

CRITICAL SUCCESS FACTORS AFFECTING SUCCESSFUL COMPLETION OF  
“INSTITUTIONAL” PROJECTS: A CASE STUDY APPROACH

A Thesis

by

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## ABSTRACT

Modern construction presents various challenges for both clients and contractors with regards to the delivery of a successful project. This is due to the increasing complexity in design and the involvement of multiple stakeholders as well as various other factors. To deal with these challenges, Critical Success Factors (CSF's) are often identified and given particular attention to ensure a successful project. CSF's can be identified as "areas, in which results, if they are satisfactory, will ensure successful competitive performance for the organization. From the literature reviewed, it is evident that there is a large amount of research and data with regards to Critical Success Criteria and Critical Success Factors for construction projects. However, it was found that there was no specific research which had been conducted on "Institutional" projects such as collegiate education buildings. This study attempts to analyze the critical success factors for the successful completion of "institutional" projects and was conducted with a qualitative approach utilizing several research tools including a literature review, written surveys, and interviews with construction professionals. The research focused on several "institutional" buildings from Texas A&M University (TAMU) located in College Station, Texas. The study consisted of conducting four face-to-face interviews with industry professionals who were directly involved with the construction management of "Institutional" projects at TAMU. Interviewees were asked to evaluate / rank the importance of twenty factors, and after evaluation and accounting for similar factors, this was reduced down to a final list of fourteen CSF's. A questionnaire was then developed

and sent out to the interviewees using Qualtrics, a survey analysis software. Within the survey they were asked to rank the fourteen CSF's in order of importance. The positional preference rankings from each participant were then evaluated and using the Borda Count Method, they were awarded a score. This provided a final ranking of the CSF's. This study highlights many of the CSF's needed for construction projects, including that of "Institutional" projects, and provides an overview between the similarities and the differences found. Within the reviewed literature it was found that planning, cooperation and experienced management were the most essential CSF's for construction projects. This study has shown that "pre-construction" activities such as planning are the most essential CSF's for "Institutional" projects on the Texas A&M University campus and suggests that if this is achieved then experienced management is not as important. This may be a cause of the form of contract employed for these projects, Construction Manager at Risk (CMAR).

## DEDICATION

I dedicate this thesis to my mother Pam, my father Dean, my sister Lauren, my partner Kristin and all of my loving family and friends who believed in me and made this journey possible. I can honestly say that without all of their continued love and support this journey would have been much more difficult and a lot less fun.

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## NOMENCLATURE

AHP	Analytical Hierarchical Process
BIM	Building Information Model
CSC	Critical Success Criteria
CSF	Critical Success Factors
CMAR	Construction Manager at Risk
GC	General Contractor
IRB	Institutional Review Board
OSHA	Occupational Health & Safety Administration
PPE	Personal Protective Equipment
PSP	Pre-task Safety Planning
TAMU	Texas A&M University

## TABLE OF CONTENTS

	Page
ABSTRACT .....	ii
DEDICATION .....	iv
ACKNOWLEDGEMENTS .....	v
NOMENCLATURE.....	vi
TABLE OF CONTENTS.....	vii
LIST OF FIGURES.....	ix
LIST OF TABLES .....	x
1. INTRODUCTION.....	1
1.1 Background .....	1
1.2 Research Goals & Objectives.....	2
1.3 Limitations .....	3
2. LITERATURE REVIEW .....	4
2.1 Construction Projects & Their Challenges.....	4
2.2 Critical Success Factors .....	7
2.3 Ranking System.....	9
3. RESEARCH METHODS.....	12
3.1 Data Collection.....	12
3.2 Data Analysis .....	13
4. FINDINGS & RESULTS.....	15
4.1 Project Participants.....	15
4.2 Critical Success Factors .....	16
4.3 Weightings & Overall Scores.....	31
4.4 Discussion .....	36

	Page
5. SUMMARY AND CONCLUSIONS.....	39
5.1 Summary .....	39
5.2 Significance .....	41
5.3 Future Research.....	41
REFERENCES .....	43
APPENDIX A: INTERVIEWS & SURVEY QUESTIONNAIRE .....	53
APPENDIX B: IRB APPROVAL.....	56



## LIST OF FIGURES

	Page
Figure 1 Report & Analysis of the survey questionnaire.....	32

## LIST OF TABLES

	Page
Table 1 Interview 1 & Project A: (Project Manager).....	17
Table 2 Interview 2 & Project B: (Project Manager).....	20
Table 3 Interview 3 & Project C (Project Manager) .....	23
Table 4 Interview 4 & Project D (Construction Director).....	26
Table 5 Final List of Critical Success Factors.....	29
Table 6 Point Allocation.....	33
Table 7 Points Total .....	35
Table 8 Final Position Rankings .....	36

# 1. INTRODUCTION

## **1.1 Background**

Construction is a detailed and intricate process which requires a considerable amount of planning from the conception stage through to the completion stage (Gayatri, et al., 2002). The uniqueness of new construction projects and their increasing complexity make them highly challenging and the control of their cost, schedule, and quality are main indicators of performance in construction projects (Mckim, et al., 2000). These indicators become even more complicated in the case of reconstruction projects due to various additional factors including space constraints, safety regulations, and coordination requirements (Krizek et al. 1996). “Institutional” projects such as educational buildings can fall into both of these categories and can also present new obstacles which can stand in the way of a successful project. This study attempts to analyze the critical success factors (CSF) for the successful completion of “institutional” projects and is conducted with a qualitative approach utilizing several research tools including a literature review, written surveys and interviews with construction professionals. The research conducted focuses on several “institutional” buildings from Texas A&M University located in College Station, Texas. Once the relevant critical success factors were identified they were evaluated and ranked in order of importance using the Borda Count voting method. The ranking of these CSF’s should provide valuable data and suggestions for future construction professionals and organizations

with regards to working on institutional projects and ensuring that they are able to carry out the works successfully.

## **1.2 Research Goals & Objectives**

**Goal:** The main goal of this study is to obtain information and data from construction professionals who have worked on “Institutional” projects in order to understand the main critical success factors that they believe were critical to the successful completion of the project and to rank said factors in order of importance using a ranking method.

**Objectives:** The research goal was divided into the following objectives:

1. Obtain information and data from several contractors who were involved in the construction and completion of building projects located on the Texas A&M University campus.
2. Rank the data and CSF’s obtained in order of importance using a ranking method.

### **1.3 Limitations**

The research limitations for this study were as follows:

1. This research was limited to construction projects on the Texas A&M University campus only.
2. The interviews and questionnaires were presented to construction professionals who worked on “Institutional” projects on the Texas A&M campus.
3. Only one ranking method was utilized to create the CSF rank order.

One limitation that was not initially considered was that several of the project managers involved with the construction of the projects located on campus are no longer with the organization who originally constructed them. This meant that some of the projects that were originally identified were not viable as the PM’s were no longer with the organization responsible for completing the project. This meant that only two companies participated in the study.

## 2. LITERATURE REVIEW

### **2.1 Construction Projects and Their Challenges**

Modern construction presents various challenges for both clients and contractors with regards to the delivery of a successful project. This is due to the increasing complexity in design and the involvement of multiple stakeholders (Doloi, 2009).

**Unique projects:** Construction is a unique industry due to the ever evolving set of activities and requirements that are essential to produce a unique product.

**Unforeseen conditions:** Due to the uniqueness of each project, unforeseen conditions is a challenge which is often encountered and is something that can hinder or even halt a project completely. Unforeseen conditions can include a multitude of different things and as the industry leans towards more work involving retrofit and restoration projects, even more risk is included (Muir, 2005). Work in built up areas such as universities and campuses means that special attention must also be given when it comes to work involving utilities. These must be maintained and protected during the project and this can be an issue if as built drawings and information provided is not entirely accurate or complete.

**Technical innovations:** Technical innovations within construction have for many years sought to decrease project cost, increase productivity and quality, and reduce project delivery time. The introduction of building information modelling (BIM) has the potential to offer solutions to these targets (Azhar, Nadeem et al. 2008). However, BIM also presents its own challenges and risks which must also be given consideration. BIM is a labor intensive product and requires considerable time spent inputting and reviewing BIM data. This is a new cost in the design and project administration process (Azhar, 2008). Additionally, unlike many other construction practices, there is no single BIM document that provides instruction on its application and use (Associated General Contractors of America 2005). One final and quite considerable challenge is the integration of learning and collaboration that is required for the optimal use of the application, the changing roles of key parties such as the client, architect, contractor and subcontractors, and the collaboration that is required for the process presents new challenges (Sebastian, 2011).

**Quality of people:** The quality of the workforce is also essential to any project and a competent project manager possesses several critical skills that are key to a projects success (Crawford, 2000). According to (Frank, 2002) the project manager has direct influence over 34-47% of project success. This shows that finding the right person for the job is vital to the success of any project and this can in itself present a challenge.

**Weather and environment:** Weather and the environment are also key challenges that are faced in almost every project. Contractors can try to mitigate these delays by including a number of weather days to their schedule but it is an issue that is largely unpredictable and can hinder a project significantly.

**Safety:** Construction by nature is inherently dangerous, with a high degree of hazard and risk (Muir, 2005). Therefore, safety is a key consideration that must be given to each and every project. Legal obligations imposed by the Occupational Safety Health Administration (OSHA) have increased the importance of safety and the rules and regulations which must be followed by contractors and other parties involved with a project.

**Regulations:** Rules and regulations such as those presented by the government can present their own set of challenges. The industry is becoming increasingly regulated with various codes and standards such as the International Building Code (IBC) and American National Standards Institute (ANSI), as well as permitting requirements, licensing laws, and the costs associated with them is also something that must be considered within a construction project.

**Institutional projects:** All of the above challenges are valid factors which must be considered on almost every construction project. Additionally, the definition of a successful project can often be complex in itself (Lam et al. 2008, Toor and Ogunlana,



2010; Wang and Huang 2006.). Despite identifying some underlining challenges, the review of literature did not present any challenges that were specific to institutional projects such as collegiate education buildings and this is something that this study attempts to provide.

## **2.2 Critical Success Factors**

Basu (2012) describes critical success criteria as “a definition in measurable terms of what must be done for the project to be acceptable to the client, stakeholders and end-users who will be affected by the project”. A study by Atkinson, (1999) suggested that the “iron triangle”: 1) on time; 2) under budget; and 3) according to specifications has been the widely accepted criteria for project success over the last few decades. However, performance criteria is also something that is no longer straight forward due to the change in demands of users, evolving environmental regulations, and the shifting functions of buildings (Toor and Ogunlana, 2010). This is supported by the fact that despite studies from Shenhar, (2002) and Ahadzie, (2008), there is still not a total agreement with regards to the critical success criteria (CSC) that is required for construction projects. Despite the non-agreement, there are several studies that have been carried out which have identified various CSC as contributors to project success. One CSC that has been identified as a major factor for project success is the contractor and how much project success depends on them (Banki et al., 2009; Ng et al., 2009; Palaneeswaran and Kumaraswamy, 2001; Yaweli et al., 2005). Appointing the right contractor for the project can provide various benefits, among which is ensuring overall

quality and allowing for potential cost savings (Alzahrani, 2013). This is also supported by Yang et al (2011); Nixon et al. (2012); Hwang et al. (2013) who agree that the role of the project leader / project management is significant to project success. Critical Success Factors are considered to be the elements or activities required to ensure success criteria Wateridge, (1995). Rockart, (1978) identified CSF's as "areas, in which results, if they are satisfactory, will ensure successful competitive performance for the organization". They have also been viewed by other researchers as "those critical areas of managerial planning and action that must be practiced in order to achieve effectiveness" (Saraph et al. 1989). A study by Assaf et al. (2013) highlighted critical success factors in lump sum turnkey (LSTK) projects and suggested that a clearly defined project objective and scope was the most important CSF but also suggested that there should be a heavy focus on experienced management and project leaders. A study carried out by Gudienė et al. (2014) for CSF's in construction projects also supports these findings by suggesting that clear and realistic project goals and planning were essential, but also suggested that management competence & experience were also critical to the success of projects. Other CSF's that were identified as being important to project success and which were reviewed within the literature include:

- 1) Well integrated teams / teamwork (Ibrahim et al., 2013);
- 2) Relationships management (Meng., 2012);
- 3) Construction processes / planning and effective management; (Zavadskas et al. 2014);
- 4) Information technology (Yang et al., 2012);

- 5) Communication. (Ismael et al., 2012);
- 6) Safety (Aksorn et al., 2008);
- 7) Schedule (Hwang et al., 2013);
- 8) Cost performance. (Memon et al., 2012);
- 9) Clear & realistic project goals. (Gudienė et al., 2014)
- 10) Personnel. (Pinto et al., 1987).

### **2.3 Ranking Systems**

There are various ranking techniques and methods that are available and could be utilized to identify and analyze the data set forth in this research study. After careful consideration, this study chose to narrow the methods down to three techniques; the “Delphi” technique, the “Analytical hierarchy process method” and the “Borda Count Voting Method”.

The Delphi technique is a widely used and accepted method for gathering data from respondents within their area of expertise Hsu et al. (2007) and Chan et al. (2001). A study by Hatush and Skitmore (1997) adopted this technique to identify the least important and most important criteria from a list of twenty commonly used criteria by interviewing six experts and two expert validators within their respected fields. In the literature, the “Delphi” technique has been utilized in various fields such as program planning, needs assessment, policy determination, and resource utilization (Hsu, C. et al. 2007). Anatharajan and Anataraman, (1982) utilized the technique for the development

of residential areas, while Manoliadis et al., (2006) used the technique for sustainable development decisions. Chan et al., (2001) adopted the technique for procurement selection and described the method as a highly formalized method of communication that is designed to extract the maximum amount off unbiased information from a panel of experts. Therefore the Delphi technique would be ideal for the scenario of construction professionals and their experiences with “institutional” projects. The Delphi technique is used as a method for consensus building through the utilization of several questionnaires presented through multiple iterations to obtain data from a set of selected subjects (Dalkey & Helmer, 1963; Dalkey, 1969; Linstone & Turoff, 1975; Lindeman, 1981; Martino, 1983; Young & Jamieson, 2001). The Delphi technique can be considered to have several rounds that all play an integral part to reaching an agreed consensus on an issue. Cyphert and Gant (1971), Brooks (1979), Ludwig (1994, 1997), and Custer, Scarcella, and Stewart (1999) state that three iterations are often sufficient in achieving an agreed consensus.

The “Analytical Hierarchy Process” (AHP) was introduced by Thomas Saaty (1980) and is considered to be an effective tool for dealing with complex decision making, as it can assist the decision maker with regards to setting priorities and making the best decision. The AHP method is a powerful and flexible method that uses a hierarchic structure to present a complex decision problem by decomposing it into several smaller sub problems Gudiene et al., (2014). A study carried out by Chua et al., (1999) identified different sets of CSF’s for various project objectives and used the analytical hierarchy

process to identify sixty seven project success factors which related to four key project aspects. The AHP is a widely accepted method and is considered by many as the most reliable Multi criteria decision making method Triantaphyllou, and Mann, (1995).

The Borda Count Voting Method developed by Jean-Charles de Borda is a relatively simple positional voting method which determines the ranking of the candidates by evaluating the total number of points assigned to each item. Heravi, (2014) utilized the Borda method for a study concerning group decision making for optimization of time, cost, and quality in construction projects and described the technique as a frequently used social choice method that has been applied to many group decision making and management problems. It is a method which is easy to implement and has the added benefit of assigning a weighting or scores to the alternative criteria. The Borda Count Voting Method has several advantages which separate it from other methods such as the AHP method. For example, it minimizes the need for subjective assessments which are essential when trying to apply a pairwise comparison like that required with the AHP method. (Lansdowne, ZF and Woodward, BS. 1996)

### 3. RESEARCH METHODS

#### **3.1 Data Collection**

The data collection for this study consisted of face-to-face interviews with construction professionals and therefore contact was made to four construction companies with the aim of receiving two participants/projects from each organization. Out of the four organizations contacted only two responded stating that they were willing to participate in the study. From these two companies a total of four interviews were held with construction professionals who were involved with “institutional” projects at Texas A&M’s campus located in College Station, Texas. Although the study aimed for more than four participants, which would have yielded a greater confidence in results, studies involving the Borda count method have been conducted using only four participants for example Srdjvevic,. (2009). The interviews were conducted in a face-to-face manner, however, all persons and projects are to be anonymous with no identifiable links made. The interviewees were contacted via email once they were given permission to participate in the study and asked to sign a consent form before the interview began. Each of the subjects were asked about several key items with regards to their project including an open question: “What 5 Critical Success Factors do you believe were most important with regards to the successful delivery of the project?”

Once all of the interviews were conducted and the CSF’s were obtained from each interview, they were analyzed as described below, and a survey questionnaire was

developed using an online questionnaire tool provided by TAMU called Qualtrics. The questionnaire listed the CSF's obtained from the interviews and provided a short description of each. A copy of the same survey was then forwarded to all four participants and utilizing the Qualtrics software the participants were asked to assess each CSF and respond with their preference ranking by arranging them into a rank order. Both the interview and the survey questions (See Appendix A) were reviewed and approved by the Texas A&M University's Institutional Review Board (IRB) (See Appendix B).

### **3.2 Data Analysis**

As mentioned previously, there were various ranking techniques identified within the literature review that could be utilized for the purposes of this research, however, after careful consideration these were narrowed down to three ranking techniques.

The three methods were carefully reviewed and the decision was made to proceed with the Borda Count Voting Method. The reason for this decision is that the "Delphi" technique, although sound in its approach and results, would take a large amount of time to create and to carry out. This, coupled with the fact that construction is an industry that is time sensitive, lead the researcher to conclude that it would be too much of a burden on the research participants with regards to the time consumption required. The "Analytical Hierarchy Process" method was also found to be a sound technique and could have been used in this instance, however, as this process consisted of just one

question and four interviews coupled with a questionnaire, the decision was made to implement a more simple method, the Borda Count method.

The Borda Count method consists of examining the pertinent data and analyzing the given options for consideration and providing a preference to said options. The options given are awarded a complete preference ranking from all voters and awarded points based on their preference position (the higher the position the higher the score). This allows for an overall score to be given to the complete list of options from several voters. For example, if there were 14 options to choose from, then the 1<sup>st</sup> placed option would receive 14 points and the 14<sup>th</sup> placed option would receive 1 point. This scoring is applied to each voter's preference list and then each options score is calculated as a total score from/ of all respondents which in turn, provides the final preference list order.



## 4. FINDINGS & RESULTS

### **4.1 Project Participants**

Various organizations who have participated in construction projects on Texas A&M's campus were contacted and asked if they would be willing to participate in this study. From the contact made, a total of four participants were interviewed in a face to face fashion for this study. An email was sent to each interviewee prior to the interview so that the participants would have time to think about their preferences carefully. Each interviewee was asked one simple question: "What 5 Critical Success Factors do you believe were most important with regards to the successful delivery of the project?"

As this study required TAMU IRB approval, the decision was made that all interviewees and their projects would be kept anonymous and there would be no identifiable links.

Therefore, the interviewees and their projects shall be listed as follows:

Interview: 1 (Project Manager) & Project A

Interview: 2 (Project Manager) & Project B

Interview: 3 (Project Manager) & Project C

Interview: 4 (Construction Director) & Project D

Each of the participants interviewed were professional having a vast amount of experience within their respected field. When asked about their job position and experience within the industry and their organization, each responded by stating that they had been with their organizations for at least 8 years and had been involved with several projects on the TAMU campus.

#### **4.2 Critical Success Factors**

Tables 1 through 4 present the data taken from the interviews conducted and represent what the interviewees felt were the top five Critical Success Factors they believe were most important with regards to the successful delivery of their project. The interviews and CSF's are not in any particular order of importance, they are simply in the order they were discussed. The ranking and scores for these CSF's can be found in section 4.3 Weightings & Overall Scores.

Table 1: Interview 1 & Project A: (Project Manager)

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Pre-Construction Phase</p>	<p>This CSF was discussed as being the steps before stepping on site to build. This included all of the operations and estimating, developing the BIM model and obtaining a good knowledge of the project before starting the physical building works.</p>
<p>Schedule &amp; Budget</p>	<p>Having a realistic schedule &amp; budget was discussed as being very important. Within the interview it was stated that it is the contractor's job to manage the expectations of the client by developing a realistic schedule and budget at the beginning rather than getting to the close of the project and not being able to deliver on time and on budget.</p>
<p>Experienced Management</p>	<p>Experienced management was one CSF that was highlighted in the literature review and is a very important aspect of any project. This CSF was discussed as being something that included tasks such as ensuring payments are made and received on time, resolving change orders, and ensuring the project is managed as best as it can be.</p>

Table 1 Continued.

<p style="text-align: center;"><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p style="text-align: center;"><b><u>Description</u></b></p>
<p>Quality of workforce</p>	<p>This CSF was once again highlighted within the literature review and was explained within the interview as being something that is both important from the clients, contractors and subcontractors perspective. From the contractors perspective it is essential to obtain well-qualified subcontractors who can carry out the work professionally and provide a good product. From the clients perspective it is also imperative to employ a well-qualified GC who will carry out the work to a high standard and provide the end user with a project they are happy with (it was discussed that the cheapest option is not always the best option).</p>

Table 1 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Safety</p>	<p>A positive approach to safety was discussed as being an extremely important CSF and within the interview it was explained that management should be actively involved with safety both from the office and on-site. This includes providing PPE when necessary and promoting the use of PPE at all times. Toolbox talks were also discussed as being important to ensure that the “safety” message was being delivered to the relevant persons on site. Interviewee 1 also said that within his organization they use something called PSP (Pre-task Safety Planning) which is designed to identify the risks associated with an activity before it begins so that necessary precautions can be taken to ensure risks are mitigated.</p>

Table 2: Interview 2 & Project B: (Project Manager)

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Communication</p>	<p>This CSF was discussed as being imperative to the success of a project and was explained in the interview as being something that must flow from the client to the GC to the Subcontractors. This could be seen through request for information (RFI) sheets and change orders that are needed for the project and includes direct input from each party for an honest and organized flow of information to be delivered throughout the project.</p>
<p>Safety</p>	<p>This CSF was described as being paramount to any project and was explained as something that if not given the necessary attention, can result in the shutdown of the project all together by authorities such as the Occupational Health &amp; Safety Administration (OSHA). Within the interview it was stated that safety can directly affect the success and opinion of the project, for example if someone is injured or killed on a project, it does not matter if it was a profitable project that was delivered on time; it will always be considered an unsuccessful project.</p>

Table 2 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Schedule</p>	<p>Schedule was discussed as being an important CSF for a project, within the interview it was explained that the project schedule should be treated as a living document which requires a “buy in” from each stakeholder. It was discussed that the schedule must be honest and realistic so as not to give anybody a false expectation about completion dates. One way that this is achieved is by having weekly subcontractor meetings and regular client meetings to discuss progress and planning.</p>
<p>Trust &amp; Accountability</p>	<p>This CSF was discussed as being very important and something that flows down from the top, for example a GC will not win any work if clients do not trust them, the same way that as a GC, one will not award work to subcontractors they do not trust. It was also discussed that by having trust and accountability that you will in fact be rewarded with repeat work from their clients, something that is extremely important to any organization.</p>

Table 2 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Teamwork</p>	<p>This CSF was discussed in the interview as being a core value for their organization. It was explained that teamwork is needed from all stakeholders (owners, architects, subcontractors, and engineers), as they all play a pivotal role in the success of any project. With teamwork, the flow of information is better and problems are resolved as a collective group working towards the same goal, rather than individuals just looking out for themselves. One way that this is achieved is by keeping in regular contact with all stakeholders and holding regular meetings to discuss the project and what is required to ensure success.</p>



Table 3: Interview 3 & Project C: (Project Manager)

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Ownership of Project</p>	<p>This CSF was discussed as being vital to the success of the project, it was explained as owning the project by having a good knowledge of the plans, specifications, drawings and tracking it all as necessary. This includes knowing of any alterations that are required through change orders and updated drawings and passing them onto the relevant persons such as subcontractors.</p>
<p>Company Processes</p>	<p>This CSF was discussed as being an important part of every project but something that is slightly different for each organization. It was explained as something that should be followed to ensure risks are mitigated and liabilities are covered. It was expressed that this could be seen through ensuring that the chain of command is followed as per the company process so that all parties are in the loop, this may be seen by going up the chain to request information or authority to proceed, or down the chain through instructions to proceed with said work once authority is given.</p>

Table 3 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Schedule</p>	<p>Schedule was discussed as a vital CSF and was explained in the interview as being something which must be given attention to ensure that any potential issues that may be coming can be dealt with and an alternative plan can be implemented if necessary. It was explained that this can be seen with the use of “look ahead schedules” whereby the work ahead is identified and discussed allowing for the necessary preparation and planning to take place.</p>
<p>Resolving Issues Quickly</p>	<p>Resolving issues quickly was a CSF that was discussed as being something that must be done with every project, no project is ever totally issue free. It was discussed that taking care of issues in a timely manner prevents the issue increasing in size. It was explained that in some cases an issue must be escalated up the chain of command so that the entire project team can be utilized and a resolution can be implemented as soon as possible.</p>

Table 3 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Relationships</p>	<p>Relationships is a CSF that is much like the “Trust &amp; Accountability” factor identified in interview 2. It was discussed within the interview as being something that needs to be maintained to ensure future work. It was explained that maintaining a good relationship with the end user is essential, this can be done by being transparent and upfront about any issues and working with them to minimize any further issues that may come from it.</p>

Table 4: Interview 4 & Project D: (Construction Director)

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Subcontractor Selection</p>	<p>This CSF was discussed as being a vital part of the project process. The subcontractor selection process is extremely important as they will be building the physical building. It was discussed that the GC must be aware of the subcontractor and be confident in their abilities to 1) provide the necessary labor 2) have the ability to carry out their particular task (it may be a specialized task) and 3) be confident that they have included costs for all associated work in order to complete their contractual obligation.</p>
<p>Quality Of Documents</p>	<p>This CSF was discussed as being a vital part of any project, without good quality documents the projects is already at a disadvantage before it has even begun. It was explained that having good drawings, specifications and general information helps prevent RFI's (request for information) sheets and allows the project to move along without constant stoppages.</p>

Table 4 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Teamwork &amp; Cooperation</p>	<p>Teamwork &amp; Cooperation was a CSF that was also discussed previously in interview 2. Within this interview it was discussed as being something that the interviewee’s organization strives for when on a project. It was discussed that having teamwork &amp; cooperation can greatly improve the chances of a successful project because it means that each party (Client, owners representative, architect etc...) are all pulling in the same direction and working towards the same goal as one cohesive unit instead of a set of individuals.</p>
<p>Co-ordination Efforts</p>	<p>This CSF is very similar to the Pre-construction Phase CSF in interview 1. In this interview it was discussed as being something that must be done to ensure that problems are identified and solved before they actually become an issue. It was explained that building information modelling (BIM) is utilized in this instance to identify and resolve issues before physical construction begins, this risk mitigation is essential in making the project run as smoothly as possible.</p>

Table 4 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Project Politics</p>	<p>This CSF was described as being something that is unique to every project and is something that can help make or break a project with regards to a successful delivery. It was explained that Project Politics can take many forms depending on the type of project and who the stakeholders are. When dealing with a private client on a private project it may be that the politics are minimal and they can direct the GC as desired without any “red tape” or authority issues. In contrast an Institutional project may have many stakeholders who have direct input with regards to the decision making process and therefore “red tape” can be encountered, leading to an increase in steps before a task can proceed. However, it was also discussed that the “knowledge of the process” comes into play with Project Politics. A well-established and experienced client’s representative can also be a great aid with regards to the success of the project</p>

Table 5 contains the 14 final success factors which were sent out for ranking. This list takes into consideration CSF's that were brought up in more than one interview and also groups those that were very similar. For the fully detailed list please see (Appendix A)

Table 5: Final List of Critical Success Factors

<b><u>Critical Success</u></b> <b><u>Factor</u></b>	<b><u>Description</u></b>
Pre-construction Phase / Pre- coordination Efforts	This CSF was discussed as being the steps and operations that are carried out before stepping on site to build.
Schedule & Budget	The schedule and budget is the cost and duration of the project, it is the contractor's job to manage the expectations of the client by developing a realistic schedule and budget.
Experienced Management	This CSF was discussed as being something that included things such as ensuring payments are made and received on time, resolving change orders and just making sure that the project is managed as best as it can be.
Quality Workforce	This CSF involves having well qualified management, contractors and subcontractors who can carry out the project.

Table 5 Continued.

<p><b><u>Critical Success</u></b> <b><u>Factor</u></b></p>	<p><b><u>Description</u></b></p>
<p>Safety</p>	<p>Management should be actively involved with safety both from the office and on-site. This includes providing PPE when necessary and promoting the use of PPE at all times.</p>
<p>Communication</p>	<p>This was explained as being something that must flow from all parties.</p>
<p>Trust &amp; Accountability / Building Relationships</p>	<p>Having trust and accountability can lead to repeat work from your clients, something that is extremely important to any organization. Maintaining a good relationship with the end user is also essential.</p>
<p>Teamwork &amp; Cooperation</p>	<p>Having teamwork &amp; cooperation involves each party (Client, owners representative, architect etc...) all pulling in the same direction and working towards the same goal as one cohesive unit instead of a set of individuals.</p>
<p>Ownership of Project</p>	<p>This CSF was explained as owning the project by having a good knowledge of the plans, specifications, drawings and tracking it all as necessary.</p>
<p>Company Processes</p>	<p>This CSF was explained as something that should be followed to ensure risks are mitigated and liabilities are covered.</p>



Table 5 Continued.

<u>Critical Success Factor</u>	<u>Description</u>
Resolving Issues Quickly	This CSF was discussed as taking care of issues in a timely manner which prevents an issue increasing in size.
Subcontractor Selection	The GC must be aware of the subcontractor and be confident in their abilities necessary to complete their contractual obligation.
Quality Of Documents	Having good drawings, specifications and general information helps prevent RFI's (Request For Information) and allows the project to move along without constant stoppages.
Project Politics	Project Politics can take many forms depending on the type of project and who the stakeholders are. For example if there are many stakeholders who have direct input with regards to the decision making process then "red tape" could be an issue.

**4.3 Weightings & Overall Scores**

Once the survey questionnaire was developed utilizing the final list of CSF's (as seen in Table 5) it was sent out to the four interview participants. They were asked to drag and drop the CSF's in order of what they felt were most important to the successful delivery of the "Institutional" project that they worked on. The questionnaire can be found in (Appendix A). Once the survey was completed by the four participants the data was collected and recorded using the Qualtrics software provided by Texas A&M University.

The report generated by the software provided the preference ranking for each participant along with a statistical analysis of the findings, this can be seen below in

Figure 1: Report & Analysis.

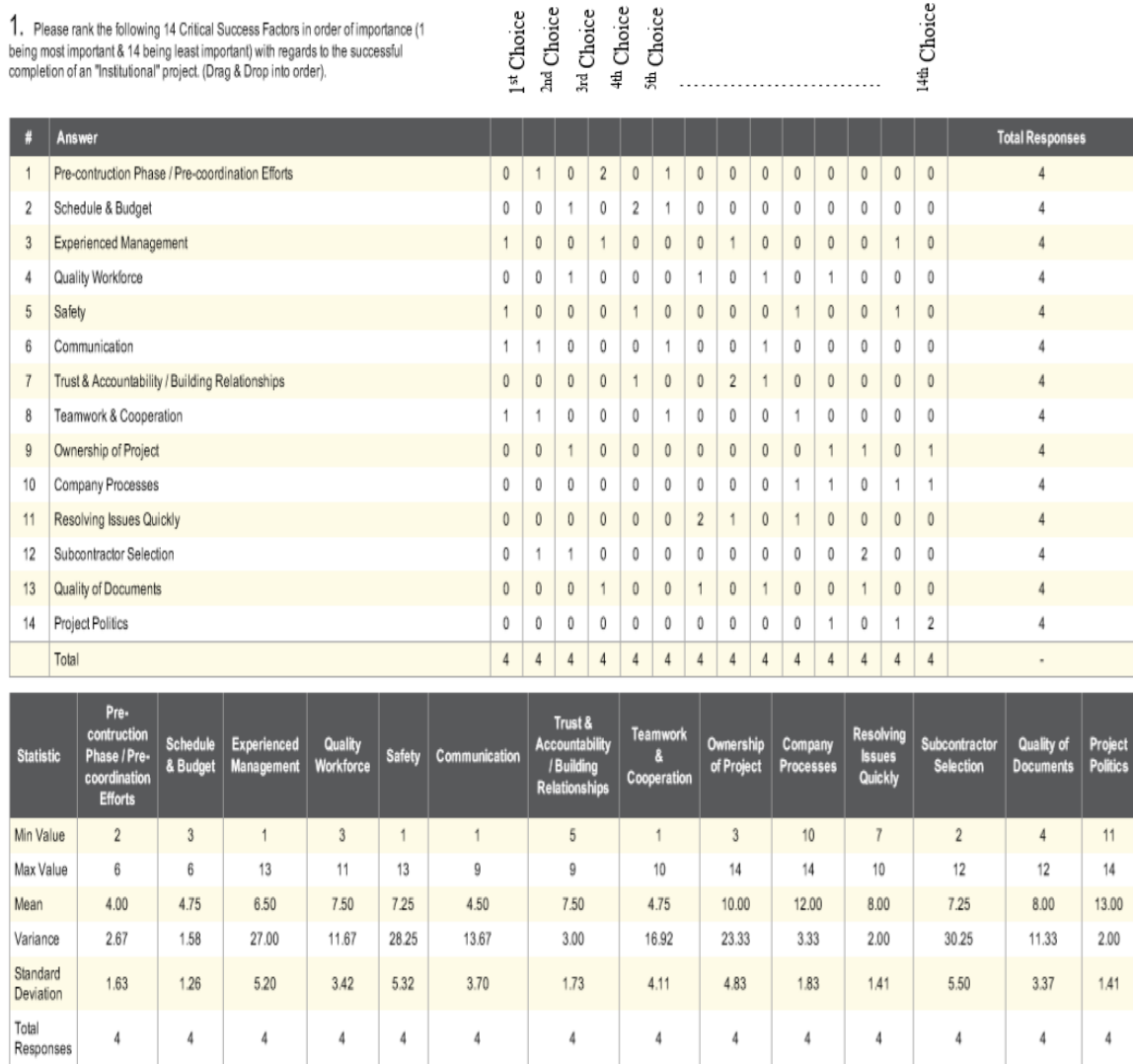


Figure 1: Report & Analysis of the survey questionnaire.

Figure 1 shows a screenshot from the Qualtrics software analyzing the 14 selected CSF's for evaluation and ranking. The analysis identifies how many participants selected a particular CSF and their preference ranking of said CSF by labeling it with a number such as 1 for one participant or 2 for two participants. For example, one participant chose "Experienced Management" as their 1<sup>st</sup> choice ranking, while two participants chose "Preconstruction Phase / Pre-coordination Efforts" as their 4<sup>th</sup> choice ranking. Utilizing the Borda Count Method, these CSF preference rankings were then allocated a score based on their positional preference. This can be seen below in Table 6: Point Allocation.

Table 6: Point Allocation

#	Answer	14 1st Choice: points	13 2nd Choice points	12 3rd Choice: points	11 4th Choice: points	10 5th Choice: points
1	Pre-construction Phase / Pre-coordination Efforts	0	1	0	2	0
2	Schedule & Budget	0	0	1	0	2
3	Experienced Management	1	0	0	1	0
4	Quality Workforce	0	0	1	0	0

Table 6 Continued.

#	Answer	14 points		13 points		12 points		11 points		10 points	
		1st Choice:		2nd Choice:		3rd Choice:		4th Choice:		5th Choice:	
5	Safety	1	14	0	0	0	0	0	0	1	10
6	Communication	1	14	1	13	0	0	0	0	0	0
7	Trust & Accountability / Building Relationships	0	0	0	0	0	0	0	0	1	10
8	Teamwork & Cooperation	1	14	1	13	0	0	0	0	0	0
9	Ownership of Project	0	0	0	0	1	12	0	0	0	0
10	Company Processes	0	0	0	0	0	0	0	0	0	0
11	Resolving Issues Quickly	0	0	0	0	0	0	0	0	0	0
12	Subcontractor Selection	0	0	1	13	1	12	0	0	0	0
13	Quality of Documents	0	0	0	0	0	0	1	11	0	0
14	Project Politics	0	0	0	0	0	0	0	0	0	0
	Total	4		4		4		4		4	

Table 6 shows how points were allocated to the CSF's based on their positional preference rankings. The points scale ranged from 14 points being awarded to the 1<sup>st</sup> choice ranking, 13 points for the 2<sup>nd</sup> choice, and a one point reduction thereon until the 14<sup>th</sup> choice received 1 point. All of these points were then added together and a final points total was awarded to each CSF. The point totals can be seen below in Table 7: Points Total.

Table 7: Points Total

Answer	Total Score
Pre-construction Phase / Pre-coordination Efforts	44
Schedule & Budget	41
Experienced Management	34
Quality Workforce	30
Safety	31
Communication	42
Trust & Accountability / Building Relationships	30
Teamwork & Cooperation	41
Ownership of Project	20
Company Processes	12
Resolving Issues Quickly	28
Subcontractor Selection	31
Quality of Documents	28
Project Politics	8

The total score allocations in Table 7: Points Total, identify the 14 CSF's and their respective scores after evaluation. This list is still in its original order of factors, while the positional ranked list can be seen in Table 8: Final Position Rankings.

Table 8: Final Position Rankings

Final Position	Answer	Total Score
1	Pre-construction Phase / Pre-coordination Efforts	44
2	Communication	42
3	Teamwork & Cooperation	41
3	Schedule & Budget	41
5	Experienced Management	34
6	Subcontractor Selection	31
6	Safety	31
8	Quality Workforce	30
8	Trust & Accountability / Building Relationships	30
10	Resolving Issues Quickly	28
10	Quality of Documents	28
12	Ownership of Project	20
12	Company Processes	12
14	Project Politics	8

Table 8 above shows the final position rankings for the 14 CSF’s based on the preference ranking from the four participants who were interviewed within this study and by utilizing the Borda Count Method.

#### **4.4 Discussion**

The results given in section 4.3 provide the final list of CSF’s in their preference and positional ranked order. Table 8: Final Position Rankings highlights that there were multiple CSF’s which achieved equal position ranks and score totals respectively. The highest ranked CSF with a score of 44 was “Pre-construction Phase / Pre-coordination efforts” and the lowest with a score of 8 was “Project Politics”. From Table 6: Point

Allocation, it can be seen that only two of the fourteen CSF's were picked in the top 5 from three of the four participants. These were "Pre-construction Phase / Pre-coordination efforts" and "Schedule & Budget". Due to limitations, only four participants took part in this study and therefore it would seem that there were a fair number of equal scores and therefore positional rankings. This may differ with an increase in participants.

This study shows that from a general contractors perspective, pre-construction activities including communication, teamwork and the development of a realistic and well planned schedule and budget are critical to the successful delivery of an "Institutional" project for the TAMU system. These CSF's were all ranked very highly within this study and this could be due to the type of contract put in place for these particular projects. It was discussed within the interviews of the participants that many of the TAMU projects are of a CM at risk form of contract and therefore much of the work is put forth by the GC at the planning stages of the project to ensure that they can obtain maximum profitability. These results support the findings in the literature with regards to "pre-construction activities" such as planning as being critical to the success of a project. However, experienced management did not score as highly in this study as it did in the studies reviewed in the literature. This study has identified that if a TAMU "Institutional" project can be well planned and organized by taking advantage of the "Pre-construction and pre-coordination efforts phase" then it can have a considerable impact on the success of the project. As discussed, elements such as operations and estimating, developing

BIM models, sub-contractor selection and obtaining good knowledge of the project before starting the physical building works will all contribute to identifying issues early. This in turn will allow for resolutions to be implemented before the issue becomes a substantial problem. This risk mitigation is essential in ensuring the project runs smoothly and is delivered successfully. The results also suggest that factors such as “Company Processes” and “Project Politics” are not as essential with regards to delivering an “Institutional” project for Texas A&M University in a successful manner.



## 5. SUMMARY AND CONCLUSIONS

### **5.1 Summary**

This study focused on the critical success factors that are essential with regards to the delivery of an “Institutional” project on the Texas A&M University campus. The study was of a case study approach and consisted of carrying out four face-to-face interviews with construction professionals who each worked on a project located on the Texas A&M University campus to identify what they believed to be the top five critical success factors for each of their projects. The results from these interviews then lead to the development of an online survey through the Qualtrics software provided by TAMU which was sent out to each participant. They were then asked to provide a preference ranking of the given CSF’s within the survey using a drag/drop method. These preference rankings were then awarded points based on the CSF positions allowing for a final CSF preference ranking to be achieved.

The review of literature indicates that there are a large number of CSF’s for various types of projects. However, many of the studies reviewed suggested that a clear project scope, planning, cooperation and experienced management are critical to the success of most construction projects. Several of the studies suggested that experienced management is an essential CSF when carrying out a construction project.

The research goal within this study was to identify CSF's for "Institutional" projects for the Texas A&M University system. The goal of this study was split into two objectives; 1) Obtain CSF's for "Institutional" projects through several face-to-face interviews and 2) rank the CSF's in an order of importance using the Borda Count method. This goal was met and a list of CSF's for "Institutional" projects for the TAMU system was achieved.

Whilst many of the studies reviewed in the literature did suggest factors such as planning and cooperation as being essential, many of them also suggested experienced management as being the most critical for the successful delivery of construction projects. The results of this study have shown that "pre-construction" activities are the most critical to the successful delivery of an "Institutional" project on the Texas A&M University campus. This indicates that while there are similarities between other types of construction projects and that of "Institutional" with regards to the CSF's needed for success, there should be a heavy focus on "pre-construction" activities when carrying out an "Institutional" project. As discussed this could be a cause of the type of contract used for these projects, CM at risk.

As this research was a case study approach, the limitations included carrying out research on buildings on the Texas A&M University campus only. Several companies were asked to participate in this study, however, only two chose to participate allowing for a total of four interviews. The four participants interviewed had each worked on a

project from the Texas A&M University campus. Although several ranking methods were identified within the literature only the Borda Count method was used for the ranking.

## **5.2 Significance**

From the literature reviewed it was evident that there is a large amount of research and data with regards to CSC and CSF's for construction projects. However, it was found that there was no specific research which had been conducted on "Institutional" projects. This research attempts to fill this gap in knowledge and provide future recommendations for CSF's specific to "Institutional" projects which may provide a greater probability for successful delivery and completion of these projects. This research study has shown that while there are similarities between the CSF's needed for success on an "Institutional" project and that of other construction projects; "Institutional" projects should be given as much attention as possible in the "pre-construction" activities stage, especially if they are of a CM at risk form of contract.

## **5.3 Future Research**

This research study was limited to only Texas A&M University and "Institutional" projects and, therefore, this research could be continued on different campuses in different geographical locations as the CSF's may differ considerably with regards to these variables. Due to restrictions such as available participants, this study was limited to four interviews and a total of 14 CSF's. If more participants could be incorporated

into the research then this may provide more CSF's which in-turn could provide a different set of results. It should also be considered that the research was conducted only from the General Contractors perspective and, therefore, further research could be conducted by taking into consideration a different stakeholder, such as the client's representative.

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## APPENDIX A

### INTERVIEWS & SURVEY QUESTIONNAIRE

*Below are the 14 compiled Critical Success Factors gathered from the interviews conducted. Each has a short description and details of what was discussed to help you make an informed decision for your preference ranking. Please go to Question 2 and rank these CSF's in an order of importance with regards to the successful completion of an "Institutional" project.*

#### **- Pre-construction Phase / Pre-coordination Efforts:**

This CSF was discussed as being the steps before stepping on site to build. This included all of the operations and estimating, developing the BIM model, and obtaining a good knowledge of the project before starting the physical building works. It was discussed as being something that must be done to ensure that problems are identified and solved before they actually become an issue. This risk mitigation is essential in making the project run as smoothly as possible.

#### **- Schedule & Budget:**

The Schedule and Budget should be treated as living documents which requires a "buy in" from each stakeholder. It is the contractor's job to manage the expectations of the client by developing a realistic schedule and budget at the beginning rather than getting to the close of the project and not being able to deliver on time and on budget. It was discussed that the schedule must be honest and realistic so as not to give anybody a false expectation about completion dates or costs to complete works.

#### **- Experienced Management:**

This CSF was discussed as being something that included things such as ensuring payments are made and received on time, resolving change orders, and ensuring that the project is managed as best as possible.

#### **- Quality Workforce:**

This CSF was explained as something that is both important from the clients', contractors', and subcontractors' perspective. From the contractor's perspective it is essential to obtain good subcontractors who can carry out the work professionally and provide a good product. From the clients perspective it is also imperative to employ a good GC who will carry out the work to a high standard and provide the end user with a project they are happy with (It was discussed that the cheapest option isn't always the best option).

#### **- Safety:**

A positive approach to safety is important, if not given the necessary attention, it can result in the shutdown of the project all together by authorities such as OSHA (Occupational Health & Safety Administration). Management should be actively involved with safety, both from the office and on-site. This includes providing PPE when necessary and promoting the use of PPE at all times. Risks associated with an activity before it begins should be reviewed so that the relevant precautions can be taken to ensure risks are mitigated.

#### **- Communication:**

This was explained as something that must flow from the client to the GC to the subcontractors. This could be seen through RFI's and change orders that are needed for the project and includes direct input from each party for an honest and organized flow of information to be delivered throughout the project.

#### **- Trust & Accountability / Building Relationships:**

This is something that flows down from the top, for example you will not win any work if clients don't trust you, comparatively that as a GC you will not award work to subcontractors you don't trust. Having trust and accountability can lead to repeat work from your clients, something that is extremely important to any

organization or business. Maintaining a good relationship with the end user is also essential. This can be done by being transparent and upfront about any issues and working with them to minimize any further issues that may come from it.

**- Teamwork & Cooperation:**

Having teamwork and cooperation involves each party (client, owners representative, architect etc...) all pulling in the same direction and working towards the same goal as one cohesive unit instead of a set of individuals. With teamwork, the flow of information is better and problems are resolved as a collective group. One way that this is achieved is by keeping in regular contact with all stakeholders and holding regular meetings to discuss the project and what is required to ensure success.

**- Ownership of Project:**

This CSF was explained as "owning" the project by having a good knowledge of the plans, specifications, drawings, and tracking it all as necessary. This includes knowing of any alterations that are required through change orders and updated drawings and passing them onto the relevant persons such as a subcontractor.

**- Company Processes:**

This is slightly different for each organization. It was explained as something that should be followed to ensure risks are mitigated and liabilities are covered. It was expressed that this could be seen through ensuring that the chain of command is followed as per the company process so that all parties are in the loop. This may be seen by going up the chain to request information or authority to proceed, or down the chain through instructions to proceed with said work once authority is given.

**- Resolving Issues Quickly:**

No project is ever totally "issue free". It was discussed that taking care of issues in a timely manner prevents the issue increasing in size. It was explained that in some cases an issue must be escalated up the chain of command so that the entire project team can be utilized and a resolution can be implemented as soon as possible.

**- Subcontractor Selection:**

The GC must be aware of the subcontractor and be confident in their abilities to 1) provide the necessary labor 2) have the ability to carry out their particular task (it may be a specialized task) and 3) be confident that they have included costs for all associated work in order to complete their contractual obligation.

**- Quality Of Documents:**

Having good drawings, specifications, and general information helps prevent RFI's (Request For Information) and allows the project to move along without constant stoppages.

**- Project Politics:**

Project Politics can take many forms depending on the type of project and who the stakeholders are. When dealing with a private client on a private project it may be that the politics are minimal and they can direct the GC as desired without any "red tape" or authority issues. In contrast an Institutional project may have many stakeholders who have direct input with regards to the decision making process and therefore "red tape" can be encountered, leading to an increase in steps before a task can proceed. However, it was also discussed that the "knowledge of the process" comes into play with Project Politics. A well-established and experienced client's representative can also be a great aid with regards to the success of the project.



**Please rank the following 14 Critical Success Factors in order of importance (1 being most important & 14 being least important) with regards to the successful completion of an "Institutional" project. (Drag & Drop into order).**

- Pre-construction Phase / Pre-coordination Efforts
- Schedule & Budget
- Experienced Management
- Quality Workforce
- Safety
- Communication
- Trust & Accountability / Building Relationships
- Teamwork & Cooperation
- Ownership of Project
- Company Processes
- Resolving Issues Quickly
- Subcontractor Selection
- Quality of Documents
- Project Politics

APPENDIX B

IRB APPROVAL

DIVISION OF RESEARCH



**DATE:** April 06, 2016

**MEMORANDUM**

**TO:** Sarel Lavy  
TAMU - College Of Architecture - Construction Science

**FROM:** Dr. James Fluckey  
Chair, TAMU IRB

**Study Number:** IRB2016-0185D

**Title:** Critical success factors affecting successful completion of "institutional" projects: a case study approach.

**Date of**

**Determination:**

**Approval Date:** 04/06/2016

**Continuing** 03/01/2017

**Review Due:**

**Expiration** 04/01/2017

**Date:**

**Documents Reviewed and Approved:** Only IRB-stamped approved versions of study materials (e.g., consent forms, recruitment materials, and questionnaires) can be distributed to human participants. Please log into iRIS to download the stamped, approved version of all study materials. If you are unable to locate the stamped version in iRIS, please contact the iRIS Support Team at 979.845.4969 or the IRB liaison assigned to your area.

Submission Components			
Study Document			
Title	Version Number	Version Date	Outcome
Critical success factors affecting successful completion of institutional projects, a case study approach - IRB REVISED	Version 2.0	03/29/2016	Approved
citiCompletionReport5344801 - Social and behavioral	Version 1.0	02/26/2016	Approved
citiCompletionReport5344801 - Group 2	Version 1.0	02/26/2016	Approved
Study Consent Form			
Title	Version Number	Version Date	Outcome
Consent Form	Version 2.0	04/06/2016	Approved

**Document of Consent:** Written consent in accordance with 45 CF 46.116/ 21 CFR 50.27

750 Agronomy Road, Suite 2701  
1186 TAMU  
College Station, TX  
77843-1186 Tel.  
979.458.1467 Fax.  
979.862.3176  
<http://rcb.tamu.edu>

**Comments:**

- This study is approved for 10 participants.
- This IRB study application has been reviewed and approved by the IRB. Research may begin on the approval date stated above.
- Research is to be conducted according to the study application approved by the IRB prior to implementation.
- Any future correspondence should include the IRB study number and the study title.

Investigators assume the following responsibilities:

1. **Continuing Review:** The study must be renewed by the expiration date in order to continue with the research. A Continuing Review application along with required documents must be submitted by the continuing review deadline. Failure to do so may result in processing delays, study expiration, and/or loss of funding.
2. **Completion Report:** Upon completion of the research study (including data collection and analysis), a Completion Report must be submitted to the IRB.
3. **Unanticipated Problems and Adverse Events:** Unanticipated problems and adverse events must be reported to the IRB immediately.
4. **Reports of Potential Non-compliance:** Potential non-compliance, including deviations from protocol and violations, must be reported to the IRB office immediately.
5. **Amendments:** Changes to the protocol and/or study documents must be requested by submitting an Amendment to the IRB for review. The Amendment must be approved by the IRB before being implemented.
6. **Consent Forms:** When using a consent form or information sheet, the IRB stamped approved version must be used. Please log into iRIS to download the stamped approved version of the consenting instruments. If you are unable to locate the stamped version in iRIS, please contact the iRIS Support Team at 979.845.4969 or the IRB liaison assigned to your area. Human participants are to receive a copy of the consent document, if appropriate.
7. **Post Approval Monitoring:** Expedited and full board studies may be subject to post approval monitoring. During the life of the study, please review and document study progress using the PI self-assessment found on the RCB website as a method of preparation for the potential review. Investigators are responsible for maintaining complete and accurate study records and making them available for post approval monitoring. Investigators are encouraged to request a pre-initiation site visit with the Post Approval Monitor. These visits are designed to help ensure that all necessary documents are approved and in order prior to initiating the study and to help investigators maintain compliance.
8. **Recruitment:** All approved recruitment materials will be stamped electronically by the HRPP staff and available for download from iRIS. These IRB-stamped approved documents from iRIS must be used for recruitment. For materials that are distributed to potential participants electronically and for which you can only feasibly use the approved text rather than the stamped document, the study's IRB Study Number, approval date, and expiration dates must be included in the following format: TAMU IRB#20XXXXXX Approved: XX/XX/XXXX Expiration Date: XX/XX/XXXX.
9. **FERPA and PPRA:** Investigators conducting research with students must have appropriate approvals from the FERPA administrator at the institution where the research will be conducted in accordance with the Family Education Rights and Privacy Act (FERPA). The Protection of Pupil Rights Amendment (PPRA) protects the rights of parents in students ensuring that written

parental consent is required for participation in surveys, analysis, or evaluation that ask questions falling into categories of protected information.

10. **Food:** Any use of food in the conduct of human research must follow Texas A&M University Standard Administrative Procedure 24.01.01.M4.02.
11. **Payments:** Any use of payments to human research participants must follow Texas A&M University Standard Administrative Procedure 21.01.99.M0.03.
12. **Records Retention:** Federal Regulations require records be retained for at least 3 years. Records of a study that collects protected health information are required to be retained for at least 6 years. Some sponsors require extended records retention. Texas A&M University rule 15.99.03.M1.03 Responsible Stewardship of Research Data requires that research records be retained on Texas A&M property.  
This electronic document provides notification of the review results by the Institutional Review Board.