KICEM Journal of Construction Engineering and Project Management
Online ISSN 2233-9582

www.jcepm.org
http://dx.doi.org/10.6106/JCEPM.2016.12.4.015

Authentic Leadership and Construction Superintendent Effectiveness

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Abstract: ***The construction industry suffers from declining productivity and lack of trust between stakeholders and among the public. Increasing technical, regulatory, environmental and ethical challenges face the sector and necessitate a new type of leader. Authentic leadership is a relatively new construct that focuses on a leader demonstrating self-awareness, relational transparency, an internalized ethical and moral perspective and balanced processing. This study uses the Authentic Leadership Questionnaire to measure construction superintendent's levels of authentic leadership and compares them to effectiveness ratings. There is a correlation between higher authentic leadership scores and effectiveness and this study concludes that authentic leaders are more effective superintendents.***

Keywords: Authentic Leadership; Leadership; construction; superintendent; effectiveness

I. NTRODUCTION

The construction industry in the United States is a mixture of successes that are a testament to human ingenuity and technical and moral failures. Lack of trust and lack of productivity are two areas in which the sector has faced and continues to face challenges.

As an industry, construction has suffered a lack of trust from the public for decades. In a survey by the Construction Management Association of America (Doran, 2004), 63% of respondents answered affirmatively when asked if the construction industry is tainted by prevalent acts that are considered unethical. The simple nature of traditional low-bid contracting is adversarial and given to mistrust. Construction activities are also inherently full of risk as each project is essentially the production of a prototype. The uncertainties from the design and execution of a construction project are therefore numerous and the risks high (Jin and Doloi, 2009). Because of the complexity of construction projects and the openness with which stakeholders must communicate, trust is an essential attribute of stakeholder relationships within these projects (Guerriero et al, 2010). As Lau & Rowlinson (2011) say:

Complex construction projects are exposed to uncertainty and high risk, and coupled with the problems of imperfect information, the project environment may easily become a breeding ground for adversarial relationships and defensive behaviour. Since people are the host to minimize these negative effects, managing differences in people seems to be one critical task. We need to trust because there are circumstances of no choice and no knowledge, and this is a risk-taking process (p. 633).

New contract structuring such as Construction Manager at Risk reduce the adversarial nature of the traditional fixed price model of construction contracts. Such moves toward trust based contracts are resulting in more open and collaborative relationships and a restoration of trust to the industry. However, due to the higher degree of transparency afforded in the new contract structures, it is more important than ever that construction superintendents demonstrate good communication and integrity. As consumers come to expect better customer service from the industry, the stereotypical image of the cigar chewing, short tempered, foul mouthed construction superintendent is fast becoming unacceptable. The new model of a construction superintendent will need to demonstrate not only management skills but they are also "not self-centered and project stereotypes; rather, they are motivated by the well-being of their subordinates, other colleagues, their organization, and society at large" (Toor and Ofori, 2008, p. 624).

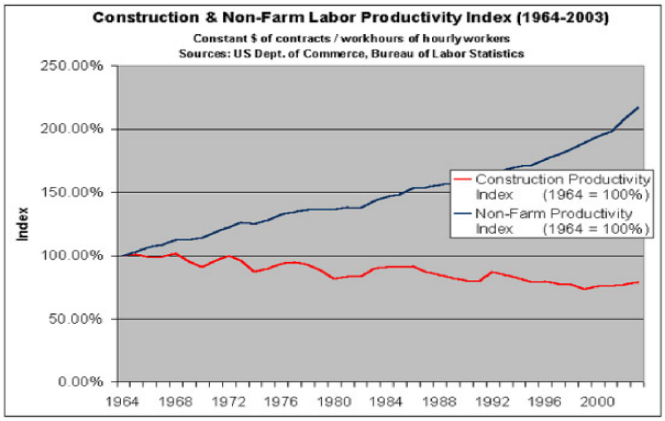

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FIGURE I
SECTOR PRODUCTIVITY INDEX (Teicholz, 2004)

Another failing of the construction industry has been the inability of the sector to increase productivity. As Figure 1 shows, not only has the construction industry failed to make gains in productivity as all other non-farm sectors have, but productivity has actually decreased over the last four decades. Such shocking data immediately prompts the reader to begin trying to reconcile the seemingly unbelievable claim with their observation that the world around them is seeing exponential growth in productivity. Attempts at this reconciliation begin with proposing simple explanations but these attempts will prove unsatisfactory.

The manufacturing sector lends itself most readily to comparison with the construction sector because both produce a tangible product in highly technical fields. When the two industries are compared, some potential explanations for such a trend can be disproven. The first possible explanation for the lack of productivity gains could be the presence of strong unions in the industry limiting gains in personnel productivity, however the manufacturing sector has made gains in spite of union influence. Another possible explanation is the ability of the manufacturing sector to create factories in which they control the environment and a repetitive process that allows perfection of the assembly. This most likely represents a true difference in the industries and may mean that construction will never surpass the productivity of the manufacturing sector but with more sophisticated project delivery systems that include off site assembly manufacturing, identification of design clashes preconstruction with BIM, and prefabrication capabilities, manufacturing's environmental control and process repetition cannot account for the huge disparity between the productivity of the two sectors. The next obvious explanation is that there are physical limits to human productivity and most construction tasks do not lend themselves to automation. Also the ability to move large components in three dimensional space on a construction site has many constraints that are not easily removed. Again these points are valid and will certainly continue to offer challenges but with the advent of better tools and equipment, better training, more sophisticated scheduling and project delivery systems, and more efficient site management and logistics these considerations could not have caused productivity to stagnate nor decrease. Lastly, constructing in a more regulated environment requiring more documentation, safety meetings and inspections adds bottlenecks but their effects on productivity are easily mitigated by proper planning.

Authentic Leadership

The question then remains why the construction industry, despite great advances in technology and sophistication in every area of activity, has lost productivity over the last four decades. In the literature, construction superintendents are seen as a primary contributor to poor construction productivity (Sanvido, 1988). Particularly the impact of any superintendent with poor ability to plan, schedule and direct the work will harm labor productivity (Olson, 1982). An older study by the Department of Energy (Borcherding and Garner, 1981; Borcherding et al, 1980) determined that the factors most impactful to poor productivity on construction sites were as follows: 1) material availability, 2) tool availability, 3) work redone, 4) overcrowded work area, 5) inspection delays, 6) foreman incompetence, 7) crew interference, 8) craft turnover and absenteeism, and 9) foreman changes. Another more recent study done by Rojas & Aramvareekul (Rojas and Aramvareekul, 2003) reported survey results that management systems and strategies had the greatest impact of any factor on labor productivity. A study by Liberda et al. (Liberda et al, 2003) focused on 51 productivity factors within the categories of labor, management, and external factors. Management factors, such as lack of detail planning and information and inadequate supervision accounted for half of the 15 most critical factors. Dai et al. (Dai et al, 2009) surveyed craftsmen and determined the top 10 most significant productivity factors on construction projects as shown in Table 1.

TABLE I
10 MOST SIGNIFICANT PRODUCTIVITY FACTORS
(Dai et al, 2009).

Issue	Normalized Severity Score
I have to wait for people and/or equipment to move the material I need.	100.0
There are errors in the drawings I use.	91.7
When there is a question or problem with a drawing, the engineers are slow to address the issue.	89.9
If I need a manlift to do my job, there are not any available.	84.3
When I need a crane or forklift to help me, there are not any available.	83.6
I can't get the consumables I need to do my job.	82.2
I have to search in a lot of places to get the tools I need to do my job.	78.4
When I go to install prefabricated items, work has to be done on them to fix quality problems.	75.2
I cannot get the power tools from the contractor that I need to do my job.	74.7
My supervisor does not provide me with enough information to do my job.	72.0

A trend is seen throughout these studies that site managers have a huge impact on the productivity of the labor on site and the project as a whole. With new contracting procedures, more complex projects and demand for better productivity, construction superintendents are in need of new skills that will equip them to lead in this high-stakes environment if productivity is to increase.

This author proposes that the root cause of both the productivity struggles and ethical problems in the industry is a lack of leadership from construction superintendents to bring all of the discussed advances together into a unified whole. Certainly the technical skills, training and quality of the construction superintendent have increased during this time period. In fact the industry almost unanimously requires a bachelor's degree for new

superintendents, a degree which didn't exist 40 years ago. The breakdown in harnessing advances in technology and personnel to increase productivity stems from a lack of sustainable leadership through all levels of construction management. Additionally, this lack of leadership contributes greatly to the protracted struggle to improve the public trust and respect of the construction industry.

Toor and Ofori (2006) state that "educational institutions and construction firms continue to produce managers who lack leadership skills. This is due to the traditional academic curricula which do not cover the development of individuals as leader, the conventional transactional mentality and task-orientation of industry professionals" (p. 620). Furthermore, Toor and Ofori attribute the lack of leadership to managers whose:

Day-to-day work involves management of activities and achievement of the short-term goals of the project such as conforming to budget, schedule, and quality. They are focused on the end goals and not the means to achieve the results. This mindset of construction project management makes the managers more production oriented rather than relationship oriented. They mostly end up managing their teams and day-to-day work rather than leading people to achieve long-term objectives (p. 620).

Schwalbe (2006) defines a leader as someone who is focused on long-term goals and inspiring people to meet those goals whereas a manager focuses on the day-to-day details of meeting specific goals. In other words "you lead people, you manage things" (Schwalbe, 2006, p. 24). The lack of leadership in the construction industry has actually been referred to as a "leadership crisis" (Toor, 2006). In order to rectify this "crisis" and to accelerate changing the negative industry trends seen above, "the construction industry needs to concentrate in developing a new breed of future project leaders through authentic leadership development" (Toor, 2008, p. 621).

In essence, authentic leaders understand their purpose, practice solid values, lead with heart, establish connected relationships, and demonstrate high levels of self-discipline (George, 2004). Authentic leaders will demonstrate characteristics of confidence, hopefulness, optimism, resilience, transparency, ethics, future orientation and associate building (investing in others). (Toor and Ofori, 2008). In "high-trust" contracting methods such as Alliances, authentic leaders are particularly well-suited to lead as they are collaborative, demonstrate attributes that build trust and encourage communication and dialogue and facilitate team building and commitment (Lloyd-Walker and Walker, 2011).

A study by Rosenthal et al. (Rosenthal et al, 2007) that compiled data for the National Leadership Index saw 77% of study participants agreeing or strongly agreeing that there was a crisis of confidence in American leaders. The 2009 version of this National Leadership Index (Rosenthal et al, 2009) found 63% of respondents do not trust what business leaders say and 83% of respondents believe that business leaders primarily work to benefit themselves or a small group of people's interests. The construction industry is not immune to these ill-perceptions of business leaders and is currently facing challenging new socio-economic, business, cultural and political environments (Toor and Ofori, 2008). Construction superintendents typically focus on managing tasks day-to-day and not on leading their people toward long-term objectives (Toor and Ofori, 2008). In others words construction superintendents focus more on the ends than the means. The new challenges in construction project complexity, more strict environmental regulations, safety issues, and legal matters necessitate that the means require more attention from superintendents than ever before. The expectation is that authentic leaders will bring the necessary skills to construction projects to counteract the traditional construction superintendent, who operates based on power, authority, and task-orientation.

Proposed benefits of applying authentic leadership to individual construction projects are numerous, but one benefit to a company that is crucial to program management is the "sharing and retention of knowledge, ethical behavior that supports future and not only immediate success, and accordingly contributes to organizational sustainability" (Lloyd-Walker and Walker, 2011, p.385). As authentic leaders contribute to the development of beneficial cultures within companies, their traits should be replicated in their followers. There are several definitions of authentic leadership found in the literature that each try to elaborate on these factors or traits that an authentic leader will possess. Because this study uses the Authentic Leadership Questionnaire, the definition of authentic leadership associate with that questionnaire is the one selected. The four factors that make up this definition of authentic leadership are defined in Table 2.

Objectives and Scope

The first step in moving the construction industry towards a model of authentic leadership is to demonstrate empirically that as authentic leaders serving as construction superintendents focus on the means of a project, they will benefit the bottom line of companies by delivering projects on time, on budget and with greater customer satisfaction than their non-authentic leader peers. Research demonstrating higher performance of projects led by individuals with higher authentic leadership attributes are needed to convince the industry of the merits of authentic leadership.

The purpose of this study is to determine if a correlation can be demonstrated between authentic leadership traits in a superintendent and effectiveness of that superintendent in delivering construction projects on budget, on time and with high customer satisfaction. A lack of research on this topic prompted the inquiry. Development of the construct of authentic leadership (AL) is mature enough to have produced two validated instruments for measurement of AL, namely the Authentic Leadership Questionnaire (Walumba et al, 2008) and the Authentic Leadership Inventory (Neider and Schriesheim, 2011). However, there is limited empirical research that can verify the beneficial effects of authentic leadership

that are claimed in the literature (Gardner et al, 2011). While Toor & Ofori (2009) used the Authenticity Inventory (Kernis and Goldman, 2005) to operationalize authentic leadership in the construction industry, application of the Authentic Leadership Questionnaire (ALQ) instrument has not been used in the construction industry according to the literature. This study, therefore, presents the first attempt at directly measuring the effect of authentic leadership on the construction industry.

TABLE II
AUTHENTIC LEADERSHIP FACTORS FROM AUTHENTIC LEADERSHIP QUESTIONNAIRE. (Walumba et al, 2008).

Factor	Definition
Self-awareness	"An understanding of how one derives and makes meaning of the world and how that meaning-making process impacts the way one views himself or herself over time. It also refers to showing an understanding of one's strengths and weaknesses and the multifaceted nature of the self, which includes gaining insight into the self through exposure to others, and being cognizant of one's impact on other people" (p. 95).
Balanced Processing	"Showing that they objectively analyze all relevant data before coming to a decision. Such people also solicit views that challenge their deeply held positions" (p. 95).
Internalized Moral Perspective	"Refers to an internalized and integrated form of self-regulation. The sort of self-regulation is guided by internal moral standards and values versus group, organizational, and societal pressures, and it results in expressed decision making and behavior that is consistent with these internalized values" (p. 95).
Relational Transparency	"Presenting one's authentic self (as opposed to fake or distorted self) to others. Such behavior promotes trust through disclosures that involve openly sharing information and expressions of one's true thoughts and feelings while trying to minimize displays of inappropriate emotions" (p. 95).

This study investigates the following research objectives:

Research Objective 1: Determine if there is a correlation between authentic leadership attributes in a construction superintendent and that superintendents effectiveness at delivering projects on time, on budget and with high customer satisfaction.
Research Objective 2: Investigate consistency of scores on the authentic leadership Questionnaire when answered by self versus when answered by a peer.

Significance of the Study

Authentic leadership has been championed by practitioners as an effective means to achieve great results in organizations (George, 2003). However, within the scholarly literature, most attention has been paid to developing the construct and a validated instrument. The research agenda has become stalled by conflicting definitions and instruments and entangled in theoretical discussions. Empirical evidence that authentic leadership is effective in the real world is needed and may help balance the body of literature that has mostly been conceptual.

In the construction industry, authentic leadership has been discussed in a few papers at most (Toor and Ofori, 2008; Toor and Ofori, 2009). Those papers have done an excellent job in making a case that authentic leadership could provide excellent benefits to the industry and also that there needs to be empirical studies done that look at authentic leadership in real world settings. Leadership studies within the construction industry have been scarce until recently as Toor & Ofori (2008) report from a 2007 study in which they reviewed the literature and found that of the 44 papers on this topic, half were published in the decade preceding the paper. This lack of research on leadership in the construction industry is attributed to social scientists not understanding the construction industry and construction participants not understanding the social sciences (Langford et al, 1995). This paper seeks to meet these needs by furthering the discussion of authentic leadership as a needed component in the construction industry, bridging the divide between construction and social science, and by providing a first attempt at quantifying the benefit of authentic leadership in the construction sector.

Proposed Conceptual Model

This study expects that construction superintendents who possess greater levels of authentic leadership traits will also demonstrate higher levels of effectiveness at completing their projects on time, on budget and with high customer satisfaction. The proposed conceptual model is shown in Figure 2.

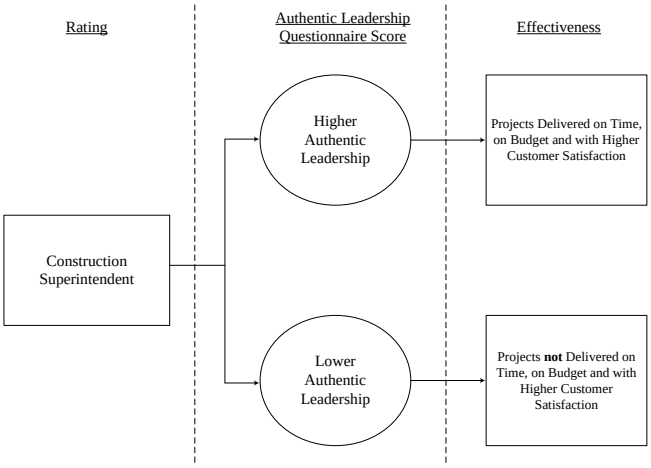

FIGURE II
PROPOSED CONCEPTUAL MODEL FOR CONSTRUCTION SUPERINTENDENT EFFECTIVENESS MEDIATED BY AUTHENTIC LEADERSHP TRAITS

Development of Hypotheses

Authentic Leadership and Effectiveness

Authentic leaders have been shown to produce development in followers in areas of work engagement (Hassan and Ahmed, 2011), Organizational Citizenship Behaviors (Walumba et al, 2011b), psychological capital and creativity (Rego, 2011), and trusting (Hassan and Ahmed, 2011) and ethical climates (Lloyd-Walker and Walker, 2011). As an authentic leader develops their followers, there should be a measureable upward trend in areas of performance in whatever tasks the leader and their followers are engaged in. As authentic leaders create

an environment where, for example, the exchange of ideas is welcomed then better project performance will result. This effect should increase over time as knowledge gained on one project by followers transfers to the next project. It is also plausible that over time, followers of authentic leaders might see greater success in their careers as the development they enjoy under such leaders prepares them well for advancement (Luthans and Avolio, 2003; Toor and Ofori, 2008).

If a construction superintendent can develop followers, there should be an increase in performance over time from project to project so a leader with higher authentic leadership traits might see better performing projects due to the development of their followers. The transient nature of the construction industry though may make long-term linkage of followers to a specific leader less likely. Therefore construction superintendents that demonstrate authentic leadership attributes may produce benefits due to the fact that an authentic leader communicates well with the owner, subs and followers and establishes a more open and effective atmosphere on the project, leading to collaboration, higher satisfaction and better productivity.

Whether the mechanism that mediates higher effectiveness and customer satisfaction is due to development of followers or the positive attributes that a construction superintendent brings to the stakeholders of a project, it is proposed that an authentic leader will see greater effectiveness of their projects. Therefore, this study postulates the following hypotheses:

Hypothesis 1A: Construction superintendents with higher scores on the Peer-report Authentic Leadership Questionnaire will receive higher ratings of effectiveness on their ability to deliver projects on time, on budget and with high customer satisfaction.

Hypothesis 1B: Construction superintendents with higher scores on the Self-report Authentic Leadership Questionnaire will receive higher ratings of effectiveness on their ability to deliver projects on time, on budget and with high customer satisfaction.

Difference in Self-report vs. Peer-report

Because part of the authentic leadership construct includes self-awareness, the opportunity to compare the responses from a subject who answered for themselves with the responses answered about them by another is intriguing. If there is a difference in the answers, it would be noteworthy to determine if those who score higher on the Self-report Authentic Leadership Questionnaire see less distance between group means when a paired T-test is run on their answers and their peer's answers about them. The idea that those with greater authentic leadership traits have better self-awareness and therefore will answer more closely to the peer-report on them than those who score lower on authentic leadership is beyond the scope of this study. However, it is valuable to determine if there is a statistically significant difference between the mean of the self-report surveys and peer-report surveys to the following hypothesis is postulated:

Hypothesis 2: There will be a significant difference in the mean score from the Self-report survey and the mean score from the Peer-report survey.

METHODOLOGY

Data Collection Procedure

A commercial construction company in the top 150 largest firms as reported by Engineering News Record (2011) was selected as the sample because of the high levels of sustained performance, customer satisfaction and examples of leadership that exists in this company.

The first step was to contact the target company to seek permission to perform this study within the organization. A meeting with the owner was arranged and after a short presentation, access was given to the superintendents and two Vice-Presidents (VP) to complete the study. The VPs were assigned to the project by the owner of the company since both were involved in operations and therefore the most familiar with the superintendents. In this particular company structure, the superintendents report directly to the VPs of operations so these VPs were the only people with direct responsibility to all of the superintendents. An online version of the Self-Report Authentic Leadership Questionnaire (ALQ) was set up after obtaining permission from the authors to utilize this copyrighted instrument. A link to the survey was sent to the coordinating VP of the construction company via email containing distribution instructions. The superintendents were forwarded the link and completed the self-report version of the survey. An online survey was then created for each superintendent that had responded for the two VPs to complete a peer-report version of the survey. In order to randomize assignment of the superintendents between the two VPs, and online list randomizer (www.random.org/lists) was utilized. Each VP answered the survey for half of the sample group of superintendents.

The VPs were then sent an online rating scale and asked to rate each superintendent on their "effectiveness at delivering projects on budget, on time and with high customer satisfaction." Each VP rated the effectiveness of the superintendents that they had completed the peer-report ALQ for.

Sample Description

Of the 38 Self-Report Authentic Leadership Questionnaire surveys distributed, 34 of the superintendents responded resulting in a yield rate of 89.5%. One-hundred percent of the superintendents that returned the self-report survey had peer-report surveys and effectiveness scores completed by the VPs. The respondents ranged in age from 21 to 60 years with a mean age of 45.2 years. One-hundred percent of the respondents were male. Twenty-nine of the respondents were superintendents and five were assistant superintendents. Any assistant superintendent included in the study was in charge of the job site to which they were assigned, making the title of assistant relevant only to company hierarchy as they were *de facto* superintendents.

Years of experience in the construction industry ranged from less than one year to 39 years with a mean of 23.3 years of experience. The highest degrees earned were 35.2% high school diploma, 58.8% some college, 0% associates degree, 5.8% have a bachelor degree. Table 3 summarizes the demographics.

TABLE II
DEMOGRAPHIC INFORMATIN FOR SAMPLE

Demographic	# of Respondents
Age (n=33)	
18-25	1
26-33	3
34-41	3
42-49	15
50-57	9
58-65	2
Year of Experience (n=34)	
0-5	1
6-10	2
11-15	3
16-20	7
21-25	8
26-30	6
31-35	5
36-40	2
Sex	
Male	34
Female	0
Level of Education	
High School	12
Some College	20
Associates Degree	0
Bachelor Degree	2
Graduate Degree	0

Survey Instrument

Authentic Leadership

To measure authentic leadership this study uses the 16 item Authentic Leadership Questionnaire (Copyright © 2007 Authentic Leadership Questionnaire (ALQ) by Bruce J. Avolio, William L. Gardner, and Fred O. Walumba. Distributed by Mind Garden, Inc. www.mindgarden.com). There are two versions of this questionnaire, one for self-report and one for peer report. The ALQ measures four dimensions of authentic leadership: balanced processing (3 items), self-awareness (4 items), internalized moral perspective (4 items) and relational transparency (5 items). Respondents answer with what frequency they observe each described behavior in themselves or in their peer on a 5 point scale ranging from 0 (not at all) to 4 (frequently, if not always).

Sample items are: (1) analyzes relevant data before coming to a decision; (2) seeks feedback to improve interactions with others (self-awareness); (3) makes difficult decisions based on high standards of ethical conduct; (4) admits mistakes when they are made (relational transparency). A composite score of all items reveals the target's authentic leadership score.

Effectiveness

To measure effectiveness two methods were used. First, a seven point Likert instrument was created online. The scale ranged from one (Not Effective at All) to 7 (Highly Effective). Each superintendent's name was placed with one of these scales and the VPs were prompted: "For each person listed below, please select a rating of their effectiveness at delivering high quality projects on time, on budget, and with customer satisfaction." The scale was selected to have seven points to prevent many superintendents from "piling" up on one score.

Data Analysis

Because authentic leadership is a core construct Walumba et al. (2008) report that variance in the individual dimensions of authentic leadership are not as important as variance in the composite authentic leadership score. Due to this, comparison of the individual dimensions was not performed.

In order to account for one survey that had a missing answer, the composite scores from each response to the Authentic Leadership Questionnaire were divided by the number of items answered to determine an average per item score which was then used as the Effectiveness Score for each superintendent.

Using SPSS 18.0, a correlation analysis was run between AL Self-report, AL Peer-report and Effectiveness Rating to determine mean, standard deviation and whether there were significant interaction effects between the variables. A paired T-test was performed between the AL Self-Report and AL Peer-report to determine if there was a significant difference in the means between the two surveys. The AL Self-report and AL Peer-report scales were both validated using a reliability analysis but the Effectiveness Rating was not since it has only one item.

FINDINGS

Reliability of Scales

The reliability analysis performed on the Peer-report version of the ALQ produced Cronbach's Alpha of α=.944. The Self-report version of the ALQ produced Cronbach's Alpha of α=.801. With the generally accepted standard of anything greater than α=.70 named as a reliable instrument, both of these scales are determined to be internally consistent.

Correlation of Effectiveness Score and Authentic Leadership

There was a statistically significant correlation between the scores from the Peer-report version of the ALQ and the effectiveness ratings of the superintendents ($r = 0.377$, $p = 0.05$). Hypothesis 1A was supported. Superintendents with higher traits of authentic leadership as reported by another demonstrate higher levels of effectiveness on their projects. There was no statistically significant correlation between the Self-report ALQ scores and the Effectiveness Ratings. Hypothesis 1B was not supported ($r = .299$). Superintendents self-reporting higher levels of authentic leadership do see higher effectiveness ratings, however the correlation was not statistically significant. The correlation coefficients of all paired variables are shown in Table 4.

TABLE IV
CORRELATIONS, MEANS, STANDARD DEVIATIONS, AND α VALUES OF VARIABLES

(n=34)

Variable	1	2	3
1. Effectiveness Rating (M=5.88; SD=.913)		.377*	.299
2. AL Peer-Report (α=.944; M=2.93; SD=.634)			.069
3. AL Self-Report (α=.801; M=3.41; D=.361)			

M: Mean; SD: Standard deviation
* Correlation is significant at the 0.05 level (two-tailed).

Difference of Means in Self-report vs. Peer-report

The sample mean per question score for the Self-report ALQ was M=3.41 with SD=.361. The sample mean per question score for the Peer-report ALQ was M=2.93 with SD=.634. A paired t-test performed on the sample means of the Self-report version of the ALQ and the Peer-report version of the ALQ. First, a weak and not significant correlation (r =.069, *p*.=.697) existed between the responses of the two instruments. The paired t-test showed a significant difference in the response means of the two surveys (t(34) = -3.940, *p* [2-tailed]=.000). Table 5 summarizes the paired t-test result. Hypothesis 2 was supported with Self-reported authentic leadership (M = 3.41) higher than Peer-reports (M = 2.93).

TABLE 5
PAIRED SAMPLE t-TESTS FOR SELF-REPORT AND PEER-REPORT

Variable	No. of Pairs	Self-report Mean	Peer-report Mean	t-value	Sig.
Authentic Leadership Scores	34	3.41	2.93	-3.940	.000

DISCUSSIONS

The most important finding of this study was a correlation between the peer-reported authentic leadership of the construction superintendents and their effectiveness rating. This correlation demonstrates that superintendents that possess higher levels of authentic leadership attributes are more effective at managing construction projects. This finding supports research in the literature that the construction industry should move toward authentic leadership as the model for construction superintendents (Toor and Ofori, 2008).

This study also demonstrated a significant difference of means between the Self-report and Peer-report versions of the ALQ with the Self-reports seeing a higher mean. This is to be expected since people will often think more favorably of themselves than others or than the true state of themselves. This discrepancy fed into the failure of this study to demonstrate a correlation between Self-report scores on the ALQ and effectiveness. No statistically significant correlation existed between these two variables meaning that the Self-report ALQ may not be a useful tool in predicting superintendent effectiveness. Nonetheless, evaluation of superintendents by executives or recruiters for authentic leadership traits is still supported by this study as a useful tool in selecting effective employees due to the correlation of Peer-report ALQ to effectiveness.

Assuming the accuracy of the Peer-report version of the ALQ to be higher and therefore more truly reflective of the levels of authentic leadership present in the sample participants, the results suggest that the authentic leadership traits displayed by superintendents are visible to executives. Any company will certainly have metrics in place for evaluating performance based upon objective measures so the effectiveness ratings are assumed to reflect actual states of the superintendents. The difficult part of evaluating superintendents comes in identifying the more subjective contributions of the superintendents that contribute to the effectiveness differences. These are often referred to as "soft skills." This company is known to perform 360 feedback for all employees. In this form of evaluation, each employee will receive feedback on their performance from other employees below, beside and above them in the corporate hierarchy. Such practices are useful when done with truthfulness as a paramount component but can lose their impact if participants are reticent to speak openly and honestly. For 360 feedback to work well, the receiver of the evaluation needs to possess many of the traits of an authentic leader in order to be open to difficult information that may come in. Balanced processing will allow the receiver to hear and accept suggestions for change and relational transparency will aid in evaluators accurately knowing and evaluating the receiver. Because the company that is the subject of this study practices 360 feedback, it may be assumed that the authentic leadership traits are seen in their employees to some degree during these sessions. Whether or not this company saw these traits as a grouping that correlated with greater effectiveness for their superintendents is unknown but the results warrant construction companies looking for and developing these traits in their employees. Additionally, because "authentic leaders are presumed to be free of the need to engage in ego-protecting biases that distort the process of self-relevant information," (Walumba et al, 2011a, p. 2) practices such as 360 feedback sessions should be more productive when they involve intellectually honest authentic leaders.

CONCLUSIONS

Authentic leaders are expected to increase the overall performance of a project (Kernis and Goldman, 2005) for all involved stakeholders (Toor and Ofori, 2008). This study supports that expectation as it shows that authentic leaders benefit their company through projects delivered on time and on budget and benefit the owners through high customer satisfaction. Now that construction

superintendents who are authentic leaders have been shown to offer better project performance, the next step is to discover how to train authentic leaders. There is some discussion on this topic in the literature (Michie and Gooty, 2005) but the topic is still in the theoretical phases and needs empirical studies to compliment theory development. This need poses a great opportunity to uncover how authentic leaders are made and how construction superintendents interested in increasing their productivity can shift toward this model of leadership.

Limitations to this study include sample size, subjective measure of effectiveness, validity threats from having a single person answer both the Peer-report ALQ and the effectiveness scores, and possible difference in rating approaches between the two VPs. The sample size appears small for a study of this type but the professional level of construction superintendent limits the numbers available in any one company. Limitations on access to multiple companies necessitated the sample size but ideally future studies would incorporate multiple companies to increase samples.

The measure of effectiveness used was a simple, one item survey for each superintendent. While this question was aimed at the full range of success factors in a construction project, the simplicity of the measure and the subjective nature of the Likert style ratings mean that it is not as powerful as a more objective method. Due to time constraints and limited resources, engaging company records for cost and schedule performances or actively measuring project performance over time were not options.

The fact that the VPs each answered half of the Peer-report ALQ surveys and provided the corresponding effectiveness ratings poses a potential threat to validity. It might be argued that by filling out the ALQ for the superintendents the VP was primed to think more positively of those supers he scored higher on the ALQ and that influenced his effectiveness ratings. Ideally the Peer-reports would have been answered by followers of the superintendents but the structure of the company used did not have employees directly under each of the superintendents.

The final threat to this study stemmed from splitting the sample in half and having two VPs each fill out half of the Peer-report ALQs and effectiveness ratings. If one VP tends to rate more critically than the other, the sample will not accurately reflect the true distribution of the superintendents.

Future research on authentic leadership in the construction industry may focus on using more objective means to measure superintendent effectiveness such as project cost, schedule adherence and quality. Following superintendents over multiple projects will allow conclusions to be drawn as to the sustained performance of authentic leaders in the industry and whether project performance sees an upward trend under authentic leaders as they develop followers. Tracking follower development will provide insight into an authentic leader's ability to transform their direct reports into authentic leaders themselves. Research seeking to determine the exact method whereby authentic leaders in the construction industry increase project performance is needed. Determining if it is by follower development or other means is crucial in an industry where stakeholders are numerous and workforces are transient. Also, as other studies call for, authentic leadership needs to be singularly defined.

Finally, studies are needed to determine if a correlation exists between higher authentic leadership levels and smaller differences of means between the self and peer report versions of the ALQ in order to see if the self-awareness of authentic leaders plays out in their questionnaire responses.

The nascent field of leadership in the construction industry and the relatively recent application of authentic leadership theory to the industry creates ample opportunities for research.

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