Implementing Project Management Software into a Small Residential Construction Company

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Over the past twenty years, the popularity of web-based project management software in the construction industry has grown tremendously. Today, there are a variety of different project management software companies that aim to specifically serve the construction industry. Many construction companies have committed significant financial and personnel resources to the implementation of project management software. The largest users of project management software in the construction industry are large commercial and/or heavy civil construction firms. This is because of the large and complex nature of the projects these companies typically work on. Small residential construction companies deal with projects that are less complex, that produce less overall project data, but could still see significant benefits from implementing a project management software into their company. This case study details the implementation of Procore, a web-based project management software, into an existing small residential construction company. The case study also outlines the benefits the company realized since the software's implementation. Overall, the case study shows that the implementation of Procore had many positive effects on the company. This outcome strongly suggests that small residential contractors as a group would benefit from the implementation of project management software.

Key Words: Residential Construction, Software Implementation, Project Management, Procore

Introduction

The goal of this case study is to successfully implement a project management software, in this case Procore, into an existing small residential construction company. In doing so, the case study will also serve as a roadmap for other small residential contractors looking to implement a project management software into their company. Additionally, the case study will show that even though residential construction companies deal with smaller and less complex projects, project management software such as Procore, can still have a positive impact on their company. The case study will detail the sales and training phase, as well as the startup of both the project management and financial management modules within Procore. The case study will conclude with an interview of the owner of the company detailing the benefits of the software from his point of view.

Literature Review and Background

As it stands today, the existing literature regarding project management software in the construction industry is solely focused on large corporations mainly in the heavy civil and commercial sectors. These papers outline the importance of project management software for large companies and various case studies outline the implementation process. There are no such papers or case studies for small residential construction companies even though the benefit for these small companies would be large, possibly even larger (in terms of percentage) than the benefit experienced by the larger companies. The following literature review describes how project management software is not being used to its full potential in the construction industry; the potential benefit construction companies could see from implementing project management software; and the barriers to implementation for these companies.

While many industries have embraced new technology, the construction industry has been resistant to change (Marsh, Flanagan, 200). One such technological advancement that construction companies have resisted for over two decades is the implementation of a web-based project management software. Before the internet, contractors relied on notepads and their memory for managing their company's projects. Today, there are much more sophisticated and efficient methods for project management, one of which is project management software. While some construction companies have embraced project management software, as a whole the AEC (architecture-engineering-construction) industry is not using project management software to its full potential (Arnold, Javernick-Will, 2013). A 2004 study by the National Institute of Standard and Technology, quantified failure to maximize potential and found a loss of $15.8 billion to the AEC industry from its lack of data integration, much of which could have been avoided with a project management software (Gallaher, O'Connor, Dettbarn, Gilday, 2004).

The benefits from implementing a project management software into a construction company with an outdated or nonexistent project management system are many. While there may be a variety of different types and uses for project management software, the overarching goal of any project management software is to give project managers a tool that they can use to successfully manage and achieve the financial, scheduling, contractual, and quality goals of a project. To illustrate this point, a case study of a railway project in Hong Kong found that the project management software used for the project assisted "project managers and administrators in assessing project performance in a timely manner" (Cheung, Suen, Cheung, 2004, p.11). In addition to allowing project managers and administrations to easily analyze their projects, project management software also increases the overall efficiency of a construction project. Project management software increases the efficiency of a construction project by reducing the time required for distributing documents, automatically distributing changes to project documents, eliminating the possibility of losing important project files, providing a collaborative environment for all project players, and much more (Alshawi, Ingirige, 2003).

Despite an awareness of these benefits, many construction companies are still not implementing /// project management software into their company. Some construction companies are avoiding implementing a project management software due to worries over system reliability and security, legal issues of electronic transactions, and resistance to change (Nitithamyong, Skibniewski, 2004).

While this may have been a valid concern two decades ago, issues with electronic security are far less common despite the ever-growing number of global electronic transactions (Clement, 2020). Another concern construction companies have regarding the implementation of project management software is with the challenge of quantifying the potential benefits resulting from the use of the software (Marsh, Flanagan, 200). A third and final area of concern for companies considering implementing a project management software is the fear of excessive data entry (Arnold, Javernick-Will, 2013).

Methodology

In order to accomplish the goal of this case study – successfully implementing a project management software into a small residential construction company – this researcher broke the implementation up into three sequential phases sales/initial training, startup of the project management module, and finally startup of the financial management module. The software that was chosen to implement into the company was Procore. This decision was based off of the researcher's and the company's familiarity with the Procore software.

Procore directed the company to complete each phase before moving on to the next. This helped to not overwhelm the individuals implementing the software or disrupt the day to day operations of the company. The sales/initial training phase was the lengthiest and consisted of meetings with sales representatives from Procore, as well as training sessions outlining the basic functionality of the software. The project management phase was simple and was mainly data entry to ensure the module could be used as designed. Lastly, the financial management phase was the most complex as it required the company to change the way all financial transactions were tracked.

Immediately following the completion of the implementation of Procore into the company, this researcher conducted an interview with the owner of the company. The purpose of the interview was to capture the benefits the company experienced from the owner's perspective. The interview results will allow the owners of other small residential construction companies to see how this company benefited from the implementation of the project management software. Table 1, shown below, highlights a few key statistics about the company which Procore is being implemented into.

Table 1

Company X Key Statistics

Annual Construction Volume	**Number of Employees**	**Typical Project Type**	**Typical Project Length**	**Entity Type**

$1.3 - $1.5 Million	5	Ground Up Custom Home or Remodel (Residential)	12-14 Months	Sole Proprietorship

Results/Analysis

Sales/Initial Training

The first step in the implementation of Procore is speaking with a sales representative from Procore to see if the product is a fit for the company. In this initial phone call, the sales representative asks about the structure of the company, the type and length of projects the company works on, and lastly gives a rough order of magnitude estimate for the price of the software. The pricing for Procore's software is based on the annual construction volume of the company, as well as the number of tools (also called modules) the company plans to use. If the company is interested in the software and believes the pricing to be reasonable, the sales representative will schedule another call, this time with a market specific specialist.

The market specific specialist is chosen based on which sector of the construction industry the company works in. Since the company in question is a small residential contractor, the specialist chosen was a residential-small general contractor specialist. The specialist reviews information covered with the sales department and then explains how the process will look moving forward. The specialist explains that the next step is to go through three demonstration calls where he will walk the company through some of the different modules of the software – project management, financial management, and bid management. These three demonstrations are designed to explain the different modules, the basic functionality of the software, and the potential benefit the company could see from implementing the software. At this point there is no commitment to buy the software and there is no charge for the three demonstrations.

The specialist and the company organize a schedule to cover one module per week allowing for adequate time to gain understanding while still maintaining the day to day operations of the company. In between each demonstration, the specialist assigns the company certification videos to watch. These certification videos are made by Procore and cover certain topics in more detail allowing the company to gain more understanding on complex pieces of the software.

At the conclusion of the third demonstration, the specialist along with members from the sales team asks the company about their feelings about the software and their willingness to go forward with a purchase. In this case, the company understood the benefit the software provided and believed the pricing to be reasonable, so the company purchased the software. However, rather than buying all of the modules offered, the company decided to purchase two of the most basic but essential modules – project management and financial management. Once the product was purchased, a five-week

implementation period begins. During this implementation period Procore offers custom built solutions to assist the company in starting up the project management and financial management modules.

Project Management

In starting up both the project management and financial management modules, the company first created a new project within Procore. This new project was for an upcoming job the company was pursuing. After entering general information about the job such as the value, start date, and location, the company could begin uploading data which would allow them to use the project management and financial management tools.

Procore is designed so that the largest contractor in the world can use it. Since the company in question is smaller than even an average size commercial contractor, some of the functionality of the modules had to be scaled back. Rather than using the full functionality of the project management module, the tools that were chosen were the schedule, daily logs, photos, drawings, and punch list. Once the tools within the project management module were selected, the company began uploading the required data such as the project schedule, drawings, and photos. Choosing the relevant tools as well as a large amount of data entry made up the bulk of the work for the startup of the project management module.

Financial Management

Now that the project management module was up and running, the company could begin work on the financial management module within the same project. Similar to the project management module, the functionality of the financial management module had to be scaled back. The tools within the financial management module that were selected were the prime contract, budget, and commitments.

Setting up the financial management module was much more difficult and complex than setting up the project management module. For years, the company had tracked costs in a way that did not make use of cost codes and was an outdated inefficient system. In order for the financial management module to operate correctly, a detailed cost code system was required. The company first tried to use Procore's standard cost code list which was comprised of the original 16 division from the Construction Specifications Institute. Quickly the company realized this list was insufficient and thus the company was forced to go through the process of creating their own cost code list. Once the cost code list was completed the company could upload necessary data to make use of the prime contract, budget, and commitments tools within the financial module. At this point the company could begin using the tools as they were designed to be used.

Interview Results

Once the implementation was complete, this researcher interviewed the company owner to get an insight into the benefits he saw in his company since the software implementation. The company

owner reported seeing many benefits in three key areas of the company: record keeping, efficiency, and marketing.

The first and foremost benefit the company realized since the implementation is a standardized and organized system of record keeping. Prior to the software implementation, the company office was flooded with stacks of paper. Often times when the company owner needed an important document, he struggled to find it. Now, all relevant company and project data such as photos and daily logs are stored within the project management software in one folder. This not only helps the company stay organized, it also helps solve disputes early and serves as a form of liability protection.

The next benefit the owner reported seeing in his company since the software's implementation was an increase in overall efficiency – both in the field and in the office. One of the key reasons for this increased efficiency is that the software created an environment which encouraged communication between all individuals and groups involved in the project. For example, if a drawing is updated or a specification is changed, this change can be updated on the software and immediately sent out to all project players, ensuring everyone has the most up to date project documents. A second reason for the increased efficiency is the set procedures and templates available on the software. Built into the software are set procedures and templates for items such as timecards and change orders which expedites their completion and allows more time for actual construction.

The third and final benefit the company owner claimed the company has experienced was increased leverage in the marketing realm. Being able to show a potential client a state-of-the-art project management software that allows for transparency and accurate updates is something that most small residential contractors cannot do. Project owners can now be given access to view certain project information in order to track the progression of their project from anywhere. Additionally, the company is given the ability to restrict the clients access so that they can only view certain items such as meeting minutes or photos.

Conclusions

From the perspective of the researcher, there are numerous benefits to the company since the implementation of the software. Some of these benefits are small technical items and others are large items that improve the structure of the company. Overall, the implementation of the software has given the company a solid foundation on which it can expand. For years, the company did things that worked in the moment but did not support the longevity and continued success of the company. Now, the company has highly structured and organized processes which it follows that not only support the day to day decisions but also support the health of the company. The result is a less stressful work environment, more satisfied clients, and a better product.

The most difficult part of the implementation was not disrupting the day to day operations of the company. In this case, the implementation took place while one major job was nearing completion, another major job was going through the approval process, and various minor jobs were taking place.

This meant that the company staff was already extremely busy with normal operations. It took a large effort on the part of the researcher, as well as all company staff to schedule implementation meetings and follow through with those meetings.

In order for the implementation to be successful, all members of the company need to believe in the software. It is extremely critical that, before beginning the implementation process, time is reserved to showcase the power of the software and the benefits it can and will have on company operations. Without this important step, some members of the company may never put the required time and effort into the implementation process. This would result members of the company not understanding how the software works, or even a faulty implementation.

Future Research

This case study is just the beginning of the possible research on this topic. Technology in construction is growing and that growth will encourage more research. While this study qualitatively shows the benefits of implementing a project management software, a study that showed these benefits quantitatively may be more convincing. One such study could perform a financial analysis on a company before and after implementation in order to show the financial effects of the software's implementation. The researcher would have to be versed not only in construction, but also in the analysis of financial statements.

Another potential study could analyze the effects on field and office productivity from the software's implementation. This study could identify key daily tasks and measure how efficiently/inefficiently the task was done prior to implementation and measure how efficiently/inefficiently the task was done after implementation. These are just two of a wide variety of potential research ideas regarding this topic. For this research to be effective the researchers would need unhindered access to a company's records, an adequate number of personnel, and enough time to study the data.

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