX.XX if you have any questions or need any questions answered.

Edelmiro Escamilla
Ph.D Candidate
Texas A&M University
Architecture/Construction Science

APPENDIX J

Exemption IRB

TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH AND GRADUATE STUDIES - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU, General Services Complex
College Station, TX 77843-1186
750 Agronomy Road, #3500

979.458.1467
FAX 979.862.3176
http://researchcompliance.tamu.edu

Human Subjects Protection Program

Institutional Review Board

DATE: 29-Apr-2009

MEMORANDUM

TO: ESCAMILLA, EDELMIRO F
77843-3578

FROM: Office of Research Compliance
Institutional Review Board

SUBJECT: Initial Review

Protocol Number:	2009-0294
Title:	Logistics Management Planning for Renovation of Historical Buildings in an Urban Context Located in Texas
Review Category:	Exempt from IRB Review

It has been determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

This electronic document provides notification of the review results by the Institutional Review Board.

APPENDIX K

Definition of Terms

Term	Definition and Citation (if applicable)
Change Order	This form is a request to expand or reduce the project scope, modify policies, processes, plans, or procedures, modify costs or budgets, or revise schedules. Requests for a change can be direct or indirect, externally or internally initiated, and legally or contractually mandated or optional. Only formally documented requested changes are processed and only approved change requests are implemented (PMI, 2004).
Completion Reports	These reports are must be submitted to the THC and include the project data specific to each project. Each completion report was submitted in a three ring binder(s) (See Appendix F).
CDF Courthouse Data File	This document contains information on project performance as well as contact information of the team members that worked on the courthouse renovation projects.
Historic Context	Historic contexts are those patterns or trends in history by which a specific occurrence, property, or site is understood and its meaning within history or prehistory is made clear. They are also historical patterns that can be identified through consideration of the history of the property and the history of the surrounding area (National Park Service).
Historical Integrity	Integrity is the ability of a property to convey its significance. For a property to retain historic integrity it must possess several, and usually most, of the following aspects: location, design, setting, materials, workmanship, feeling, and association (National Park Service).
Historical Significance	The National Register Bulletin defines historical significance as the architecture, archeology, engineering, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association. Historically significant buildings are: associated with events that have made a significant contribution to the broad patterns of American history; are associated with lives of person significant in our past; embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; represent a significant and distinguishable entity whose components may lack individual distinction; or yield, or may be likely to yield, information important in prehistory or history (National Park Service).

Term	Definition and Citation (if applicable)
Invested Respondents	These are project team members (THC reviewers, architects, contractors) who are active in the delivery of the renovation project. THC reviewers evaluate the drawings and inspect the construction. Architects design and inspect the renovation project. Contractors construct the renovation project according to the drawings and specifications.
National Trust	This organization provides leadership, education, advocacy, and resources to save America's diverse historic places and revitalize our communities (National Trust for Historic Preservation).
NTP, Notice to Proceed	This document forms the basis of a legal contract between the owner and the contractor. Because negotiation of the provisions of the contract usually takes a certain amount of time, this notice allows the work to begin before the actual contract is signed. The letter is a legal document in itself and has two basic provisions: it accepts the bid proposal submitted by the contractor, and it establishes a start date and a completion date. Documenting the start date is particularly important if the length of the construction is a contract item (Gould & Joyce, 2008).
Observational Respondents	These project team members (owners or their representatives) are observational in the delivery of the renovation project, meaning that their role is to evaluate the final product.
Project	For the purposes of this research, a project is defined as a *temporary* endeavor having a definite beginning and *definite end* and is undertaken to create a *unique product, service or result.* A definite end is defined as reaching the project's objective, discovering that the objective cannot be reached, or the project is terminated. A unique product, service or result is defined as the product is quantifiable and either an end item in itself, or part of something bigger, the project result in the capability of performing a service, or there is a result. (PMI, 2004)
Procurement	For the purposes of this research, procurement is defined as the overall process of finding and purchasing the materials called for in the contract and hiring the best subcontractors to build the projects (Gould & Joyce, 2008).
Project Delivery System	A project delivery system is a term describing the comprehensive design/construction process, including all the procedures, actions and sequences of events, contractual relations, obligations, interrelations, and various forms of agreement. These are all aimed at successful completion of the design and construction of buildings and other structures (Dorsey, 1997).

Term	Definition and Citation (if applicable)
PMP Project Management Plan	This document describes how the *project management system* will be used. The project management system content varies depending upon the application area, organizational influence, complexity of the project, and availability of existing systems. The project management system is the set of tools, techniques, methodologies, resources, and procedures used to manage a project (PMI, 2004).
Project Lifecycle	Projects are divided into phases to provide better management control with appropriate links to the ongoing operations of the performing organization (PMI, 2004).
Quality	For the purposes of this research, quality is defined as the characteristic element of an item that can be evaluated as meeting a standard. If the item meets or exceeds the standard, it is deemed to be of good quality, or high quality (Mincks & Johnston, 1999).
Scope of Work	The work that must be performed to deliver a product, service, or result with the specified features and functions (PMI 2004).
Construction Staging	These are the steps the contractor will need to take during construction in order to build the access road. A plan for construction staging will need to be implemented to provide safe and efficient construction operations as well as to minimize community impacts during construction (Detroit River International Crossing Study).
Site Layout Plan	This is the plan for temporary facilities, material movement, material storage, and material handling equipment on the jobsite (Mincks & Johnston, 1999).

Term	Definition and Citation (if applicable)
Secretary of the Interior's Standards	The Secretary of the Interior is responsible for establishing standards and for advising federal agencies on the preservation of historic properties listed or eligible for listing in the National Register of Historic Places. The Secretary of the Interior's Standards for Historic Preservation Projects have been developed to guide work undertaken on historic buildings. Initially developed by the Secretary of the Interior to determine the appropriateness of proposed project work on registered properties within the Historic Preservation Fund grant-in-aid program, the *Standards for Rehabilitation* have been widely used over the years, especially to determine if a rehabilitation project qualifies as a Certified Rehabilitation for federal tax purposes. In addition, the Standards have guided federal agencies in carrying out their historic preservation responsibilities for properties in federal ownership or control, and have guided state and local officials in reviewing both federal and nonfederal rehabilitation proposals. These Standards have also been adopted by historic district and planning commissions across the country. The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and interior of the buildings. They also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction (Secretary of the Interior's Standards).
Stakeholder	These are individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion (PMI, 2004).
THC, Texas Historical Commission	This is a state agency for historic preservation. THC staff members consult with citizens and organizations to preserve Texas' architectural, archeological and cultural landmarks. The agency is recognized nationally for its preservation programs (Texas Historical Commission About Us).
THCPP, Texas Historical Courthouse Preservation	The Texas Historical Commission announced in June 1999 that the Texas Legislature and then Gov. George W. Bush had established the Texas Historic Courthouse Preservation Program (THCPP) through House Bill (HB) 1341. The program provides partial matching grants to Texas counties for the restoration of their historic county courthouses (Texas Historical Commission THCPP).

VITA

Name: Edelmiro Escamilla

Address: Department of Construction Science
Texas A&M University
3137 TAMU
College Station, TX 77843-3137

Education: Ph.D., Architecture, Texas A&M University, 2011
M. Arch., Architecture, Texas A&M University, 2002
B.E.D., Architecture, Texas A&M University, 1999

Experience: Faculty member of Department of Construction Science,
Texas A&M University, 2010 to present

Project Manager/Designer for Engineering and Design Services,
Texas A&M University, 1999 to 2010