Optimizing Contractor Organizational Agility in Dynamic Markets

by

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ABSTRACT

Over the last twenty years, governments at all levels have made changes to increase their level of accountability and transparency. The researcher proposed that the concepts of organizational agility (OA) (leveraging core competencies, proactively seeking new opportunities, implementation of performance metrics, and strategically planning projects) are well-aligned with the public accountability systems. In the first part of this dissertation, the researcher examined the components of a "Value-Based Model" for public works contractor selection and project delivery, and its propensity to increase public accountability. The researcher studied 415 projects ($561.47M value) delivered with the Value-Based Model at eight different public agencies over a ten-year period.

Next, the researcher analyzed factors affecting contractor organizational agility. In light of the "Great Recession", the concepts of organizational agility offers insights into companies could have made different strategic decisions to avoid many of the issues faced. Construction was particularly affected: by January 2010, unemployment reached approximately 20 percent. One way to combat declining profits is to adjust general overhead costs (indirect expenses). These costs include items such as home office expenses, business development, and bonuses. The objective of the second part of this research was to conduct a study of how contractors responded to dynamic market conditions and to identify if whether contractors' company attributes impacted their responses to the market changes. A total of 437 contractors responded to the survey, and 92 percent reported that they reduced overhead costs in five areas, by an average of about 15 percent. Additional analysis suggests that there are distinct categories of overhead flexibility.

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CHAPTER 1

INTRODUCTION

PUBLIC ACCOUNTABILITY AND ORGANIZATIONAL AGILITY STUDY

The National Partnership for Reinventing Government (NPR), previously known as the National Performance Review, was a directive from President Bill Clinton in 1993 to conduct an extensive review of all facets of the federal government in an effort to reduce spending and increase efficiency (Gore, 1993; Kamensky, 2001). The report acknowledged that the government was historically bureaucratic, bogged down in red tape and rules, burdened by excessive service acquisitions costs, faced resistance in making changes to the status quo, and was susceptible to corruption. One of the important results from the study was Congress' creation of the Government Performance Results Act (GPRA) of 1993. The Act was designed to improve accountability to the public through increased transparency and availability of objective performance information for policymakers. President George W. Bush expanded the role of GPRA through the Program Assessment Rating Tool (PART) to help streamline the reporting requirements of various agencies (Schoen, 2007). These tools have had an impact: for instance, in 2006 President Bush recommended eliminating 48 programs (of the 607 evaluated) based on their PART assessment scores and other factors (Gruber, 2005).

GPRA, and subsequent programs, are attempts to increase the accountability of government entities through the use of performance information and specifically to increase public accountability and solve many of the problems bedeviling large, public construction efforts and creating the over-budget-and-behind-schedule outcomes commonly associated with them. From a business perspective, performance improvements

come from methods that increase the organizational agility of public agencies: that is, the legislation attempts to encourage rapid response to changing societal conditions in the most cost-effective manner that yields highly beneficial results. The concept of "agility" has applicability in the public sector as much as it does in the private. Yet, the two sectors, of course, are hugely different. Public officials often face competing accountability systems in numerous facets of delivering public goods and services.

One area that is particularly susceptible to conflicting accountability requirements is the provision of public works projects and its intersection with the budgeting process. Justice and Miller's 2011 study of New York's Metropolitan Transportation Authority (MTA) found that the "…dilemma of accountability here resulted not from conflicts between public accountability systems or the mixed market and nonmarket nature of the MTA but instead from a conflict between values within the professional accountability system" (p. 323).

This paper first frames the concepts of organizational agility within the context of public entities, and considers the various ways in which agile concepts increase public agencies' propensity for accountability and transparency. Agility stems from the manufacturing industry in response to increasing demands for rapid response to changing customer preferences (Gunasekaran, 1999; Nagel & Dove, 1991; Yusuf, Sarhadi, & Gunasekaran, 1999). At first glance the ideas may seem inconsistent with public values, but further analysis shows that they are, in fact, quite in line. The public certainly wants their representative government to respond quickly to changing needs, more accountability, be cost-effective in using taxpayer funds, and be flexible enough to address the concerns of the general population.

The paper then discusses a "value-based model" (VBM) in the context of the five major public accountability systems (bureaucratic, legal, professional, political, and market). The paper concludes with a ten-year longitudinal case study of eight public users' implementation of the agility and public accountability on 415 public works projects ($561.47M in project value).

AGILITY AND CONSTRUCTION CORPORATE OVERHEAD STUDY

The past several years have been marked by significant economic changes in the United States and throughout the world. The "Great Recession" had wide-ranging impact on numerous industries, but particularly those tied to the business of housing, both on the financial and construction sides. The Recession lasted approximately 18 months, from December 2007 to June 2009 (National Bureau of Economic Research, 2010). Many organizations were substantially affected by the downturn and were forced to change how they transacted with other businesses. Banks' lending requirements became more stringent, bonding companies were more selective of their clientele, government entities increased their oversight and accountability measures, and consumers limited expenditure of their disposable income.

Economies are highly interdependent systems: the success (or failure) of one group of entities certainly has an impact on others within the system. This paper first provides contextual data of the U.S. economy, and its specific impact on the construction industry. The researcher focused on construction spending and employment rates, and then provided a financial snapshot of the typical company during and after the recession. The data shows that many construction companies experienced severe losses. The researcher conducted a

survey of contractors on how they adjusted their internal overhead expenses as a direct result of the recession. The paper concludes with an analysis of these expenses and offers insights into how certain company traits might affect their ability to adjust overhead.

OVERHEAD FLEXIBILITY CLASSIFICATION SYSTEM STUDY

Some background is needed to understand how markets change, and the impact that competition has on internal structures of business. Many decades ago, the Austrian economist Schumpeter stated, "There is certainly no point in trying to conserve obsolescent industries indefinitely; but there is point in trying to avoid their coming down with a crash and in attempting to turn a rout, which may become a center of cumulative depressive effects, into orderly retreat." (Schumpeter, 1943, p. 90). A reflection on the 2008-2013 recession may bring about similar questions, as the industry, and especially construction, attempt to rethink their corporate structures, in terms of labor forces, business processes, and financial structures. Schumpeter's "gale of creative destruction" describes a phenomenon whereby firms successfully enter a market, which therefore encourages other companies to also enter it (D'Aveni & Gunther, 1994; Schumpeter, 1943; Wiggins & Ruefli, 2005). With a well-established market, like construction, the cost pressure is very strong. This pressure should force contractors to adopt advanced approaches to financial management. In essence, this is really a discussion on competitive edge – companies build up their competitive advantage over time through a series of small advances whose cumulative effect distinguishes high performers (Porter, 1985).

CHAPTER 2

LITERATURE REVIEW

PUBLIC ACCOUNTABILITY AND ORGANIZATIONAL AGILITY STUDY

Public agencies have long sought to increase their adaptability to best meet the needs of the public, while still maintaining a level of accountability to multiple parties. Accountability to the greater public has often been at the forefront of discussion of the average citizen, program administrators, political leaders, and so many others. After an extensive review of the literature and in reflection of the researcher's professional experience, four tenets of organizational agility (OA) offer insights into improving the provision of public services. These tenets include: identifying and leverage core competencies, proactively seeking new opportunities, implementation of performance metrics, and instituting strategic pre-planning. OA is then framed within the context of public accountability.

Concepts of Organizational Agility

Leverage core competencies

Core competencies are those skills sets that uniquely qualify an organization for long-term success (Porter, 1985). In general, core competencies do three things: provide access to many different potential buyers, clearly add benefit to the customer, and are difficult for competitors to imitate (Prahalad & Hamel, 1990). By extension, an agile organization is one that proactively identifies and builds their key skills. Agile organizations have an unrelenting focus on building their skills ahead of the market (Nohria, Joyce, & Roberson, 2003; Sull, 2009). Public agencies certainly do not compete

in the same sense as private businesses do, but this does not preclude them from leveraging their own assets to create better, value-generating services for the taxpayer. For instance, a city may have unique local geographic features or business opportunities that substantially differentiates it from other cities. If the city had a high degree of operational agility, it would align staff and other resources to drastically bolster the public's access to, and use of, these core competencies.

Seek New Opportunities

Organizational *flexibility* is the capacity of institutions to successfully respond to a wide range of possibilities, changing environmental factors, unforeseen circumstances, and new competition (Gerwin, 2005; Li & Zhao, 2006; Pernici & Weske, 2006). People in a flexible organization are generally more comfortable with change (compared to an inflexible entity), and face less resistance in making changes. *Agile* organizations, while similar to flexible organizations, respond to change at a more rapid pace (Dyer & Shafer, 1998; Goldman, Nagel, & Preiss, 1995; McGaughey, 1999). The key differentiating factor of an agile organization is the speed by which it responds to the new conditions of its environment. Agile organizations find, and act on, new opportunities faster than their competitors. An agile city government, for instance, may seek to adjust to fund balances in anticipation of changing financial demographics of its tax base, bolster its maintenance budget in advance of failing infrastructure, or make performance metrics of a particular government service publically available.

Performance Metrics

A third concept of agility is an organization's use of performance metrics for the key areas of their business. Performance information helps an entity identify whether they are meeting objectives or are responsive to their constituents needs (Greene, 2005; Holzer & Schwester, 2011). These measurements should be directly tied the agency's stated objectives, goals, and core competencies (Rivlin, 1971). These measurements will be what drives the organization to improve how it operates, and to what degree. It is critical then that the measurements sufficiently describe the organization's overall performance, while also being relatively simple to calculate. If the amount of resources required to generate the measurements exceeds the potential benefits from having the metric, then the measurement is too complex. Metrics that are developed haphazardly will result in misrepresentation of the agency's performance and increase internal resistance to adopting the measures (Holzer & Schwester, 2011).

Pre-planning

Finally, we also consider the concept of pre-planning as another tool within organizational agility. Pre-planning or strategizing involves looking at the feasibility of an effort, expected costs and time needs, environmental factors, and other risk considerations (Gibson Jr., Kaczmarowski, & Lore Jr., 1995). Or, stated another way, agile organizations use systems thinking and, "have an appreciation of the complex interplay among good management practices… even the best people cannot overcome the constraints imposed by the bad systems" (Worley, Williams, & Lawler III, 2014, p. 114). Agile public organizations, then, are those who think ahead, strategically consider the risks they may

face in a new project or policy change, and involve key stakeholders in the process (Arteta & Giachetti, 2004).

Increasing Organizational Agility

The question naturally becomes, "What can organizations do to increase their agility and reap its benefits?" High levels of OA are characterized by speed in adapting to new situations with a certain degree of relative ease, and are critical to maintaining sustained success (Macias-Lizaso & Thiel, 2006; Powell Jr, 2002). Nevertheless, in order for groups to even adjust to a new change, they must have the right kind of information at the right time (Walsh, Bryson, & Lonti, 2002). Generally, "agile" performance benchmarks fall under cost, time, and expectation / satisfaction categories (Dyer & Shafer, 1998; Gong & Janssen, 2012).

Organizations may also use benchmarking or performance measurement as a way of quantifying various facets of performance, such that they can compare their performance to competitors, or internally over a set period of time. Benchmarking is a quantitative method of measuring outcomes over a period of time to understand how these measures are changing (internal benchmarking), or to provide a comparison against standard industry results (external benchmarking) (Camp, 1989; Fibuch & Van Way, 2013). In fact, many public organizations are beginning to collaborate and establish a unified approach to measuring performance, both in terms of using a standard set of measures and also sharing this information with each other (Knutsson, Ramberg, & Tagesson, 2012; Siverbo & Johansson, 2006).

However, while these might seem appealing, organizations (and especially public agencies) must not underestimate the tremendous amount effort it will take to start implementing some of the agile concepts and measures (Ankrah & Langford, 2005; K. T. Sullivan, 2011). Many of long-standing systems at the foundation for the delivery of public goods and services are structurally incapable of providing information in a format that is conducive to "agile" behavior (Gong & Janssen, 2012). Organizational agility and flexibility can also change on a project-by-project basis. One study found that as a public works' project scope (cost and schedule duration) increased, so did personnel resistance to implementing project-level innovations and changes (Lines, Sullivan, Smithwick, & Mischung, 2015). However, this same study also found that organizations that took a long-term approach (in making the process-improvement adjustments) had less resistance to the change.

Public Accountability Frameworks

If profitability is the measure of success for the private industry, then public accountability is the currency by which public entities operate and deliver value to their constituents. While the concepts of organizational agility came out of manufacturing and business process analysis, many of the tenets of OA can help government organizations to increase their level of accountability. Just as investors anticipate a return on their shares, citizens expect that their tax dollars will be used efficiently and for programs that the taxpayer feels are in their own best interests. That is, citizens expect the government to be accountable for the monies they are given.

First, a brief discussion is needed on what drives government action with respect to citizens' expectations. The literature identifies five different types of public accountability frameworks (Finer, 1941; Romzek & Dubnick, 1987). However, the systems can sometimes conflict with administrators' diverse directions and requirements (Justice & Miller, 2011). The five identified public accountability frameworks are:

1. The defining trait of *bureaucratic* accountability systems is a clear command-and-control structure. Priorities are set by leadership, and subordinates are expected to carry out the necessary support tasks. The superiors manage their subordinates through tight control and explicit direction on what should, or should not, take place.
2. Unlike bureaucratic accountability, *legal* accountability is maintained by an external entity who oversees and directs the agency. These external entities include various lawmaking bodies (e.g., congress). The external nature of the legal entity changes the organizational structure of the public agency so that employees are motivated by the nature of the "third-party review" of their work.
3. *Professional* accountability is a relatively new concept. As today's social, economic, and political challenges become increasingly complex, professional accountability encourages agencies to use the expertise of their own staff and external agencies. In other words, give the right person the right job at the right time. This system is quite different from a bureaucratic accountability structure, in that professional accountability derives authority from individuals' relative skills (versus the position-based authority characteristic of a bureaucracy).

4. While legal accountability is based on legislated rules, *political* accountability recognizes the impact that the appointment of various officials has on the agency's constituents. It is designed so that the agency, as a whole, can answer the question, "Whom do I actually serve?" Political appointments can help to communicate the relative importance of the leadership's goals.
5. This fifth framework, identified by Justice and Miller (2011), allows the public to have some choice as to how the government actually provides service. *Market* accountability creates a system of private consumer choice for the provision of publically-provided goods.

The literature identifies several methods for increasing public accountability (Day & Klein, 1987; Dicke & Ott, 1999; Rist, 1989). First, *auditing* government functions ensures that the execution of the programs or projects adheres to the planned implementation. The auditing approach assumes that process being accessed will actually yield the intended results – auditing does not look at the final impact. *Monitoring* assessments verifies that the service being performed falls within the performance requirements. It is seen as an active process of observing how the service is being carried out, quantification of activities, and other inspections. A *contract* is a document that attempts to spell out what should be done, and by whom. While contracts attempt to provide detailed instruction on task requirements, the parties must strike a balance. Some argue that informal agreements, depending on the scope of the agreement, can be more efficient because more formal contracts are prohibitive due to resource costs with preparing such a detailed document (Kessler & Leider, 2011). Contracts are generally most effective

where the two entities have a large bargaining position differential (Evan, 1963). That is, when the two entities have vastly different sizes or internal operations, a contract generally creates a better understanding of the requirements.

In many ways, a high level of organizational agility is prerequisite to achieving appropriate levels of accountability. As shown in Table 1, public agencies that successfully implement the agile concepts can work to shape their internal organizational culture, and as a result, increase public accountability.

Table 1

Summary of Organizational Agility and Its Impact on Public Accountability

Agile Concept	How it Increases Public Accountability
Leverage core competencies.	Some municipalities may offer unique geographic or business assets that, if leveraged, would help increase its tax base or citizen satisfaction.
Collect the right information, at the right time, from the right sources. Use performance metrics.	Performance metrics help identify how efficient government funds are being used, and how well the agency is performing according its strategic plan, or perhaps how well they are leveraging their core competencies.
Proactively seek out new opportunities, or quickly adapt to changing environmental, economic, or societal conditions.	Citizens want their government to respond to their needs. A constant "looking ahead" mentality by public administrators will increase the agency's ability to foresee changes.
Strategically plan out efforts and targets	Planning helps communicate the public agency's long term objectives, and provide justification for the types of funding received or taxes collected

Public Accountability in the Built Environment

One area that has had relatively poor performance is public works and the various functions therein (architecture, design, construction, facility management). The construction industry has experienced many years of low performance. Several studies

have reported that construction projects were completed between 25 and 35 percent over budget, and upwards of 50 percent were completed late (Georgy, Chang, & Zhang, 2005; Post, 1998). A recent study by PricewaterhouseCoopers found that only 2.5 percent of projects were successful, when considering scope, cost, schedule, and business benefits (PricewaterhouseCoopers, 2009). Large projects have been reported to have cost and schedule deviation by as much as 200 percent (Condon & Hartman, 2004). Furthermore, the cost of capital construction projects has increased by approximately 140 percent, excluding inflation (Westney Consulting Group, 2014). Almost half (47 percent) of this cost increase is attributed to increased managerial efforts by both owners and contractors. In short, these data show that public works projects are generally not successful while at the same time increasing the cost to the taxpayer.

An analysis of the contractual relationship between the public owner and contractors helps explain the persistent levels of low performance in the built environment. Public works projects are typically awarded to the low bidder (Sturts & Griffis, 2005). When contracts are awarded solely on the basis of price, the owner is assuming that other factors (i.e., past performance, risk management capability, technical capability) do not provide enough differential to warrant consideration. Price-based award treats the service providers (be it contractors, business process consultants, healthcare providers, etc.) as if they were commodities. As a result, vendors become less efficient and quality goes down (Cotts, 2003; Singh & Tiong, 2005). The owner's actions of making price-based awards decreases the industry's incentives to spend resources on training and skill development (Marquardt, 2001). In the long run, low bid procurement in high risk areas (such as construction) is unsustainable (Dorée, 2004).

Therefore, the hallmarks of accountable, agile organizations (i.e., use of performance metrics for positive accountability, pre-planning, profitable / efficient adventures) appear to be absent from many public works projects.

Value-Based Approach to Agility and Public Accountability

Price-based practices (and the reliance on a contract to ensure performance) are incongruent with organizational agility and public accountability concepts previously discussed. In the past ten years, some owners have started using a "value-based model" (VBM) for the provision of their design and construction services (K. T. Sullivan, 2011). VBM does not focus on the contractual mechanism between the owner and contractor, but rather focuses on improving interactions between the two entities, instituting pre-planning, and establishing performance metrics of the project (Lines, Sullivan, Hurtado, & Savicky, 2014; K. Sullivan, Kashiwagi, & Chong, 2009). The VBM has three-phases that, when used in conjunction, are designed to increase public agencies' accountability through pre-contract planning and performance measurement (see Figure 1).

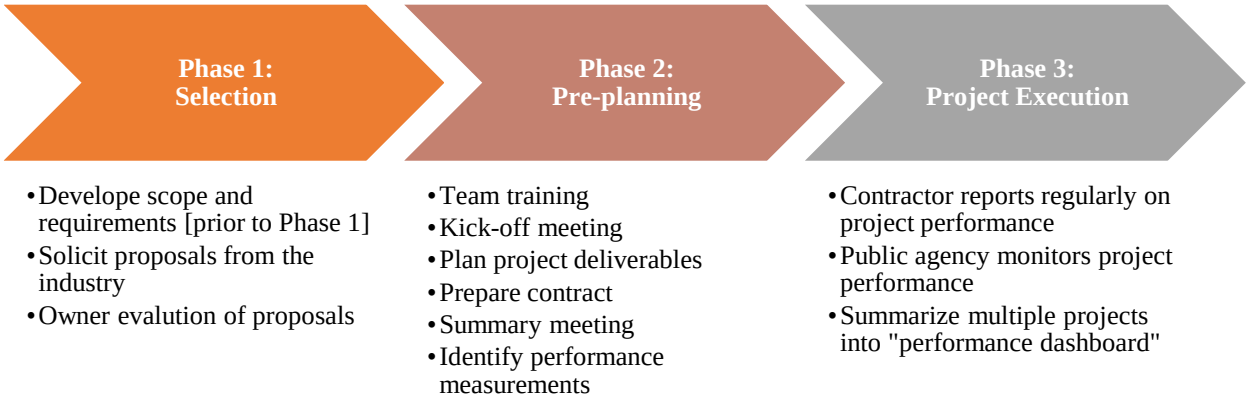

Figure 1. Three Phases of the Value-Based Model

Phase One: Selection

Typically, the owner will develop a description of their requirements for the project, an estimated cost, and a timeline. This information may be developed by external consultants, architects / engineers, or internal subject matter experts. In traditional construction projects, this will include a full set of detailed plans and specifications. While the VBM is instituted by the owner, it relies on the expertise of the contracted vendors and their personnel. Within the constraints of their internal resources, the owner should provide as much detail as possible about their existing conditions and major goals of the project. Once scope development is complete, the owner will solicit proposals from the industry, typically in a Request for Proposals (RFP). For further details about the Selection process, see (K. T. Sullivan, 2011) and (Kashiwagi, 2012).

Phase 2: Pre-planning

The Pre-planning phase is a major differentiator from the traditional project delivery mechanisms (Lines et al., 2014; Smithwick, Schultz, Sullivan, & Kashiwagi, 2013). Phase 2 is carried out with the single potential best contractor identified from Phase 1, and typically lasts between two and four weeks, depending on the project's complexity and propensity for risk. The primary objective of the pre-planning phase is align the key parties' (owner, contractor, public constituents) expectations (Schein, 2010), through the development of a project execution plan, project performance metrics, a risk management plan, financial summary, project schedule, and any other required documentation.

Phase 3: Project Execution

After successful completion of the Pre-planning phase, a contract is awarded and the project or service commences. In the VBM, the contractor will report on project status with respect to the baseline cost and schedule measurements identified in Phase 2. This regular reporting of the performance metrics is what creates accountability. It allows the public agency to improve their agility by identifying risk in the delivery of public services, where changes might need to be made, and minimizes the inefficient use of public funds (due to a lack of performance information on the project). Once the project is complete, a closeout survey will be completed by the owner's project manager to measure satisfaction.

AGILITY AND CONSTRUCTION CORPORATE OVERHEAD STUDY

The National Bureau of Economic Research (NBER) used several indicators to confirm the existence of the recession, including manufacturing sales, personal income, and payroll. These measures, along with several others, clearly show that the U.S. was experiencing tremendous financial turmoil. In an effort to highlight the reduction of construction spending, the researcher analyzed construction spending and employment data from the Bureau of Labor Statistics.

Construction Spending

Figure 2 presents the U.S. Gross Domestic Product (GDP) and inflation-adjusted nonresidential construction put in place (CIP) from the period January 2007 to December 2014 (one year before the recession and five years after). The researcher used seasonally-adjusted data and also adjusted for inflation using the producer price index (inputs to new

construction, series WPUIP2310001 from the BLS). Nonresidential data was not available prior to 2010 (however, the researcher observed that both residential and nonresidential spending showed similar patterns of change).

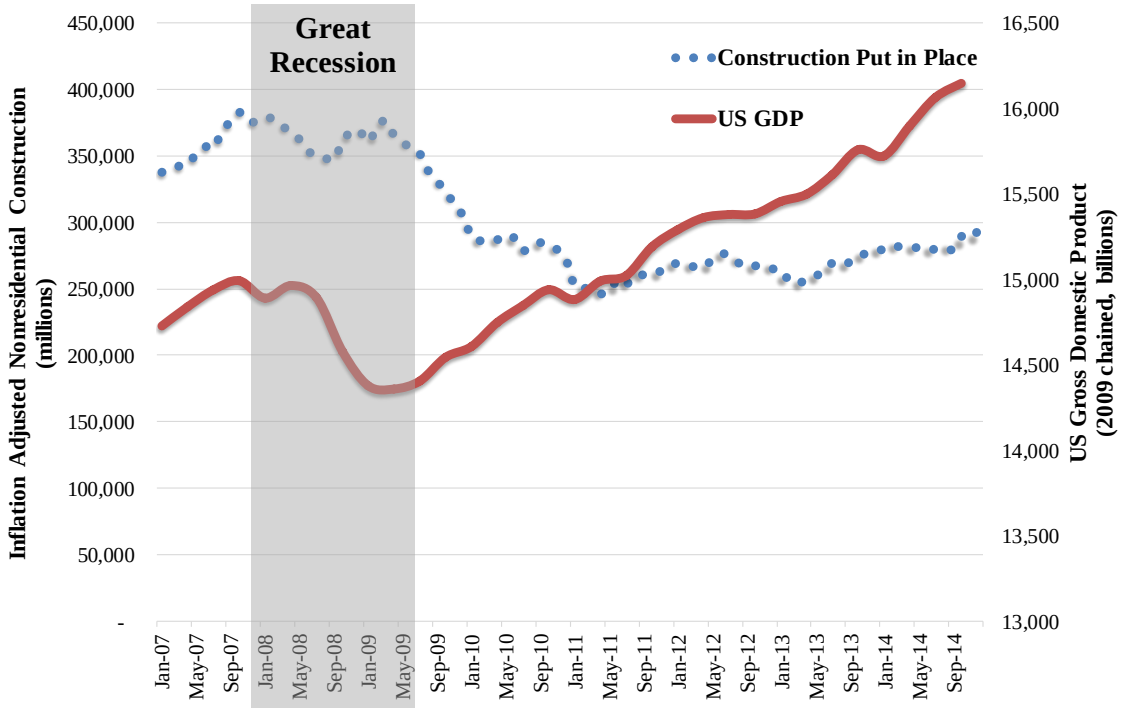

Figure 2. U.S. GDP and Construction Put in Place

During the Great Recession, construction put in place remained largely unaffected, with a mean value of approximately $364B. The recession ended, per NBER's definition, once GDP started increasing. Almost at the same time, construction put in place began losing substantial value, reaching a low of about $246B in April 2011, a 32 percent reduction. Construction spending remained close to this level, slowly increasing. Figure 2 highlights the lagging and extended impact of decreased construction spending (with respect to GDP).

Unemployment

As a result of the significant decrease in construction spending, unemployment rate during this same time frame increased to about 20 percent, from 8 percent, right before the recession. Figure 3 presents the National and Construction mean annual unemployment rates. The researcher averaged monthly raw employment levels (seasonally adjusted data was not available) as provided by the BLS. The unemployment rate is the number of unemployed individuals as a percentage of the labor force.

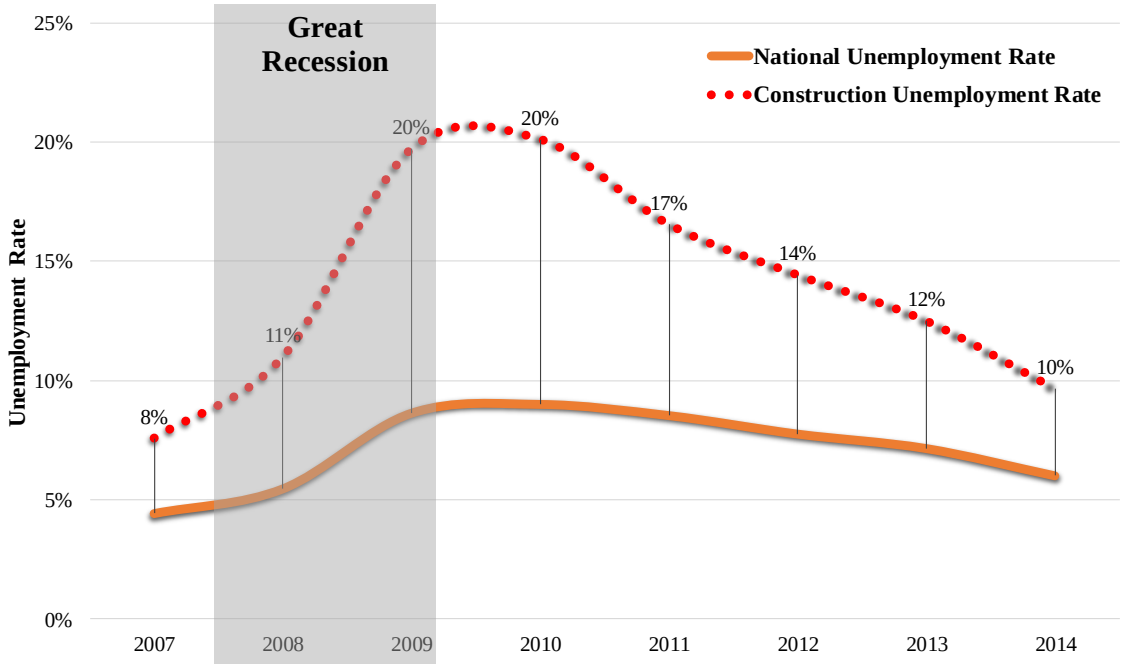

Figure 3. Annual National and Construction Unemployment Rates

While the United States has experienced several periods of relatively high unemployment in the past, the changes to the labor markets during the Great Recession were the most dramatic since the 1940s (Elsby, Hobijn, & Sahin, 2010). In fact, the peak

national unemployment level in October 2009 was the largest increase (about 5.7 percentage points) since World War II (Elsby et al., 2010). Compare this to the most recent recessions (1990 and 2001), which each had unemployment increases of about 2.5 percentages points. Furthermore, Elsby *et al.* (2010) identify that young males were substantially affected by the Great Recession, more so than other demographics (as in other downturns). The reason is that people in this demographic (younger males) tend to work in industries that are highly cyclical in nature – such as construction (Şahin, Song, & Hobijn, 2010). As contractors laid off workers, these individuals attempted to find work elsewhere in the industry, but generally to no avail. Şahin *et al.* (2010) identify that these people eventually find work in another industry, but at a significant loss in household income – which further perpetuates the recession. This also further reduces the available labor pool in construction once the market begins to recover.

Challenging Economic Conditions: Overhead Reduction

The cycles of high and low construction activity is a regular occurred in the U.S. economy, and has been evident since data collection started in the early 1900's. As less work becomes available, one option contractors have is to reduce their internal overhead requirements (Schleifer, 2009; Schleifer, Sullivan, & Murdough, 2014). Overhead expenses are those items which cannot be allocated to the production of one particular item, and are not embedded in the actual finished construction product (Cilensek, 1991; Fultz, 1980). For instance, overhead may include costs such as bonuses, travel, business development, charity, and so on.

One of the main challenges with overhead is that once it is "put on", many companies see the expense as a permanent part of their normal operating costs (Dale & Bevington, 1989). As a result, overhead rarely decreases which therefore eliminates any potential retained earnings (Snodgrass, 1991). Said in another way, unchecked overhead expenses represent the opportunity cost of funds that could have otherwise been invested in the business's core functions. However, not all overhead is the same. Some companies are highly bureaucratic and slow to change, while others have some level of flexibility built into their overhead structure. One study looking at manufacturing overhead found that companies can move to more 'robust' structures that allow rapid response to changing market conditions (Blaxill & Hout, 1991). These changes, however, are not a quick fix: it requires a fundamental shift in behavior and organizational culture.

There are several ways that construction companies can appropriately manage their internal overhead. One approach is to bring on up to 25 percent of overhead staff and office space as temporary (Schleifer, 2014b). Under this method, companies would be able to quickly reduce their overhead when less work becomes available and therefore allowing the company to maintain profitability. Another tactic is maintaining high performance in the "soft" aspect of the company's profile (Assaf, Bubshait, Atiyah, & Al-Shahri, 2001). These might include maintaining a safe working environment (reduces insurance rates), closely monitoring internal accounting practices (understand how much money is actually being spent on overhead), and maintaining a positive relationship with the banks (more favorable loan terms).

Contractor Growth

Overhead itself is not a particularly "risky" financial cost consideration. The challenge is that increased expenditures for overhead is almost always associated with company growth. A study analyzed the sources of failure of more than 1,000 companies and found that growth in and of itself was not the source of their failures, but strongly associated with it. The study identified that, "success in the construction industry, even for very long periods, doesn't guarantee continuing success. In fact, the study indicates clearly that every change in a successful organization, particularly growth, creates a period of risk in spite of all previous successes…" (Schleifer et al., 2014, p. 3)). Many of the organizations expanded their operations into unfamiliar areas, size or types of work solely for the sake of enlarging their sales volume. The driving factor for increased growth is often the result of contractors' need to sustain their overhead costs (Assaf et al., 2001; Schleifer, 2009).

OVERHEAD FLEXIBILITY CLASSIFICATION SYSTEM STUDY

Defining Construction Overhead

AACE International defines overhead as, "a cost or expense inherent in the performing of an operation, (e.g., engineering, construction, operating, or manufacturing) which cannot be charged to or identified with a part of the work, product or asset and, therefore, must be allocated on some arbitrary base believed to be equitable, or handled as a business expense independent of the volume of production" (10S-90: Cost Engineering Terminology, 2012). Overhead may also be referred to as indirect costs, and generally covers all costs not specifically categorized as subcontracts, material, equipment, and labor.

Table 2 summarizes various the dichotomous (overhead and not overhead) definitions for construction costs.

Table 2.

Summary of Construction Cost Definitions

Researchers	Direct cost definition	Indirect (overhead) cost definitions
Ahuja & Campbell, 1988	Items that specifically are included in the final project outcome, such as labor, material, equipment, and supplies.	Anything that is not part of the finished product, including contractor overhead costs, profit, contingencies, etc.
Palmer, Coombs, & Smith, 1995	Any costs which can somehow be tied back to a specific job.	All other costs not included in the direct cost.
Pratt, 2010	Material, labor, or equipment as they are specifically associated with the quantity takeoff.	Costs needed for the overall facilitation of the project's completion.

Regardless of how the various types of construction costs are defined, it's important to understand that overhead expenses present a very real cost to the contractor. However, quantifying these costs can be challenging. Overhead costs were formally recognized in the federal case, *Herbt M. Baruch Corporation v United States,* (1941). The Court ruled that contractors are allowed to recover damages from stop work orders, specifically for their overhead costs. However, in order to claim these damages the contractor must prove that the delays were of an unknown duration, and that they could not recover these costs in another manner (Ibbs, Baker, & Burckhardt, 2015). Contactors often have concurrent jobs ongoing, which makes assigning the impact on corporate overhead cost from a single job's delay extremely difficult (Ernstrom & Essler, 1982).

In essence, the contractor seeking damages must show that they had to devote time resources, at the expense of other projects, to resolve or respond to the owner-caused delays

of the problem project. Further exacerbating the issue of accurate overhead cost estimate is that, "…persons supplying information have a vested interest in the project's success and contractors are often confident, risk-taking entrepreneurs by inclination. They want to believe that their cash-flow problem is minor and transitory." (Schleifer, 1981, p. 19).

Quantification of Overhead Costs

The key to understanding and costing-out overhead expenses is that at its core, overhead is an activity-based accounting function (Dale & Bevington, 1989). In order to manage overhead, these activities need to be closely monitored and adjusted over time. The consequence of not actively managing overhead is a loss of profitability, specifically through a reduction in retained earnings. Furthermore, unchecked overhead grows over time very much to the surprise of the unsuspecting business owner (Schleifer et al., 2014; Snodgrass, 1991). This increase in overhead especially happens during times of significant market growth as the business expands and its internal processes become more complex (Assaf et al., 2001; Blaxill & Hout, 1991; Schleifer, 2009).

At a corporate level, Norfleet (2007) recommends that contractors use the same rate of overhead allocation across all projects, regardless of the external competitive pressures a company may face. Per-project overhead rates are difficult to manage, and rarely do they sufficiently capture the true overhead costs. Even if a contractor does use a single overhead percentage allocation, many of them do not accurate estimate their overhead and profit costs (Plebankiewicz & Leśniak, 2013). Many contractors have structured their overhead as a fixed (or near-fixed) cost that does not rapidly respond to the normal cyclical nature

of the construction market (Schleifer, 2009). In short, there is a need to standardize how overhead costs are developed and estimated (Hegazy & Moselhi, 1995).

Managing Overhead Costs

A contractor's ability to successfully manage their overhead is directly tied to their profitability. One study found that many contractors inaccurately quantified overhead costs as direct job costs (Holland & Hobson, 1999). One of the significant drawbacks in quantifying overhead costs as job costs is that these overhead cost are then treated as such. That is, a contractor might assume that if they have fewer jobs, or perhaps can minimize these "direct" job costs, they can therefore minimize overhead costs.

Understanding contractors' perceptions on why they choose to pursue new work provides some inferences on their financial structure. A survey of more than 200 contractors found that the second-highest rated reason contractors pursue new work is their "need for work" (highest rated being the "type of job"), while the 28th reason being "general overhead" (Ahmad & Minkarah, 1988). Interestingly, "potential for profitability of the job" or anything similar was identified by the respondents. While this is a single study of a select group of contractors, it sheds some light on how the contractors typically approach their decisions to pursue work. On its surface, these responses may seem logical and are probably the typical mindset of many companies: if the company does not have any jobs, they should go out and get new work. However, understanding what is driving this "need" has profound implications on contractors' reasons for pursuing such work. Some have argued that contractors' need for new work is primarily caused by their fixed and ever-

increasing overhead levels (Jaselskis, E., Kurtenbach, J., & Forrest, J., 2002; Schleifer, 2014a).

One consistent theme in the literature is that the outsourcing of certain overhead functions can be very effective in managing these types of costs (Jaselskis, E. et al., 2002; Oviedo-Haito, Jiménez, Cardoso, & Pellicer, 2014; Prahalad & Hamel, 1990; Quinn & Hillmer, 1995). The primary benefit in outsourcing these functions is that it allows companies to maintain their core people and assets. It also increases their flexibility in responding to challenging market conditions by uncoupling their need for overhead (and therefore the need for new work). Also, managing indirect project-level costs may lead to better project cost and quality outcomes, as it encourages the team to holistically evaluate the project and involve key players in project planning (Becker, Jaselskis, & El-Gafy, 2014).

At the core of this issue is culture and overall level of flexibility of the company. Blaxill & Hout (1991) suggest that there are generally three types of companies: bureaucratic (centralized structure), niche (nimble, few product lines), and robust (best of both). The primary differentiating factor of robust companies is their overhead structure. Bureaucratic companies typically spend more money on overhead, per unit of sales, than any of the other company types. While it is true that these bureaucratic "old-guard"-type companies can leverage economies of scale, their overhead costs have grown so tremendously over time that they are hardly competitive. However, this is not to say that the elimination of staff positions, for instance is needed to cut costs. In some cases, just a reorganization of the work flow can yield significant benefits.

CHAPTER 3

METHODOLOGY

PUBLIC ACCOUNTABILITY AND ORGANIZATIONAL AGILITY STUDY

The researcher conducted extensive educational and project support efforts in the State of Minnesota with multiple public agencies as they tested the value-based model on their construction projects. The first agency within the State to test the VBM was a large public university. The University's Associate Vice President (AVP) of Capital Planning and Project Management attended a presentation given by one of the researcher's colleagues. The AVP identified that the University had challenges with project performance and transparency – the University was currently in litigation on more than $17M in claims with its contractors. The AVP decided to use the value-based model to resolve the issues, and attempt to increase the University's level of transparency and organizational agility.

When the University started piloting VBM in 2005, all Minnesotan municipalities required legislative authority to deviate from the traditional low bid award process on construction projects; however, the University had an exception to this requirement and did not require legislative approval to use the value-based model. The University piloted the process on eight projects and received promising results: the projects were awarded 13 percent below budget and finished with 0.4 percent contractor change orders, and 0.9 percent contractor schedule delays. Over the next two years, the University rapidly expanded its use of the VBM to more complex projects.

During this period of expansion, the construction industry reported that they were more profitable on the University's value-based projects and wanted other agencies

throughout the State to start using the approach. Therefore, the labor unions lobbied the State's legislature to permit other entities' use the VBM or "best value" contracting approach, which resulted in the passing of 2007 Minn. Gen. Laws. ch. 16C, § 28 (see Thomson, Becker, & Wieland, 2007 for additional details about the law and related legislation). The law allowed for expansion of VBM throughout the State in three phases, and also required that no agency may use VBM on more than one project annually or 20 percent of all its projects during these initial three phases. Table 3 shows when various types of public agencies were permitted to use the best value approach under the new law.

Table 3

Public Agencies' Phased Implementation of the Minnesota Best Value Law

Phase (Year)	State Agencies	Counties	Cities	School Districts	Other Political Subdivisions
One (2007)	All	All	All	Highest 25% enrollment of students in State	None
Two (2009)	All	All	All	Highest 50% enrollment of students in State	All
Three (2010)	All	All	All	All	All

With the best value legislation in place and through word of mouth, several public agencies contacted the researcher for educational training and project support. Table 4 identifies the year in which each agency started working with the researcher, the year in which research concluded (if applicable), and the estimated population of each agency's constituents when their research efforts commenced (the University and School District populations are the estimated number of enrolled students). The "Research Conclusion" column shows the last year of formal project support with the researcher (however, the agencies may still be using the VBM in one form or another).

Table 4

Public Agency Value-Based Implementation Dates

Public Agency	Research Start	Research Conclusion	Estimated Population[1]
Public University 1	2005	2011	46,000
City 1	2008	2015	33,000
City 2	2009	On-going	103,000
County 1	2009	2013	144,000
School District 1	2009	On-going	16,000
Public Utility 1	2010	2011	50,000
School District 2	2010	On-going	12,000
County 2	2011	2012	1,169,000

[1]*Data obtained from US Census and School Enrollment data*

The researcher answered the following research questions:

1. In what ways do the agile tools embedded within the Value-Based Model increase public accountability?
2. What are the associated costs or savings of implementing the agile concepts?
3. And finally, do project outcomes (schedule and cost) vary by the type of public agency that uses the Value-Based Model?

AGILITY AND CONSTRUCTION CORPORATE OVERHEAD STUDY

Research Objective

The research objective of this study assesses the construction industry's changes to corporate overhead costs, specifically as a result of the Great Recession. The researcher conducted a survey that solicited information about the magnitude of overhead cuts (if any) according to a set of different overhead expense categories.

Overhead Reductions as a Result of the Recession

Survey Development

This section presents the process used to identify contractor overhead reduction during the recession according various demographic factors. The researcher developed a survey instrument as shown in Figure 4.

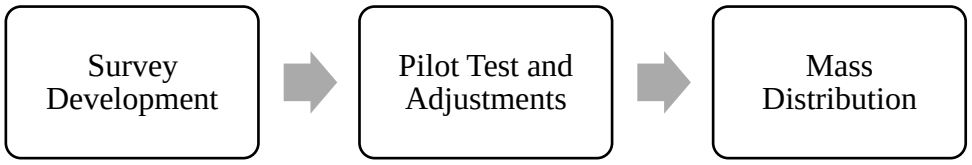

Figure 4. Overhead Survey Development and Distribution

The researcher designed the survey so that it could be completed in around five minutes or less in an effort to increase the response rate and accuracy of responses. The survey was divided into two parts: the first requested the respondent to classify their company's percentage reduction from a set of typical overhead categories, from their perspective within the company (i.e., local, region, corporate). The second part of the survey collected demographic information about the respondents, including estimated annual revenue, number of full-time employees, and business sector. The wording of the demographic questions as well as their categorical values came from AGC's 2014 National Construction Outlook Survey and the US Census of Businesses (see The Associated General Contractors of America, 2014). Both the pilot survey and the final survey were distributed through an online system called LimeSurvey. See Appendix 1 for a copy of the online survey.

The researchers were focused on company-level indirect non-construction costs (Becker et al., 2014) to assess, at a corporate level, the changes companies made to overhead. The initial list of overhead categories came from five sources: Holland & Hobson's (1999) classification of various overhead costs from an architect/engineer's perspective; AACE's list of typical list construction overhead categories (Norfleet, 2007); Cilensek's (1991) identification of project-level overhead costs; and Dale's (1989) piece on general business accounting overhead categories. The researchers then selected the overhead categories that were most in line with construction corporate level overhead costs. Next, this list of overhead categories and percentage reduction levels was presented to 17 construction industry professionals. They each had approximately 20+ years' of experience in the industry, and held executive-level positions in their companies. They made recommendations to the overhead categories, percentage reduction levels, demographic questions, and survey readability. Their changes were implemented, and the survey was then distributed to the following six groups (a total distribution of about 2,000 – 5,000 people), and the members of each group received two reminder emails:

- Arizona Builders Alliance (ABA) – all members
- Associated General Contractors (AGC) – via chapters through the US.
- National Roofing Contractors Association (NRCA) – national distribution to all members
- Sheet Metal & Air Conditioning Contractors' National Association (SMACNA) – national distribution to all members
- Roofing manufacturer's product applicators (roofing contractors) – national distribution

- Contacts database of a university construction management program.

Data Collection

This section presents descriptive statistics of the survey responses on the overhead reductions and demographic characteristics. Numerical results of several statistical tests are presented along with significant findings to understand the relationship between industry-level overhead reductions and four variables, namely:

1. Number of full-time employees (FTEs)
2. Annual revenue
3. Primary sector of business
4. Trade of work

A Spearman's rank-order correlation was run to assess the relationship between the overhead reductions and revenue and number of full-time employees. A one-way analysis of variance (ANOVA) was conducted to identify if the overhead reductions were different for different trades of work, as well as the respondent's primary sector of business. One requirement of an ANOVA is homogeneity of variances across the different groups (trade, sector, annual revenue, and number of full-time employees). The researchers used Levene's test of equality of variances, whose null hypothesis states that the population variance is equal for each group (Levene, 1960). When the variance was not equal (that is, rejecting the null hypothesis of Levene's test), Welch's ANOVA was used (Welch, 1947). For any statistically significant results, Tukey post hoc (equal variances) and Games-

Howell (unequal variances) analyses were used. Statistical Package for Social Sciences (SPSS) version 21.0 was used to conduct the analyses.

OVERHEAD FLEXIBILITY CLASSIFICATION SYSTEM STUDY

Research Objectives

The challenge with the construction industry's typical approach of using a percentage or index to estimate overhead costs is not the method itself. In fact, it is quite efficient when accurately calculated. Rather, the challenge is that by using this approach many companies do not intentionally evaluate, on a regular basis, the activities driving their overhead cost. The recent recession forced many contractors to reduce their overhead, or face bankruptcy (or both in many cases). Therefore, the extreme and long-lasting impact of the recession offers insights into construction companies, especially when viewing management overhead as a bellwether of contractors' preferences in severe financial situations. The objectives of this research study were the following:

1. As a direct result of the recession, empirically quantify the categorical corporate / company-level overhead reductions in terms of both magnitude and breadth across companies.
2. Suggest approaches to minimize the negative financial impact of future economic declines.

Reduction of Construction Overhead Expenses

The following sections provide details on how the research study was conducted. This section is laid out as follows:

1. Description of the data collection instrument and method.
2. Summary of the primary data analysis techniques.
3. Presentation of descriptive statistics for the relevant data collected.
4. Summary of results for the two primary data analyses conducted: (1) correlations between reduction of the overhead categories and respondents' demographics, and (2) statistical testing of the reduction distributions across the overhead categories, as well as post-hoc analyses.

Data Analysis Techniques

Several additional analyses were conducted on the data from the construction industry overhead survey. A Spearman's rank-order correlation was run to assess the relationship between the overhead reductions and revenue and number of full-time employees. The researchers also used the Kruskal-Wallis H test (K-W), which is a nonparametric version of an analysis of variance (ANOVA), specifically designed for ordinal dependent variables. K-W tests whether the distribution of values is equal among the different overhead categories. If the groups being analyzed have the same variance, the alternate hypothesis is, "the distributions of the values are not the same". However, if there is unequal variance, the alternate hypothesis becomes, "the mean *ranks* of the groups are not equal" (see Vargha & Delaney (1998) for a detailed discussion on this issue, and other intricacies, of the Krusal-Wallis H test).

CHAPTER 4

RESULTS

PUBLIC ACCOUNTABILITY AND ORGANIZATIONAL AGILITY STUDY

Data Characteristics

The researcher collected data on 415 construction projects from 2005 to 2015 at eight different public agencies, totaling $561.47M in project value. The researcher obtained data on contractor selection processes, pre-planning documentation, and project performance through research partnerships with each agency. The projects ranged in size from $7,000 to $71.6M (mean = $1.4M, *SD* = $6.2M) in all major vertical building trades (General Construction, Mechanical, Electrical, and Roofing). The projects had durations ranging from one week to 2.7 years (mean = 128 calendar days, *SD* = 141 calendar days). Table 5 provides a summary of the projects and their overall cost and schedule performance.

Table 5 shows the actual project cost (rows 10 – 14) and schedule (rows 15 – 19) changes. The "Percent Awarded Over Budget" (also known as the change order rate) was calculated by summing the total cost changes attributed to a given source and dividing by the project's contract cost amount. Likewise, the "Percent Delayed" (schedule delay rate) was calculated by summing the total number of days increased or decreased, and dividing by the project's contract duration in calendar days as measured from final payment date.

The overall cost change order rate was 6.9 percent (a $39M increase from the total awarded project value of $561.5M). The data shows almost all of the changes ($33M) were due to owner-directed changes (i.e., increased / changed scope, delays). Even more interesting is that the total contractor cost changes were in the form of savings or value-

engineering ideas, totaling $51,650 across all the projects (in other words, contractor-attributed change order rate was negative). The remaining $6M of changes were from design errors or unforeseen conditions. Schedule changes had similarly distributed sources of delay, with the overall delay rate being 35.2 percent (18,666 days increase from the total awarded project duration of 53,014 days). Almost all schedule delays (13,589 days) were due to the owner, with the contractor contributing a much smaller amount (1,009 days delayed across all projects).

Table 5

Summary of Project Performance Information by Public Agency

No	Criteria	City 1	City 2	County 1	County 2	Public University 1	Public Utility 1	School District 1	School District 2	TOTAL
1	Total # of Projects	5	9	1	10	345	2	39	4	415
2	Smallest Project Value ($M)	0.05	0.37	12.36	0.25	0.01	0.50	0.10	0.47	0.01
3	Largest Project Value ($M)	2.22	71.64	12.36	21.66	64.14	1.05	3.29	25.99	71.64
4	Mean Project Value ($M)	0.99	12.38	12.36	3.74	0.94	0.78	0.98	7.49	1.35
5	Total Project Value ($M)	4.94	111.46	12.36	37.38	325.66	1.55	38.13	29.97	561.47
6	Shortest Project Duration	127	150	275	125	7	95	67	85	7
7	Longest Project Duration	730	910	275	575	986	115	527	519	986
8	Mean Project Duration	290	386	275	248	105	105	203	257	128
9	Total Project Duration	1,452	3,478	275	2,477	36,175	210	7,921	1,026	53,014
10	% Over Awarded Budget	0.8%	0.9%	4.4%	0.4%	10.7%	2.1%	4.7%	2.5%	6.9%
11	Owner	0.2%	0.3%	1.2%	0.1%	9.8%	0.1%	1.3%	0.4%	5.9%
12	Contractor	0.0%	-0.1%	-0.2%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%
13	Designer	0.0%	0.6%	2.5%	0.2%	0.3%	1.6%	2.2%	1.6%	0.6%
14	Unforeseen	0.6%	0.0%	0.9%	0.1%	0.5%	0.3%	1.3%	0.6%	0.4%
15	% Delayed	5.4%	10.4%	12.7%	10.7%	47.7%	209.0%	1.5%	11.0%	35.2%
16	Owner	2.9%	6.2%	5.5%	2.1%	35.9%	81.9%	0.5%	7.4%	25.6%
17	Contractor	0.0%	2.8%	0.0%	0.0%	2.4%	0.0%	0.1%	3.2%	1.9%
18	Designer	0.0%	1.2%	7.3%	6.7%	4.4%	0.0%	0.4%	0.4%	3.5%
19	Unforeseen	2.5%	0.1%	0.0%	1.9%	5.0%	127.1%	0.5%	0.0%	4.2%
20	Satisfaction Rating – Contractor	9.7	9.6	8.8	N/A	9.5	8.1	10.0	8.9	9.5
21	Satisfaction Rating – VBM	10.0	8.5	10.0	N/A	9.6	8.0	9.9	9.7	9.6
22	Total Number of Surveys	1	2	1	0	214	1	26	3	248
23	Total value of litigation ($M)	0	0	0	0	0	0	0	0	0
24	Total number of bid protests	0	0	0	0	0	0	0	0	0

AGILITY AND CONSTRUCTION CORPORATE OVERHEAD STUDY

Descriptive Statistics

A total of 437 valid responses were received over a period of two months (January 13, 2015 to March 19, 2015). 43 responses were excluded from this study, primarily due to the respondents' identification as a non-contractor (architect, facility owner, manufacturer, etc.). While each question was optional, nearly all of the respondents provided an answer to each question, including the background and demographic information. The average response time in completing the survey was 4.8 minutes. The descriptive statistics are presented in Table 6 (each overhead expense category), Table 7 (annual revenue and number of employees), Table 8 (construction trade), and Table 9 (business sector). The overhead reductions were coded as follows: 0 = "0% (no reductions)", 1 = "1 – 10%", 2 = "11 – 25%", 3 = "26 – 50%", 4 = "51 – 75%", and 5 = "More than 75%".

Table 6

Descriptive Statistics for Overhead Reduction Categories

Overhead category	Count of responses	Mean	Median	Mode	Standard deviation
Bonuses	425	2.233	2	0	1.940
Company functions (parties, etc.)	410	2.239	2	0	1.833
Charitable or holiday gifts	426	1.988	2	0	1.703
Training or education	432	1.021	0	0	1.412
Contributions to retirement plans, etc.	424	1.297	0	0	1.853
Corporate officer's salary	418	1.077	0	0	1.367
Business development or accounting staff	429	0.854	0	0	1.375
Travel or company vehicles	425	1.228	1	0	1.438
Home office: space (i.e., rent)	408	0.398	0	0	0.919
Home office: benefits paid by company	400	0.511	0	0	1.051
Home office: number of hours worked	402	0.359	0	0	0.879
Home office: staff salary	403	0.492	0	0	0.957
Home office: various insurance costs	392	0.450	0	0	0.962

Figure 5 presents the distribution of overhead reduction, individually for each individual responses to each category. While the most common response was "0% (none)", 92 percent of the respondents reduced overhead within an average of 5.5 categories of overhead (*SD* = 3.42), by an average of a 1.14 reduction (*SD* = .96).

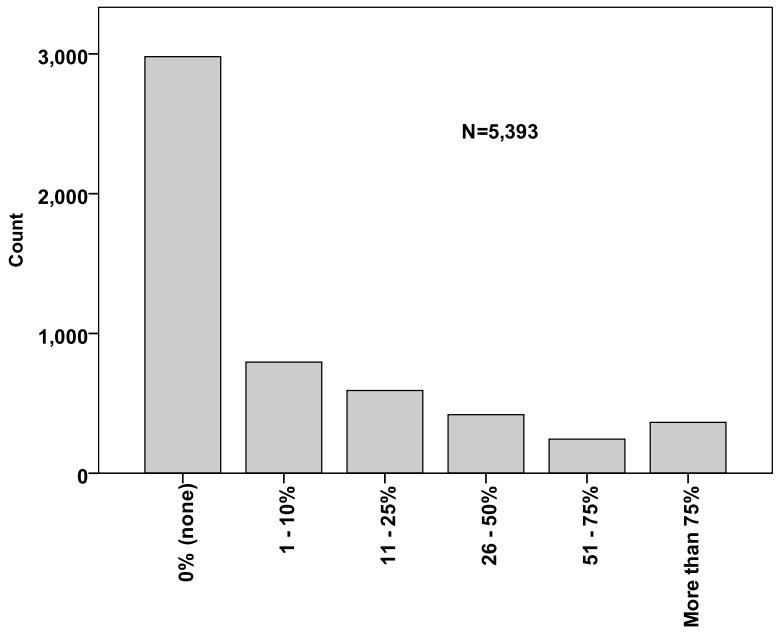

Figure 5. Histogram of Cumulative Overhead Reductions Levels for All Categories

Table 7

Descriptive Statistics for Respondent Demographics

Demographic criteria	Count of responses	Mean	Median	Mode	Standard deviation
Annual Revenue	429	2.466	2	1	1.618
Number of full-time employees	424	3.731	4	3	1.476

Table 8

Relative Frequency Distribution for Respondents' Construction Trade

Demographic criteria	Percentage of Respondents
Electrical	5.3
General Construction	30.6
Mechanical / Plumbing	22.2
Roofing	30.8
Other	11.1

Table 9

Relative Frequency Distribution for Respondents' Primary Business Sector

Demographic criteria	Percentage of Respondents
Highway	2.1
Hospital / Higher Education	16.0
K-12 School	7.2
Manufacturing	6.2
Power	1.0
Private Office	10.0
Public Building	14.1
Retail, Warehouse, Lodging	8.4
Water / Sewer	2.4
Other	32.7

Reliability Testing

The researchers used the mean of the 13 overhead categories as an overall measure of overhead reduction. The overhead categories had a high level of internal consistency (DeVellis, 2011; Kline, 2004), with a Cronbach's alpha of 0.889. Table 10 presents a summary of the statistical tests conducted in the next section.

Table 10

Summary of Statistical Tests

Independent variable	Dependent variable	Hypothesis test statistic	*p*-value (2-sided)	Correlation	*p*-value (2-sided)	Statistical test
Number of FTEs	Mean OH reduction	6.371	< 0.005	-0.198	< 0.005	Welch's F/Spearman
Number of FTEs	# categories cut	2.621	0.024	-0.123	0.011	ANOVA/Spearman
Annual revenue	Mean OH reduction	9.231	< 0.005	-0.184	< 0.01	Welch's F/Spearman
Annual revenue	# categories cut	3.001	0.011	-0.112	< 0.05	ANOVA/Spearman
Sector	Mean OH reduction	1.786	0.239	0.028	0.239	Welch's F/eta^2
Sector	# categories cut	0.701	0.708	0.015	0.708	ANOVA/eta^2
Trade	Mean OH reduction	3.107	0.018	0.028	0.020	Welch's F/eta^2
Trade	# categories cut	2.046	0.087	0.020	0.087	ANOVA/eta^2

Group Differences and Correlations

The researchers were interested in assessing overall overhead reductions across the construction industry as a result of the recession. The two primary outcome measures of overhead changes were the magnitude of overhead reduction, and the number of different categories that companies reduced. The greatest drivers of overhead reduction appear to be company size (as measured by annual revenue and the number of full-time employees). Note that, as expected, there is strong collinearity between a company's FTE and revenue (r_s = .810, p < .0005). Figure 6 is a dual-axis histogram that shows the number of respondents (left y-axis) according to their company size, and the mean overhead reduction for each company size category (right y-axis). Likewise, Figure 7 presents the mean overhead reduction by the number of full-time employees. Figure 8 and 9 present similar results, but for the number of categories reduced. As indicated by these figures and an

inspection the correlation results, there was a weak negative correlation between company size and overhead reduction.

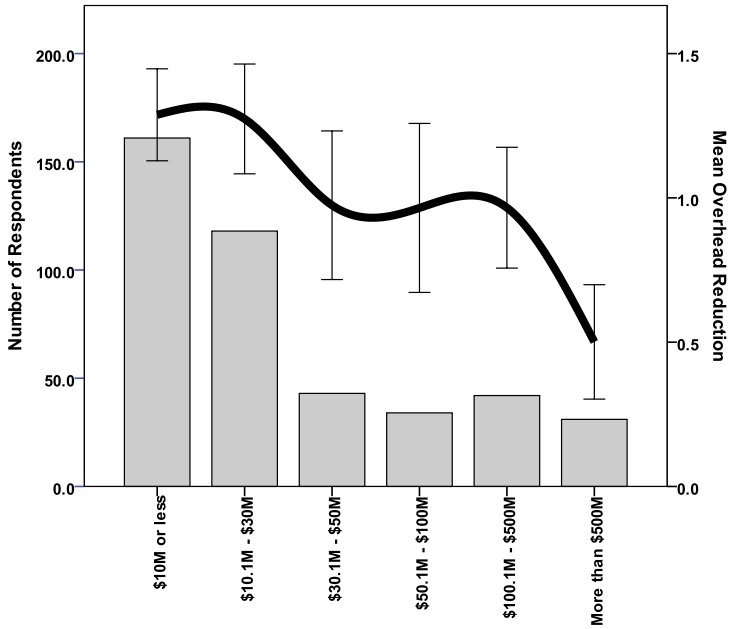

Figure 6. Mean Overhead Reduction by Frequency Distribution, Annual Revenue

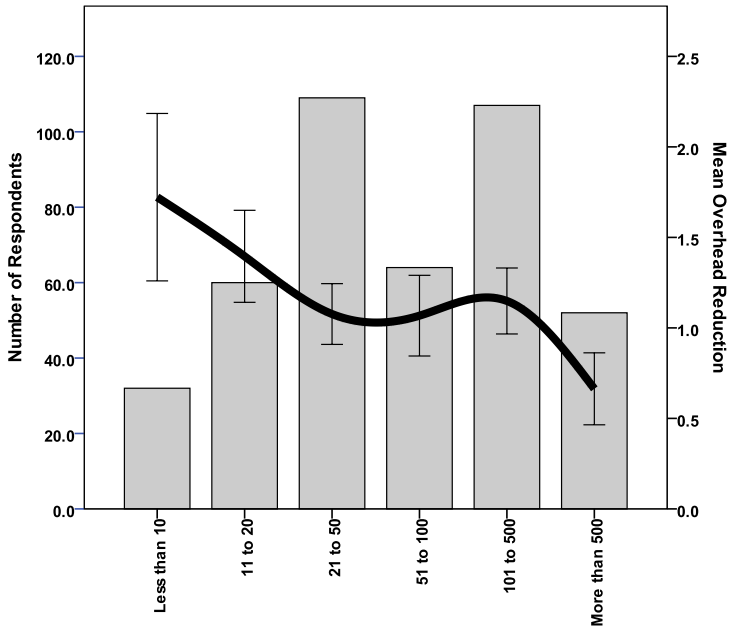

Figure 7. Mean Overhead Reduction by Frequency Distribution, Number of FTEs

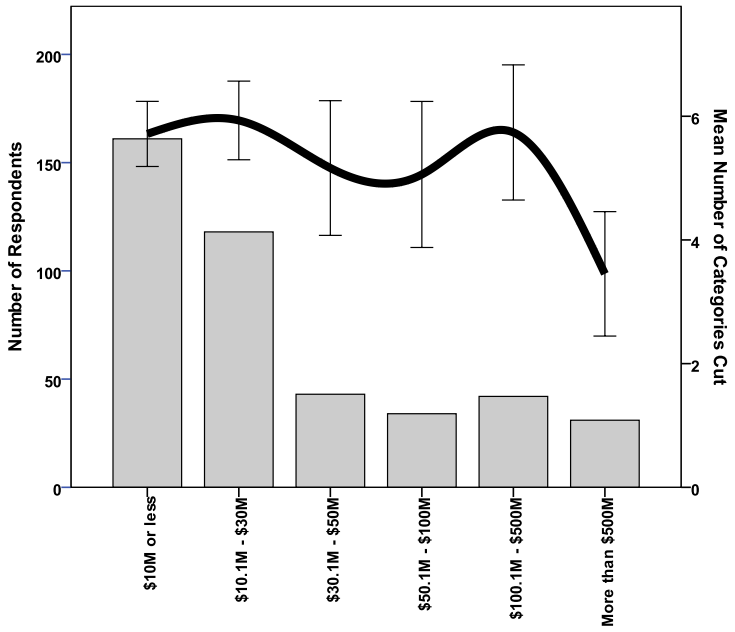

Figure 8. Mean # of Categories Cut by Frequency Distribution of Annual Revenue

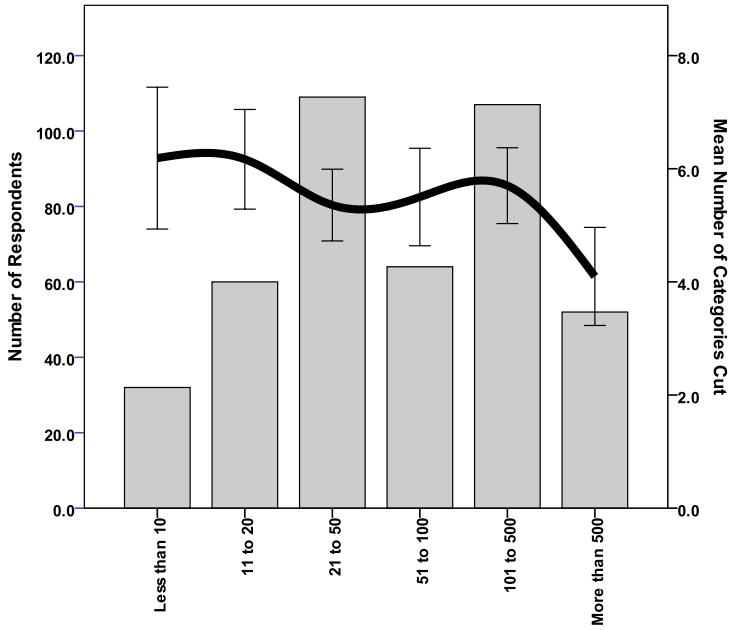

Figure 9. Mean # of Categories Cut by Frequency Distribution of Number of FTEs

Next, the researcher analyzed business sector overhead reductions (see Figures 10 and 11), and found that there were no statistically significant differences in overhead

reduction, both in terms of the mean reduction, and the number of categories reduced. Also, all construction trades had high levels of variability across measures of company size, with exception to roofing, which made almost no changes regardless of a roofer's overall size.

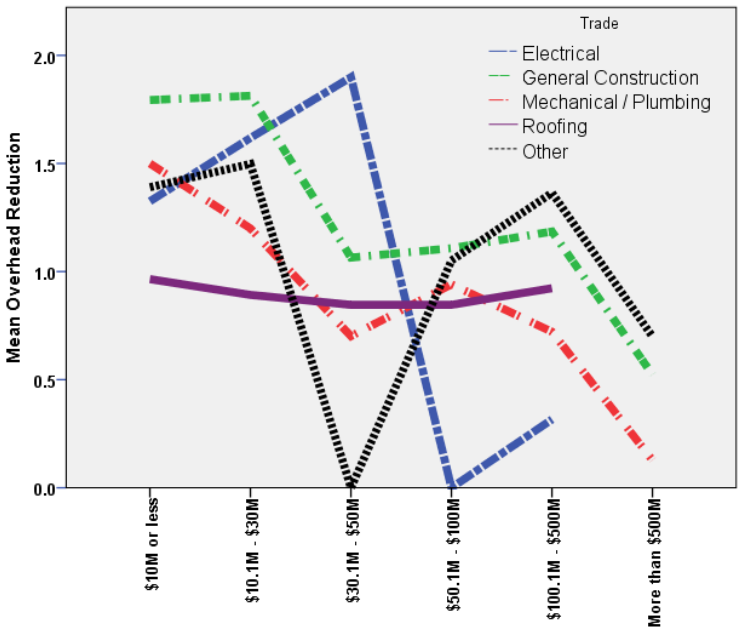

Figure 10. Mean Overhead Reduction by Revenue and Construction Trade

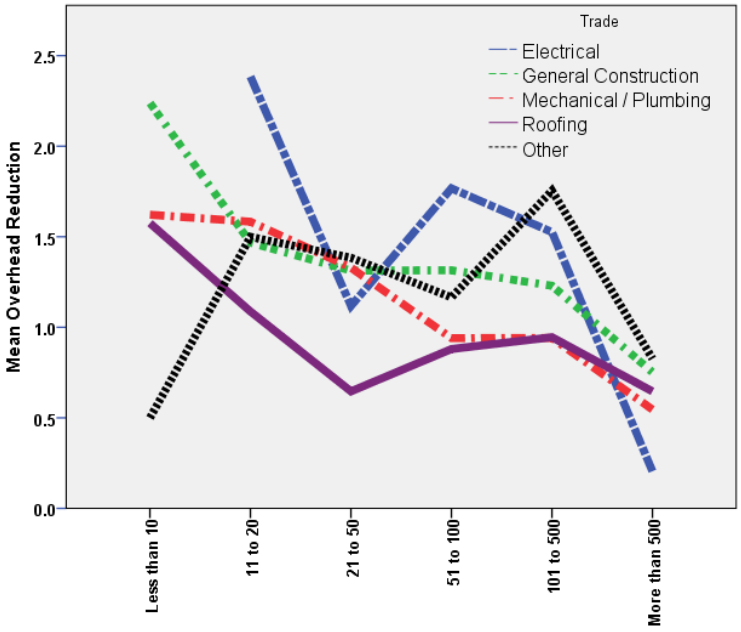

Figure 11. Mean Overhead Reduction by Number of FTEs and Construction Trade

The researcher also studied the overhead changes by business sectors (see Figures 12 and 13). There was homogeneity of variances, as assessed by Levene's test for equality of variances (p = .416). However, there were no statistically significant differences in the number of overhead categories reduced between the different business sectors, $F(4, 410) = 2.046$, p = .087.

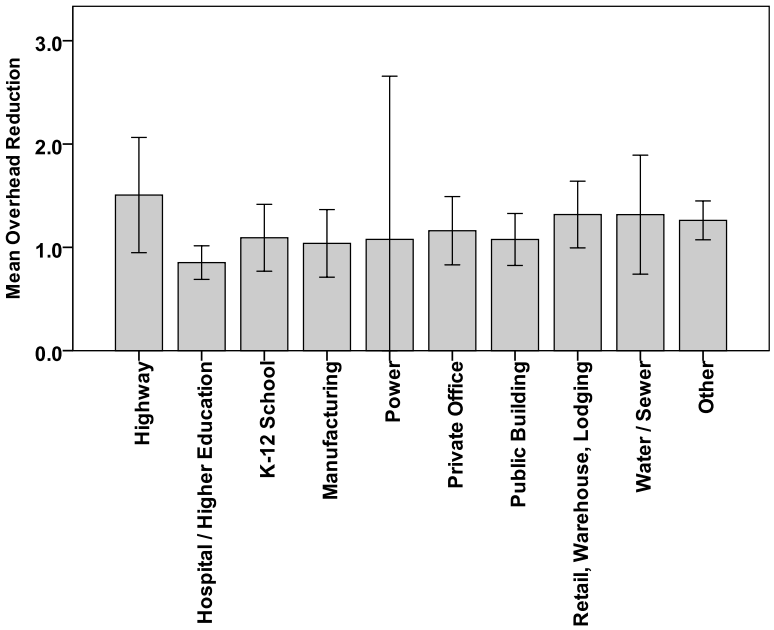

Figure 12. Mean Overhead Reduction by Number of FTEs and Construction Trade

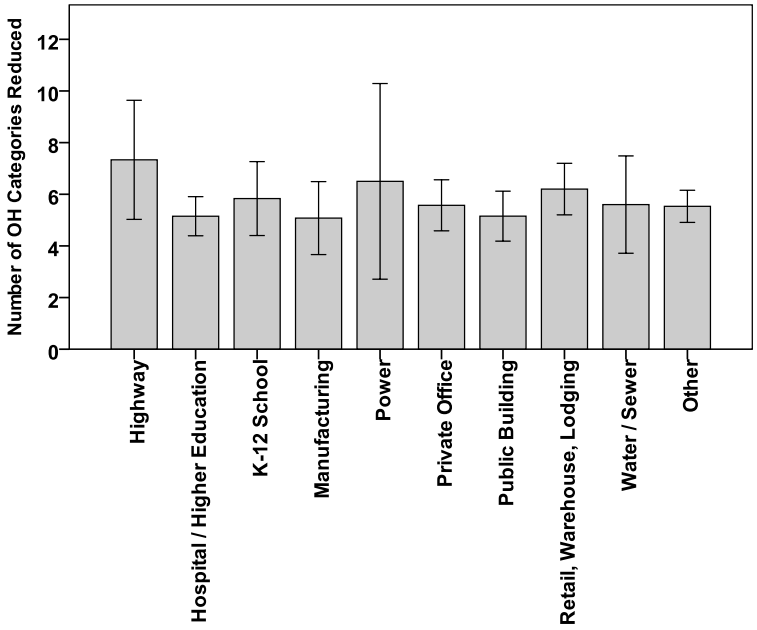

Figure 13. Mean Overhead Reduction by Number of FTEs and Construction Trade

OVERHEAD FLEXIBILITY CLASSIFICATION SYSTEM STUDY

Data Findings

Overhead Category Correlations

Table 11 presents the Spearman (rho) correlations between each overhead category, and the company size demographics (annual revenue and number of full-time employees (FTE)), the respondent's mean overhead reduction (across all categories), and the number of different categories where reductions were made.

Table 11

Correlations Between Overhead Categories and Respondents' Demographics

Overhead category	Annual Revenue	FTE Count	Mean Overhead Reduction	Number of Categories Reduced
Bonuses	-.120*	-.092	.769**	.630**
Company functions (parties, etc.)	-.136**	-.144**	.797**	.662**
Charitable or holiday gifts	-.140**	-.168**	.795**	.666**
Training or education	-.051	-.076	.693**	.678**
Contributions to retirement plans, etc.	-.116*	-.107*	.623**	.582**
Corporate officer's salary	-.187**	-.178**	.602**	.587**
Business development or accounting staff	-.081	-.120*	.659**	.667**
Travel or company vehicles	-.164**	-.198**	.678**	.646**
Home office: space (i.e., rent)	-.022	-.030	.425**	.500**
Home office: benefits paid by company	-.057	-.082	.518**	.584**
Home office: number of hours worked	-.112*	-.077	.424**	.482**
Home office: staff salary	-.036	-.063	.539**	.615**
Home office: various insurance costs	-.076	-.107*	.437**	.538**

** $p < 0.01$, * $p < 0.05$

The highest correlation values between measures of company sizes and overhead categories were with "Corporate officer's salary", "Travel or company vehicles", "Charitable or holiday gifts", and "Company functions (parties, etc.)". Stated another way, larger companies (as measured by annual revenue or number of full-time employees)

tended to reduce these four areas more, as compared to other overhead categories. Conversely, reductions to "Training or education", "Business development or accounting staff", "Home office: space", and "Home office: staff salary" had negligible and statistically insignificant correlations with the company's size.

The researcher also analyzed correlations between the individual overhead categories and overhead reduction, in terms of both the magnitude of reduction and the number of categories reduced. There were very strong and statistically significant correlations between each individual overhead category's reduction and the respondent's overall reduction in all categories. In general, larger reductions in "Company Functions (parties, etc.)", "Charitable or holiday gifts", and "Bonuses" were most strongly correlated with the respondent's overall level of overhead reduction. Furthermore, companies with larger cuts in "Training or education" tended to reduce overhead across a higher number categories. In other words, companies who were willing (or forced to) make cuts in these areas usually reduced overhead across the board.

Differences of Overhead Reduction Distributions Across Overhead Categories

It appears that construction companies do not perceive all overhead the same, otherwise the researchers would expect to see nearly identical reductions for all overhead categories. Figure 14 presents a histogram of the distribution of overhead cost reductions by category. The categories are sorted with the areas having the most frequent response of "No" reductions listed on top. A visual inspection of this figure shows that there appear to be approximately three groups of overhead category reductions: (1) company functions, charitable or holiday gifts, and bonuses, (2) travel or company vehicles, corporate officer's

salary, training or education, contributions to retirement plans, and business development or accounting staff, and (3) all categories of home office expenses. The percentage of respondents in each of these three groups reported no reductions are as follows: Group (1): 27.6%, Group (2): 52.9%, and Group (3): 75.1%.

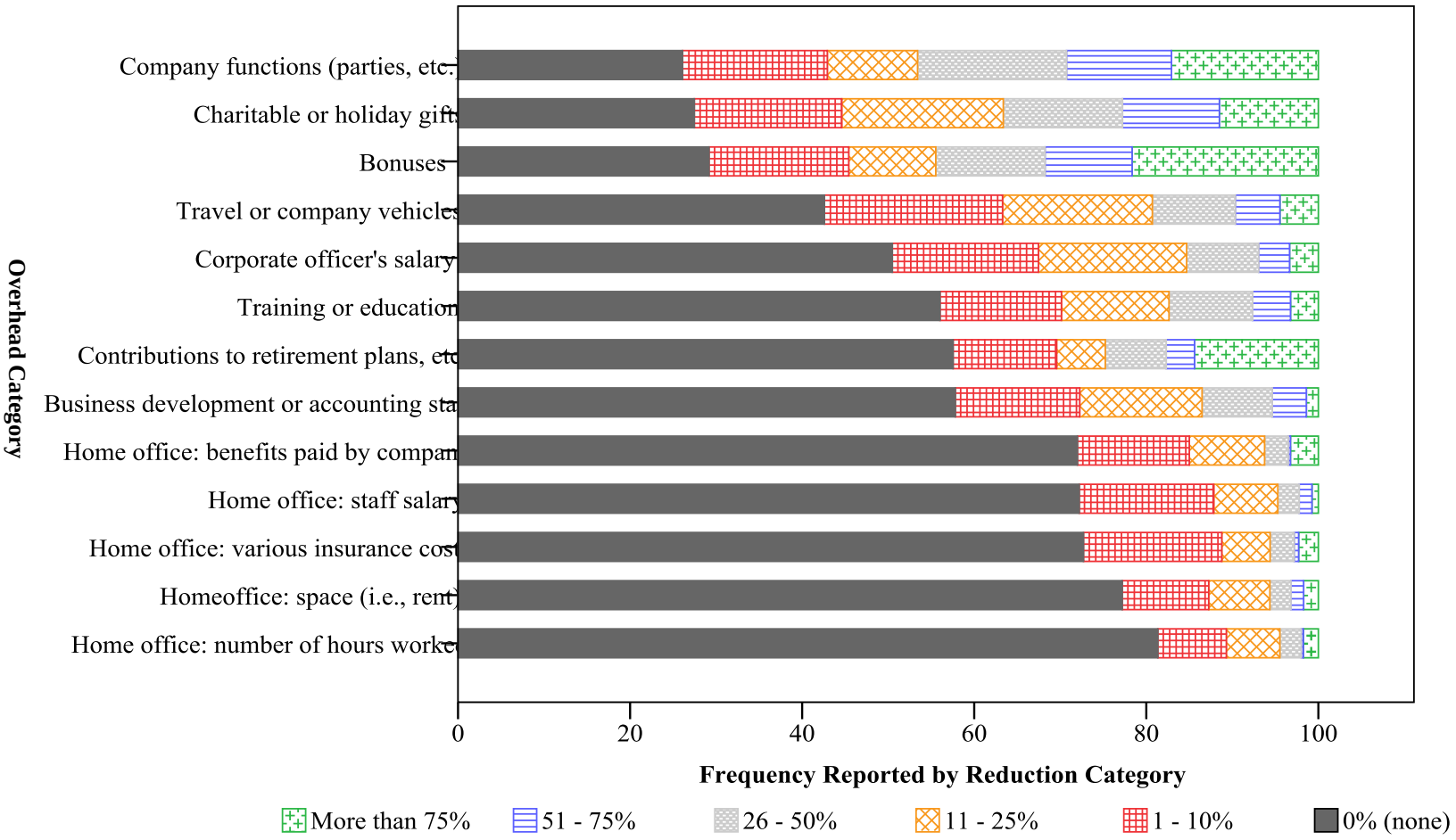

Figure 14. Distribution of Overhead Cost Reductions.

Next, the researcher conducted Kruskal-Wallis H tests to identify if there were statistically significant differences for the overhead reduction distributions within each the three groups previously identified. Table 12 presents the test statistics for each group. The overhead reduction distributions for Groups (2) and (3) were statistically significantly different. Pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. This post-hoc analysis revealed that "Travel or company vehicles" in Group (2) and "Home Office: number of hours worked" for Group (3) had statistically significant differences in their overhead reduction distributions, compared with the other overhead categories in their respective groups. When removing these two outlier categories, Group (2) and Group (3) likely did not have different distributions of overhead expenses within each group.

Table 12

Kruskal-Wallis H Test Statistics

Independent variable	Dependent variable	H statistic	N	*p*-value (2-sided)
Group (1)	Overhead Reduction	3.991	1,261	0.136
Group (2)	Overhead Reduction	19.483	2,128	< .001
Group (2) – without travel	Overhead Reduction	4.737	1,703	0.192
Group (3)	Overhead Reduction	12.316	2,005	0.015
Group (3) – without # of hours worked	Overhead Reduction	3.024	1,603	0.388

The researcher then studied the correlations between the different flexibility groups and the correlations across all of the overhead categories. Table 13 presents the mean Spearman correlation of each overhead flexibility group and the mean Spearman

correlation for all other categories, the *p* values from independent-samples t-tests between the various group combinations, and the standard deviation of each comparison group. Table 14 presents the Spearman correlations among the thirteen categories of overhead.

Table 13

Correlation Analysis of Overhead Category Groupings

Group	Mean Correlation (A)	Mean Correlation – other categories (B)	t-test *p* value	Standard Deviation (A)	Standard Deviation (B)
Group (1)	0.777	0.370	0.003	0.088	0.097
Group (2)	0.441	0.517	0.048	0.054	0.160
Group (2) – without travel	0.411	0.497	0.014	0.038	0.148
Group (3)	0.436	0.505	0.047	0.102	0.119
Group (3) – without # of hours	0.475	0.505	0.252	0.088	0.119

Spearman correlations are not normally distributed, so a simple mean of the raw Spearman correlations would produce biased results. Instead, the researcher applied Fisher's (1915) *Z* transformation to each correlation, produced means on the transformed values, and then inverse-transformed these means (back to a Spearman correlation value). While this approach is designed for Pearson (*r*) correlations, the transformation produces similar results while also minimizing Type I errors, as compared to other transformation methods (Myers & Sirois, 2004).

The greatest difference in correlations appears between Group (1) ($\rho = 0.777$) and all of the other groups ($\rho = 0.370$). While the correlations for the 'other' categories in groups (2) and (3) were higher compared to the groups themselves, the *p*-values themselves are not extraordinarily small. Overall, the average correlation for the groups was $\rho = 0.555$, and $\rho = 0.457$ for all other groups.

Table 14

Spearman Correlations Between Corporate Overhead Categories

Overhead Categories	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Company functions (parties, etc.)	-												
2. Charitable or holiday gifts	.706**	-											
3. Bonuses	.623**	.619**	-										
4. Travel or company vehicles	.510**	.495**	.442**	-									
5. Corporate officer's salary	.375**	.399**	.400**	.400**	-								
6. Training or education	.542**	.563**	.488**	.416**	.353**	-							
7. Contributions to retirement plans	.380**	.438**	.455**	.363**	.416**	.399**	-						
8. Business development	.439**	.471**	.429**	.492**	.467**	.446**	.380**	-					
9. Home office: benefits paid	.279**	.303**	.251**	.355**	.238**	.397**	.314**	.385**	-				
10. Home office: staff salary	.302**	.342**	.308**	.347**	.358**	.422**	.296**	.378**	.510**	-			
11. Home office: insurance costs	.231**	.251**	.219**	.264**	.207**	.321**	.235**	.269**	.526**	.417**	-		
12. Home office: space (i.e., rent)	.233**	.234**	.211**	.291**	.213**	.323**	.218**	.411**	.454**	.396**	.339**	-	
13. Home office: # of hours worked	.274**	.279**	.215**	.294**	.273**	.340**	.198**	.268**	.310**	.484**	.322**	.310**	-

**. Correlation is significant at the 0.01 level (2-tailed).

CHAPTER 5

DISCUSSION

PUBLIC ACCOUNTABILITY AND ORGANIZATIONAL AGILITY STUDY

Evaluating the Research Questions

Research Question 1 – Impact of Organizational Agility on Public Accountability

The researcher defines "increases" in public accountability as the availability of performance information and relative satisfaction of the public agents (acting on behalf of their taxpaying constituents). First, the data shown in Table 5 are the actual representation of funds allocated to the public projects. These results are especially useful within the context of the *Legal* accountability framework. The performance information provides external third-party agencies with quantifiable data that they can use to communicate with constituents, identify areas of improvement, or make more informed funding allocation on future efforts. Tax-payers or private businesses might also use the results to adjust their preferences when considering which public entity they would prefer to work with (*Market* accountability).

The researcher also measured the public agency's level of satisfaction of the Value-Based Model itself and the contractors' level of performance. The researcher views the public agents' satisfaction level as a surrogate of how well the agility tools in VBM increase public accountability. At the conclusion of each project, the researcher solicited a closeout survey from the public entity's project manager. A total of 248 surveys were collected, which are summarized in Rows 20 – 22 of table 4. The project managers were asked to rate eight performance criteria on a scale from 1 to 10, with 10 representing that they were very satisfied. The project managers' overall satisfaction with the contractors

was rated 9.5 out of 10 (row 20), while the VBM itself was rated 9.6 out of 10 (row 21). Furthermore, the University (as well as all of the other public agencies in this study) did not report any litigation or bid protests as a result of using the Value-Based Model.

The researcher interviewed several of the public agency's directors and their contractors. Their comments highlight how the VBM has increased their overall level of performance by implementing the agile concepts:

- "I like the transparency aspect of VBM. One of the biggest challenges I face in a public institutional setting is ensuring that we provide opportunity for many different vendors – VBM helps us increase opportunity for the high performers. Another key part of the process is preplanning –in the past, we were not very good at preplanning, we like to jump into a project and push it through the system quickly. Now that we preplan, it gives us that opportunity to align resources, properly assess the risk, and create a structure so that the project has the best opportunity for a successful outcome. While learning the new paradigm of VBM has been challenging, we've found that once you put accountability into the equation, guess what? People perform." [Associate Vice President, University 1]
- "The biggest differences between the VBM and low-bid is that in low bid, you're getting a low number, you're getting low performance, and you're getting low quality. Sometimes it works out, sometimes it doesn't. I feel much more comfortable with the VBM process, where I have little to no change orders, and sometimes even a credit back from the contractors." [Coordinator of Design and Construction Services, School District 1]

- "Phase 2 of the VBM (pre-planning) is extremely important as it helps everybody understand their role in the project and clarify the project's overall intent. During the pre-planning on our project, we reviewed the risk assessments of the general contractor and their prime subs, and there were some 'a-ha' moments on where the project risk exists." [Facilities Director, School District 2]
- "In the price-based system, our relationship with the general contractor was more oppositional than anything. Now, there's no longer fights after the contract award about, 'You're going to eat this cost' because the teamwork is promoted before the contract award. VBM increases transparency and there's no need to hide anything from each other." [Mechanical subcontractor awarded multiple VBM projects with City 2 and School District 1]
- "VBM is a huge improvement over the old traditional process, where really the contractors were looking at what was the best for them. In the VBM, contractors are really looking at what's in the best interest of the customer." [General Contractor Vice President, several projects at University 1]

Research Question 2 – Costs of Implementing the Agile Concepts

A common concern from public agencies when considering using the VBM is that the process will increase contractor bid prices. This assumption is based on the perception that contractors who implement the agile concepts are costlier than those who do not – "you pay for what you get." While this might be true in other areas (i.e., commodities), the researcher propose that VBM does not greatly affect initial bid price, due to the

uniquely competitive nature associated with building construction. On the contrary, the researcher identify that VBM projects actually have a lower lifecycle cost (as measured up to construction completion – building operation costs are not included due to lack of data). The researcher bases this claim on the two analyses discussed below: (1) VBM project performance versus Traditional low bid projects and (2) VBM project award values in relation to the allocated budgets.

First, the researcher considered the total project costs of the VBM projects versus Traditional low bid, low accountability projects. It is important to note that capturing cost and schedule performance results of low bid projects is inherently difficult. The data sources are almost non-existent and any data provided is questionable. In an effort to overcome this obstacle, the researcher obtained data from another study that measured performance of traditional low bid projects (see Lines et al., 2014 for a detailed analysis of the projects and results). Lines' dataset contained meticulously-collected performance data of 11 traditional low-bid construction projects (mean award value of $1.3M, *SD* = $1.2M) delivered by one region of a large federal agency. While not a large dataset, this project data can help explain the relative performance of the Minnesotan VBM projects.

The total cost increases with the Value-Based Model was about 5.9 percent, compared to 10.6 percent under the Traditional projects. VBM project schedule increases were about 27.5 percent, compared to 67.9 percent in the Traditional environment. An independent-samples *t*-test was conducted to compare cost and schedule performance metrics under the VBM and Traditional project delivery environments. With exception to the owner schedule deviations, there was a statistically significant difference in performance between VBM and Traditional projects (see Table 15). Cost and schedule

changes on the VBM projects were about 57 percent less than the Traditional low bid increases. The Value-based projects present a per-project savings of about $1.4M and 163 calendar days. This was calculated by applying the mean Traditional project cost and schedule performance increases to the mean Value-Based project cost and schedule values, and calculating the difference.

Table 15

t-*test Results Comparing VBM and Traditional Cost and Schedule Changes*

	Best Value	Traditional Projects	*t*-value	df
Owner Cost Changes	5.9%	10.4%	-2.47**	424
Owner Schedule Changes	25.6%	50.8%	-0.05	12
Contractor Cost Changes	0.0%	0.2%	1.83*	71
Contractor Schedule Changes	1.9%	17.1%	-4.01**	424

$^{*}p < 0.05$. $^{**}p < 0.01$.

Next, the researcher analyzed the initial cost proposals and final awarded contract amounts, with respect to the budgets, on just the Minnesota VBM projects. The only projects analyzed were those that had a project budget included in the Request for Proposal, for a total of 382 valid cases. Table 16 shows the total budgeted amount (row 1), initial cost proposal (row 2), and the awarded contract value of all projects (row 5). It also shows the accepted total cost of additional value added ideas from the contractor (row 3), and other owner-direct scope changes prior to award (row 4). The value-added ideas are developed by the contractor, and are anything above and beyond the project specifications that the contractor feels would improve the overall value to the owner.

The awarded contractor was the lowest bidder 53 percent of the time. For the remaining 47 percent of projects (where the contractor was awarded a contract but not the lowest bidder) they were an average of 8 percent above the low bidder, but still an average of 7 percent below the budget.

Table 16

VBM Initial Cost Proposals and Final Contract Award

No	Criteria	Value
1	Total Budgeted Amount ($M)	544.27
2	Total Initial Cost Proposal ($M)	530.19
3	Total Cost of Value Added Ideas ($M)	4.89
4	Total Cost of Owner-directed Changes	20.74
5	Total Awarded Contract Value ($M)	555.83

Research Question 3 – Performance Variation by Public Agency Type

Finally, the researcher wanted to understand whether the performance results, and therefore propensity of implementing the agile tools, varied by the type of public agency. The researcher conducted an analysis of variance to identify if different types of public agencies had significance differential across cost and schedule changes (see Table 17). The only statistically significant difference between public agency type was with owner schedule delays, $F(4, 410) = 2.670$, $p = .032$. However, the strength of this relationship was negligible ($\eta^2 = .0025$). Therefore, cost and schedule performance do not appear to vary based on the type of public agency – overall project performance appears to be consistent across the different agency types.

Table 17

Analysis of Variance for Cost and Schedule Performance

	All	Cities	Counties	Public Utilities	School Districts	Public University	ANOVA *F* values	ANOV A η^2
Owner Cost	5.9%	0.3%	0.4%	0.1%	0.9%	9.8%	0.655	0.006
Owner Schedule	25.6%	5.3%	2.4%	81.9%	1.3%	35.9%	2.670*	0.025
Contractor Cost	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.431	0.004
Contractor Schedule	1.9%	2.0%	0.0%	0.0%	0.4%	2.4%	0.841	0.008

* $p < 0.05$.

Study Limitations

While the researcher has attempted to bring a certain level of robustness to the case study through an analysis of more than 400 projects, there are two significant limitations that the reader should be aware of. Firstly, the researcher assumed that the contractors accurately reported all cost and schedule metrics, not only in terms of the actual values but also with regards to which party generated the change (owner, contactor, designer, or unforeseen). The researcher attempted to ensure accuracy by establishing a feedback loop between the public agency's project manager and the contractor. The project managers were directed to verify that the performance reporting tools contained all project and schedule changes. Performance metrics is one of the most difficult agility tools to begin using, for both the public owner and their non-governmental organizations.

A second limitation is generalization of the reported results. All Minnesota projects studied took place within an area of approximately 100 square miles. This relatively small geographic area could introduce unique geopolitical or other demographic considerations that might affect the owner-contractor relationship.

In a somewhat surprising result, the mean overhead deviates from its downward trend as company size increases. In an effort to understand what might be causing this, Figures 15 and 16 show the distribution of the respondents' business sectors by annual revenue and number of full-time employees. A visual inspection of these bar charts reveals that the relative distribution of respondents' business sectors remains rather consistent, with exception to Manufacturing. In fact, the largest relative percentage of respondents identifying Manufacturing as their primary business sector is with companies' whose annual revenue is $100.1M - $500M, and with 101 to 500 full-time employees – the same groups that had higher levels of overhead reductions (compared to smaller or larger companies).

Furthermore, a review of the Bureau of Labor Statistics and Census data found that Manufacturing spending declined by about $38B (about 50%), which was both absolutely and relatively higher than nearly all of the other business sectors in this study (the exception being Private Retail – spending declined there by about $40B). Thus, one possible explanation for why the mean overhead reduction spikes for companies in the $100.1 to $500M range is that there was such a large decline in this sector that, companies were forced to cut more overhead costs than their similarly-sized peers in other sectors. The researcher conducted an independent samples *t*-test to compare mean overhead reduction for respondents whose primary business sector is Manufacturing, and all other sectors (only those at the $100.1M - $500M level). There was a significant difference in overhead reduction for Manufacturing sectors (M = 1.6, SD = .887) and all other sectors (M = 0906, SD = 0.6); t(38) = 2.281, p = 0.028.

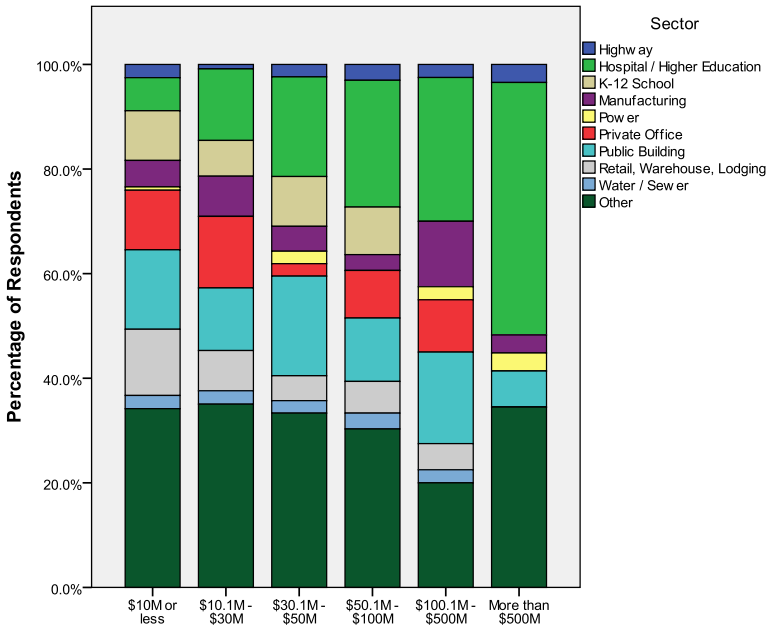

Figure 15. Relative Distribution of Business Sectors by Annual Revenue

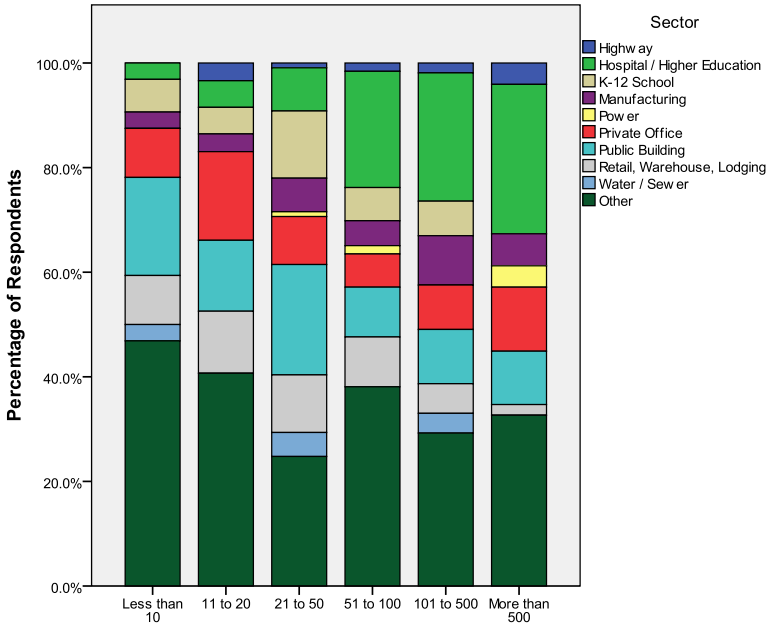

Figure 16. Relative Distribution of Business Sectors by Number of FTEs

These three results (visual inspection of the histogram in Figure 5, results of the Kruskal-Wallis H tests, and the intergroup correlations) suggest that there are at least three different levels of flexibility for corporate overhead categories in construction organizations: (1) Completely Flexible, (2) Potentially Flexible, and (3) Inflexible. Completely Flexible overhead costs are those that, at the first signs of difficult market conditions, could be immediately reduced or eliminated. Potentially Flexible are those that are the second layer of overhead reduction, and all potential reductions have been made in the Completely Flexible group. Inflexible overhead expenses are those that would require substantial effort to reduce or eliminate, and should only be considered after all reductions have been made in the other flexible groups. Table 18 summarizes the categories in each group as well as the descriptive statistics for each group.

Note that "Travel or company vehicles" and "Home office: # of hours worked" are not included in any flexibility group. Recall from the Kruskal-Wallis tests (see Table 12) that these two categories have statistically significant different distributions from the other categories in amongst the three groups. The researchers are unable to say for certain why these categories do not have distributions similar at least one of the other category groupings, but one possible explanation is that contractors view these as operational costs (not purely corporate overhead). The potentially varying perceptions of what type of costs these categories are (direct or indirect) may explain why there is a relatively high level of variability in reduction level responses for these areas.

Table 18

Spearman Correlations Between Corporate Overhead Categories

Descriptive Statistics	Completely Flexible	Potential Flexible	Inflexible
	Bonuses	Charitable or holiday gifts	Home office: benefits paid
	Company functions (parties, etc.)	Training or education	Home office: staff salary
	Charitable or holiday gifts	Contributions to retirement plans, etc.	Home office: insurance costs
		Corporate officer's salary	Home office: space (i.e., rent)
		Business development or accounting staff	
Overhead Reduction: Mean	2.152	1.073	0.497
Overhead Reduction: Median	2	0	0
Overhead Reduction: Mode	0	0	0
Overhead Reduction: StdDev	1.830	1.498	1.032

Study Limitations

The researcher acknowledges two primary limitations of this research. First, respondents were asked to identify overhead reductions based on a series of ranges (rather than the specific overhead reduction). The survey instrument was intentionally designed this way to encourage a higher response rate, but it came at a cost of data precision. Furthermore, the overhead reductions do not express the magnitude of said reduction with respect to the respondent company's overall financial position. Reductions in certain categories (especially those in the Completely Flexible group) might be easy to reduce, but may only have a negligible impact on their bottom line corporate overhead cost. This area needs further research and study.

A second limitation is that the researchers cannot guarantee that all respondents included in this study are actually contractors. The researchers removed those respondents whose companies were known to be non-contractors (i.e., an architect), but there was no way to identify the companies of respondents that did not provide this identifying

information in their response. The survey itself was intentionally distributed to just contractors, but very likely the survey website link was forwarded on to others and diluted the pool of respondents. However, we expect that the number of non-contractor responses is low, given the relative frequency of known contractors in the pool of all respondents.

CHAPTER 6

CONCLUSIONS

PUBLIC ACCOUNTABILITY AND ORGANIZATIONAL AGILITY STUDY

Review of the literature identified four general concepts related to organizational agility (OA): leverage core competencies, seek new opportunities, implement performance metrics, and strategically pre-plan efforts or projects. Though the ideas were seeded in the manufacturing industry, they have applicability in the public sector accountability frameworks. Agile organizations are responsive to their constituents, use their funds efficiently, are able to quantify their value and performance, and are successful regardless of the economic conditions. These are all the tenets of highly accountable, highly transparent organizations.

The researcher studied the applicability of a Value-Based Model in helping public entities become more agile in their provision of governmental services. The Model assists organizations by providing a structured approach to increasing their organizational agility. The various agile concepts are used through the three-phased approach of the VBM. The first phase (Selection) focuses primarily on the private industry's ability to help strengthen the public entity's core competencies through the identification of contractor expertise. During the second phase (Pre-planning), the contractor and public owner strategically plan out the project, focusing on project risk and clarifying the key project outcomes. In the final phase (Project Execution), the contractor is required to document project cost and schedule performance. The agency then utilizes the performance results to understand the overall status of projects, identify opportunities for improvement, and communicate to the

public how funding is being used. Therefore, diligent implementation of the VBM (and each of its three phases) results in increased public accountability.

The paper concludes with a case study of 415 public works projects across eight public agencies delivered with the Value-Based Model. The agencies implemented performance metrics that identify the sources of any project cost or schedule deviations, and saved approximately 57 percent compared to the traditional low-accountability method, an average of $1.4M and 163 calendar days per project. Furthermore, the researcher found that proposers were still cost competitive, as the awarded contractors were the lowest bidder 53 percent of the time, and an average of 2.6 percent below the stated budgets in the RFP.

AGILITY AND CONSTRUCTION CORPORATE OVERHEAD STUDY

Nearly every firm surveyed for this study reported that they cut overhead as a result of the Great Recession. It is likely that many of these firm's overhead expenses were seen as a permanent part of their corporate financial structure (Schleifer et al., 2014; Snodgrass, 1991). That fact that the large majority of firms reported cutting some level of overhead indicates that much of this cost may have actually been excess in the first place, much as the literature suggests.

While the recession had a negative impact on many people, and especially those in construction, the researcher proposes that it also presents a fresh opportunity for organizations to reconsider how they manage their overhead expenses. As the market continues to improve, companies will need to begin bringing back these overhead costs (people, assets, and so on). The major results of the paper were:

1. Nearly every firm surveyed cut at least some overhead. 92 percent of all respondents reduced overhead in about five different areas. The average overhead reduction was between 1% and 10%. Bonuses, Company Functions, and Charitable / Holiday Gifts had the highest levels of reductions, while Home Office Staff Salary and Home Office Insurance Costs had almost no decreases.
2. Larger companies reduce less overhead as a percentage of their total. This may indicate that smaller companies have more flexibility in their overhead expenses or were less able to maintain normal operations during the recession.
3. Roofing did not make many any statistically significant changes to their overhead levels. One explanation is that perhaps the rain still came down and the flood still occurred regardless of what the economy was doing – that is, construction buyers always have a need for roofing work. Another potential explanation is that a large percentage of the roofing industry is replacement, repair, and maintenance compared to other trades, and thus they were not as impacted by the recession.
4. There were higher levels of overhead reduction for $100.1M - $500M contractors, who primarily perform Manufacturing work. One explanation is that this sector was one of the hardest hit in the economy and thus the construction contractors for these sectors also got hit the hardest.

Recommendations for Future Research

Further analysis could also examine the relationship between different types of companies, market sectors, and overhead changes. Additional research is also recommended on the potential organizational culture aspects of the construction industry

as they relate to creating flexible organizations. This research may provide a deeper understanding of the cultural norms that lead to the creation of "permanent" overhead expenses within the construction industry.

OVERHEAD FLEXIBILITY CLASSIFICATION SYSTEM STUDY

The Great Recession of 2008 – 2013 forced many companies, especially those in the built environment, to reconsider their core competencies in an effort to just simply stay in business – let alone improve their bottom line financial position. There has been a massive outflow of the construction industry work force and there are no doubt concerns for the long term status of the industry (Elsby et al., 2010). Many companies reduced corporate overhead to cut their losses, but many of them likely made the cuts too late (Schleifer, 2015).

The researchers conducted a survey of more than 400 contractors and asked them to identify how much they reduced certain categories of corporate overhead as a result of the recession. The results revealed weak negative, but statistically significant, relationships between company size (annual revenue and number of employees), and "Corporate officer's salary", "Travel or company vehicles", "Charitable or holiday gifts", and "Company functions (parties, etc.)", while company size had almost no impact on reductions to "Training or education", "Business development or accounting staff", "Home office: space", and "Home office: staff salary".

Additional analysis suggests that there are distinct categories of overhead flexibility: Completely Flexible, Potentially Flexible, and Inflexible. During times of financial crisis, all categories of overhead should be evaluated, but the proposed overhead

flexibility classification system may provide contractors with added precision as they analyze their finances.

Recommendations for Future Research

The proposed overhead flexibility categories are based on the changes contractors make in response to a severe financial crisis. Additional research should be conducted to study how highly successful contractors fared during the recession with respect to the proposed classification system.

REFERENCES

10S-90: Cost Engineering Terminology. (2012, May). Retrieved June 7, 2016, from http://www.aacei.org/resources/terminology/

Ahmad, I., & Minkarah, I. (1988). Questionnaire Survey on Bidding in Construction. *Journal of Management in Engineering*, *4*(3), 229–243. http://doi.org/10.1061/(ASCE)9742-597X(1988)4:3(229)

Ahuja, H. N., & Campbell, W. J. (1988). *Estimating: from concept to completion*. Englewood Cliffs, N.J: Prentice-Hall.

Ankrah, N. A., & Langford, D. A. (2005). Architects and contractors: a comparative study of organizational cultures. *Construction Management and Economics*, *23*(6), 595–607.

Arteta, B. M., & Giachetti, R. E. (2004). A measure of agility as the complexity of the enterprise system. *Robotics and Computer-Integrated Manufacturing*, *20*(6), 495–503. http://doi.org/10.1016/j.rcim.2004.05.008

Assaf, S. A., Bubshait, A. A., Atiyah, S., & Al-Shahri, M. (2001). The management of construction company overhead costs. *International Journal of Project Management*, *19*(5), 295–303. http://doi.org/10.1016/S0263-7863(00)00011-9

Becker, T. C., Jaselskis, E. J., & El-Gafy, M. (2014). Improving Predictability of Construction Project Outcomes through Intentional Management of Indirect Construction Costs. *Journal of Construction Engineering and Management*, *140*(6), 4014014. http://doi.org/10.1061/(ASCE)CO.1943-7862.0000845

Blaxill, M., & Hout, T. (1991, July). The fallacy of the overhead quick fix. *Harvard Business Review*, *69*(4), 93–101.

Camp, R. C. (1989). *Benchmarking: the search for industry best practices that lead to superior performance*. Milwaukee, Wis. : White Plains, N.Y: Quality Press ; Quality Resources.

Cilensek, R. (1991). Understanding Contractor Overhead. *Cost Engineering*, *33*(12), 21.

Condon, E., & Hartman, F. (2004). Playing Games. *AACE International Transactions*, PM141-PM146.

Cotts, D. (2003). Innovative contracting. *Facilities Design & Management*, *22*(1), 28–29.

Dale, D. (1989). Controlling Overheads Without Killing The Business. *Australian Accountant*, *59*(1), 74.

Dale, D., & Bevington, T. (1989). Effective Resource Management: Achieving Overhead Control. *Australian Accountant*, *59*(2), 27.

D'Aveni, R. A., & Gunther, R. E. (1994). *Hypercompetition: managing the dynamics of strategic maneuvering*. New York; Toronto: The Free Press.

Day, P., & Klein, R. (1987). *Accountabilities: five public services*. London: Tavistock.

DeVellis, R. F. (2011). *Scale Development: Theory and Applications* (3rd ed.). Thousand Oaks, Calif: SAGE Publications, Inc.

Dicke, L. A., & Ott, J. S. (1999). Public Agency Accountability in Human Services Contracting. *Public Productivity & Management Review*, *22*(4), 502–516. http://doi.org/10.2307/3380933

Dorée, A. G. (2004). Collusion in the Dutch construction industry: An industrial organization perspective. *Building Research & Information*, *32*(2), 146–156. http://doi.org/10.1080/0961321032000172382

Dunn, O. J. (1964). Multiple Comparisons Using Rank Sums. *Technometrics*, *6*(3), 241–252. http://doi.org/10.2307/1266041

Dyer, L., & Shafer, R. (1998). From Human Resource Strategy to Organizational Effectiveness: Lessons from Research on Organizational Agility. *CAHRS Working Paper Series*. Retrieved from http://digitalcommons.ilr.cornell.edu/cahrswp/125

Elsby, M. W., Hobijn, B., & Sahin, A. (2010). *The Labor Market in the Great Recession* (Working Paper No. 15979). National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w15979

Ernstrom, J. W., & Essler, K. S. (1982). Beyond the Eichleay Formula: Resurrecting Home Office Overhead Claims. *Construction Lawyer*, *3*, 1.

Evan, W. M. (1963). Non-Contractual Relations in Business: A Preliminary Study: Comment. *American Sociological Review*, *28*(1), 67–69. http://doi.org/10.2307/2090459

Fibuch, E., & Van Way, C. W. (2013). Benchmarking's Role in Driving Performance. *Physician Executive*, *39*(1), 28–32.

Finer, H. (1941). Administrative Responsibility in Democratic Government. *Public Administration Review*, *1*(4), 335–350. http://doi.org/10.2307/972907

Fisher, R. A. (1915). Frequency Distribution of the Values of the Correlation Coefficient in Samples from an Indefinitely Large Population. *Biometrika*, *10*(4), 507–521. http://doi.org/10.2307/2331838

Fultz, J. F. (1980). *Overhead, what it is and how it works*. Cambridge, Mass: Abt Books.

Georgy, M. E., Chang, L.-M., & Zhang, L. (2005). Engineering Performance in the US Industrial Construction Sector. *Cost Engineering*, *47*(1), 27–36.

Gerwin, D. (2005). An agenda for research on the flexibility of manufacturing processes. *International Journal of Operations & Production Management*, *25*(12), 1171–1182.

Gibson Jr., G., Kaczmarowski, J., & Lore Jr., H. (1995). Preproject-Planning Process for Capital Facilities. *Journal of Construction Engineering and Management*, *121*(3), 312–318. http://doi.org/10.1061/(ASCE)0733-9364(1995)121:3(312)

Goldman, S. L., Nagel, R. N., & Preiss, K. (1995). Agile Competitors and Virtual Organizations: Strategies for. *Journal of Systems Management*, *46*(4), 31.

Gong, Y., & Janssen, M. (2012). From policy implementation to business process management: Principles for creating flexibility and agility. *Government Information Quarterly*, *29*, *Supplement 1*, S61–S71. http://doi.org/10.1016/j.giq.2011.08.004

Gore, A. (1993). *NPR 93-a Report of the National Performance Review*. Washington, D.C. Retrieved from http://www.nsf.gov/pubs/stis1993/npr93a/npr93a.txt

Greene, J. D. (2005). *Public administration in the new century: a concise introduction*. Australia ; Belmont, CA: Wadsworth/Thomson Learning.

Gruber, A. (2005, February 7). Program assessments factor into Bush plan to trim deficit. Retrieved June 3, 2011, from http://www.govexec.com/management/2005/02/program-assessments-factor-into-bush-plan-to-trim-deficit/18539/

Gunasekaran, A. (1999). Agile manufacturing: A framework for research and development. *International Journal of Production Economics*, *62*(1–2), 87–105. http://doi.org/10.1016/S0925-5273(98)00222-9

Hegazy, T., & Moselhi, O. (1995). Elements of cost estimation: A survey in Canada and the United States. *Cost Engineering*, *37*(5), 27.

Herbt M. Baruch Corporation v United States (United States Court of Claims March 3, 1941).

Holland, N. L., & Hobson, D. (1999). Indirect Cost Categorization and Allocation by Construction Contractors. *Journal of Architectural Engineering*, *5*(2), 49–56. http://doi.org/10.1061/(ASCE)1076-0431(1999)5:2(49)

Holzer, M., & Schwester, R. W. (2011). *Public Administration: An Introduction*. Armonk, N.Y: Routledge.

Ibbs, W., Baker, B., & Burckhardt, F. (2015). Process Model for Identifying and Computing Allowable Home Office Overhead Cost Claims. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, *7*(3), 4514007. http://doi.org/10.1061/(ASCE)LA.1943-4170.0000164

Jaselskis, E., Kurtenbach, J., & Forrest, J. (2002). Enhancing Financial Success Among Electrical Contractors. *Journal of Construction Engineering and Management*, *128*(1), 65–75. http://doi.org/10.1061/(ASCE)0733-9364(2002)128:1(65)

Justice, J. B., & Miller, G. J. (2011). Accountability and Debt Management: The Case of New York's Metropolitan Transportation Authority. *The American Review of Public Administration*, *41*(3), 313–328. http://doi.org/10.1177/0275074010377110

Kamensky, J. (2001, January 12). A Brief History of Vice President Al Gore's National Partnership for Reinventing Government During the Administration of President Bill Clinton 1993-2001. Retrieved July 24, 2015, from http://govinfo.library.unt.edu/npr/whoweare/historyofnpr.html

Kashiwagi, D. (2012). *Best Value Approach*. Mesa, Arizona: KSM, Inc.

Kessler, J. B., & Leider, S. (2011). Norms and Contracting. *Management Science*, *58*(1), 62–77. http://doi.org/10.1287/mnsc.1110.1341

Kline, R. B. (2004). *Principles and Practice of Structural Equation Modeling, Second Edition* (2nd ed.). New York: The Guilford Press.

Knutsson, H., Ramberg, U., & Tagesson, T. (2012). Benchmarking Impact through Municipal Benchmarking Networks: Improvement or Leveling of Performance? *Public Performance & Management Review*, *36*(1), 102–123. http://doi.org/10.2753/PMR1530-9576360105

Levene, H. (1960). Robust tests for equality of variances. In I. Olkin (Ed.), *Contributions to probability and statistics; essays in honor of Harold Hotelling* (pp. 278–292). Stanford, California: Stanford University Press.

Li, L., & Zhao, X. (2006). Enhancing competitive edge through knowledge management in implementing ERP systems. *Systems Research and Behavioral Science*, *23*(2), 129–140. http://doi.org/10.1002/sres.758

Lines, B. C., Sullivan, K. T., Hurtado, K. C., & Savicky, J. (2014). Planning in Construction: Longitudinal Study of Pre-Contract Planning Model Demonstrates Reduction in Project Cost and Schedule Growth. *International Journal of Construction Education and Research*. http://doi.org/10.1080/15578771.2013.872733

Lines, B. C., Sullivan, K. T., Smithwick, J. B., & Mischung, J. (2015). Overcoming resistance to change in engineering and construction: Change management factors for owner organizations. *International Journal of Project Management*, *33*(5), 1170–1179. http://doi.org/10.1016/j.ijproman.2015.01.008

Macias-Lizaso, G., & Thiel, K. (2006). *Building a nimble organization: A McKinsey Global Survey*. McKinsey & Company.

Marquardt, J. (2001, November 15). Delivering the goods in a tight economy. *Daily Journal of Commerce*. Seattle, WA. Retrieved from http://www.djc.com/news/ae/11127670.html

McGaughey, R. E. (1999). Internet technology: contributing to agility in the twenty-first century. *International Journal of Agile Management Systems*, *1*(1), 7–13.

Myers, L., & Sirois, M. J. (2004). Spearman Correlation Coefficients, Differences between. In *Encyclopedia of Statistical Sciences*. John Wiley & Sons, Inc. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/0471667196.ess5050.pub2/abstract

Nagel, R. N., & Dove, R. (1991). *21st Century Manufacturing Enterprise Strategy: An Industry-Led View*. DIANE Publishing.

National Bureau of Economic Research. (2010). *Business Cycle Dating Committee*. Cambridge, MA. Retrieved from http://www.nber.org/cycles/sept2010.html

Nohria, N., Joyce, W., & Roberson, B. (2003, July). What Really Works. *Harvard Business Review*. Retrieved from https://hbr.org/2003/07/what-really-works

Norfleet, D. A. (2007). The Theory of Indirect Costs. *AACE International Transactions*, ES121-ES126.

Oviedo-Haito, R. J., Jiménez, J., Cardoso, F. F., & Pellicer, E. (2014). Survival Factors for Subcontractors in Economic Downturns. *Journal of Construction Engineering and Management*, *140*(3), 4013056. http://doi.org/10.1061/(ASCE)CO.1943-7862.0000811

Palmer, W. J., Coombs, W. E., & Smith, M. A. (1995). *Construction accounting and financial management* (5th ed). New York: McGraw-Hill.

Pernici, B., & Weske, M. (2006). Business process management. *Data & Knowledge Engineering*, *56*(1), 1–3. http://doi.org/10.1016/j.datak.2005.02.003

Plebankiewicz, E., & Leśniak, A. (2013). Overhead costs and profit calculation by Polish contractors. *Technological and Economic Development of Economy*, *19*(1), 141–161. http://doi.org/10.3846/20294913.2012.763008

Porter, M. E. (1985). *Competitive advantage: creating and sustaining superior performance*. New York: Free Press.

Post, N. (1998, May 11). Building teams get high marks. *Engineering News Record*, *240*(19), 32–39.

Powell Jr, W. R. (2002). Organizational change models. *Futurics*, *26*(3/4), 20.

Prahalad, C., & Hamel, G. (1990, May). The Core Competence of the Corporation. *Harvard Business Review*, *68*(3), 79–91.

Pratt, D. (2010). *Fundamentals of Construction Estimating* (3 edition). Australia ; Boston, MA: Delmar Cengage Learning.

PricewaterhouseCoopers (PWC). (2009). *Need to know: Delivering capital project value in the downturn*. Retrieved from https://www.pwc.com/co/es/energia-mineria-y-servicios-publicos/assets/need-to-know-eum-capital-projects.pdf

Quinn, J. B., & Hillmer, F. G. (1995, January). Strategic outsourcing. *The McKinsey Quarterly*, (1), 48–70.

Rist, R. C. (1989). Management Accountability: The Signals Sent by Auditing and Evaluation. *Journal of Public Policy, 9*(3), 355–369.

Rivlin, A. M. (1971). *Systematic thinking for social action*. Washington: Brookings Institution.

Romzek, B. S., & Dubnick, M. J. (1987). Accountability in the Public Sector: Lessons from the Challenger Tragedy. *Public Administration Review, 47*(3), 227–238. http://doi.org/10.2307/975901

Şahin, A., Song, J., & Hobijn, B. (2010). The Unemployment Gender Gap during the 2007 Recession. *Current Issues in Economics and Finance, 16*(2), 1–7.

Schein, E. H. (2010). *Organizational culture and leadership* (Vol. 2). San Francisco: Jossey-Bass.

Schleifer, T. C. (1981). Construction troubleshooters can save development costs: workout group monitoring of project sites often reveals overruns, cheating. *The American Banker, 146*(Journal Article), 19.

Schleifer, T. C. (2009, March 11). Prospering in Cyclical Markets. *Engineering News-Record*. Retrieved from http://enr.construction.com/opinions/viewPoint/2009/0311-InCyclicalMarket.asp

Schleifer, T. C. (2014a, June 4). A Success Formula for Contractors for Good Times and Bad. *Engineering News-Record*. Retrieved from http://enr.construction.com/opinions/viewpoint/2014/0602asuccessformulaforcontractorsforgoodtimesandbod.asp

Schleifer, T. C. (2014b, October 27). Contractors, Let Go of Unneeded Overhead. *Engineering News-Record*. Retrieved from http://enr.construction.com/opinions/viewpoint/2014/1027-don8217t-hang-on-to-unneeded-overhead.asp

Schleifer, T. C. (2015, September 16). Overhead: A Silent Killer. *Engineering News-Record*. Retrieved from http://www.enr.com/articles/17186-overhead-a-silent-killer

Schleifer, T. C., Sullivan, K. T., & Murdough, J. M. (2014). *Managing the Profitable Construction Business: The Contractor's Guide to Success and Survival Strategies* (2 edition). Hoboken, New Jersey: Wiley.

Schoen, M. S. (2007). Good Enough for Government Work: The Government Performance Results Act of 1993 and Its Impact on Federal Agencies. *Seton Hall Legislative Journal*, *32*, 455.

Schumpeter, J. A. (1943). *Capitalism, socialism and democracy*. Routledge.

Singh, D., & Tiong, R. L. K. (2005). A Fuzzy Decision Framework for Contractor Selection. *Journal of Construction Engineering and Management*, *131*(1), 62–70. http://doi.org/10.1061/(ASCE)0733-9364(2005)131:1(62)

Siverbo, S., & Johansson, T. (2006). Relative Performance Evaluation in Swedish Local Government. *Financial Accountability & Management*, *22*(3), 271–290. http://doi.org/10.1111/j.0267-4424.2006.00403.x

Smithwick, J., Schultz, T., Sullivan, K., & Kashiwagi, D. (2013). A model for the Creation of Shared Assumptions and Effective Preplanning. *International Journal of Facility Management*, *4*(3). Retrieved from http://ijfm.net/index.php/ijfm/article/view/90/87

Snodgrass, T. (1991). Ideal Overhead: Lean and Mean. *Credit Union Management*, *14*(4), 44.

Sturts, C., & Griffis, B. (2005). Addressing Pricing: Value Bidding for Engineers and Consultants. *Journal of Construction Engineering and Management*, *131*(6), 621–630. http://doi.org/10.1061/(ASCE)0733-9364(2005)131:6(621)

Sull, D. (2009, December). Competing through organizational agility. *McKinsey Quarterly*. Retrieved from http://www.mckinsey.com/insights/managing_in_uncertainty/competing_through_organizational_agility

Sullivan, K., Kashiwagi, D., & Chong, N. (2009). The Influence of an Information Environment on Construction Organization's Culture: A Case Study. *Advances in Civil Engineering*, *2009*, e387608. http://doi.org/10.1155/2009/387608

Sullivan, K. T. (2011). Quality Management Programs in the Construction Industry: Best Value Compared with Other Methodologies. *Journal of Management in Engineering*, *27*(4), 210–219.

The Associated General Contractors of America. (2014). *2014 Workforce Survey Results*. Retrieved from https://www.agc.org/sites/default/files/Files/Communications/2014_Workforce_National_0.pdf

Thomson, D. B., Becker, M., & Wieland, J. (2007). A Critique of Best Value Contracting in Minnesota. *William Mitchell Law Review*, *34*, 25.

Vargha, A., & Delaney, H. D. (1998). The Kruskal-Wallis Test and Stochastic Homogeneity. *Journal of Educational and Behavioral Statistics*, *23*(2), 170–192. http://doi.org/10.2307/1165320

Walsh, P., Bryson, J., & Lonti, Z. (2002). `Jack be Nimble, Jill be Quick': HR Capability and Organizational Agility in the New Zealand Public and Private Sectors. *Asia Pacific Journal of Human Resources*, *40*(2), 177–192. http://doi.org/10.1177/1038411102040002337

Welch, B. L. (1947). The Generalization of `Student's' Problem when Several Different Population Variances are Involved. *Biometrika*, *34*(1/2), 28–35. http://doi.org/10.2307/2332510

Westney Consulting Group. (2014). *Approximating the Disproportionate Growth in the Cost of Capital Projects*. Retrieved from http://www.westney.com/wp-content/uploads/2014/07/Approximating-the-Disproportionate-Growth-in-the-Cost-of-Capital-Projects.pdf

Wiggins, R. R., & Ruefli, T. W. (2005). Schumpeter's ghost: Is hypercompetition making the best of times shorter? *Strategic Management Journal*, *26*(10), 887–911. http://doi.org/10.1002/smj.492

Worley, C. G., Williams, T., & Lawler III, E. E. (2014). *The Agility Factor: Building Adaptable Organizations for Superior Performance* (1 edition). San Francisco, CA: Jossey-Bass.

Yusuf, Y. Y., Sarhadi, M., & Gunasekaran, A. (1999). Agile manufacturing:: The drivers, concepts and attributes. *International Journal of Production Economics*, *62*(1–2), 33–43. http://doi.org/10.1016/S0925-5273(98)00219-9

APPENDIX A

CONSTRUCTION INDUSTRY OVERHEAD REDUCTION SURVEY

Part One

Overhead Expenses

The reseachers request your assistance conducting research to understand how the construction industry has reduced various overhead expenses over the last several years. This brief survey will take **less than five minutes** to complete. Please answer the questions from your relative perspective in your organization (i.e., local, region, corporate). Your responses will be kept completely confidential.

By roughly what percentage of general and administrative (overhead) expenses did your company **REDUCE** as a result, and since the beginning, of the recent construction market slow-down (2008 - 2013)? If you're unsure for a particular expense, please leave it blank.

DID YOU REDUCE...

	0% (none)	1 - 10%	11 - 25%	26 - 50%	51 - 75%	More than 75%
Bonuses?	○	○	○	○	○	○
Company functions (parties, etc.)?	○	○	○	○	○	○
Charitable or holiday gifts?	○	○	○	○	○	○
Training or education?	○	○	○	○	○	○
Contributions to retirement plans, etc.?	○	○	○	○	○	○
Corporate officer's salary?	○	○	○	○	○	○
Business development or accounting staff?	○	○	○	○	○	○
Travel or company vehicles?	○	○	○	○	○	○
Home office: space (i.e., rent)?	○	○	○	○	○	○
Home office: benefits paid by company?	○	○	○	○	○	○
Home office: number of hours worked?	○	○	○	○	○	○
Home office: staff salary?	○	○	○	○	○	○
Home office: various insurance costs?	○	○	○	○	○	○
Other:	○	○	○	○	○	○
Other:	○	○	○	○	○	○
Other:	○	○	○	○	○	○

Part Two

Please estimate your firm's annual revenue.

Please choose...

Approximately how many full-time employees (including field & office staff) does your firm have?

Please choose...

What is your firm's primary sector of business?

Please choose...

In which trade does your company primarily perform work?

Please choose...

If you'd like a copy of the final survey results, please provide your contact information below.

First and Last Name

Email Address

Phone Number