Adaptive Talent Management for Project Professionals:

Early Identification of Future Industry Leaders

by

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ABSTRACT

The workforce demographics in the United States are rapidly changing. According to census information, 35% of working adults are projected to retire within the next 20 years. The construction industry is being particularly affected by this demographic shift as fewer employees are entering into the industry. This shift is especially bad among project professionals within the industry. The response to these changing demographics depends on how companies manage their talent and plan for successions. In order to investigate this workforce problem in the construction industry, the author has partnered with an expert panel of human resource executives from various companies in the construction industry. This research seeks to investigate methods in which construction companies can identify high potential project leaders early on in their careers through quantitative methodologies. The author first validated the research problem by gathering demographic data from six U.S. construction companies varying in size and industry expertise. As a result of analyzing information from 2,294 construction employees in the project management career path, the authors have found that 58% of these individuals are projected to retire within the next 12 years. The author also conducted a detailed literature review and six company interviews to investigate current succession planning practices in the industry. The results show that very few companies have contingency plans for early to mid-level employees. Lastly, the author conducted 76 employee psychological evaluations to measure personality and behavior traits. These traits were then compared to supervisory performance reviews of these employees. The results of this comparison suggest that high potential employees tend to showcase previous leadership experience and also tend to be more outspoken and are also able to separate
their emotional bias from business decisions. Using these findings, the author provides an interview tool that employers can use to expand their talent pool in order to identify high potential candidates that may have been previously overlooked. The author recommends additional research in further developing the use of quantitative tools to evaluate early-career employees in order to more efficiently align resources within the shrinking talent pool.
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Chapter 1

INTRODUCTION

Background

Economic progress in the latter half of the 20th Century was propelled by the efforts of the “Baby Boomer Generation” (1946 – 1964). The vastness of this population led to an abundance of labor in most industries. Today, these Baby Boomers are in the twilight of their careers as they approach retirement. This labor exodus will lead to what many are considering to be a “talent drought”. The collection of skills and competencies within a company’s labor pool and the way those skills and competencies are applied in business processes are a key asset of any organization. This asset is often referred to as the “corporate knowledge” or “human capital”. Yet, as project professionals (human capital) leave the company and others join it, a significant part of the corporate knowledge is reshaped in ways that may not be well understood or managed.

The response to this demographic change depends on how companies choose to hire, develop, and manage the available individuals who remain in the talent pool. Talent management is a broad over-arching human resource field that examines the life-cycle and development of an employee from the initial identification and acquisition up until departure from the organization. Success planning is a component of talent management that seeks to prepare employees to fill the impending vacancies. Since its inception in the mid-20th century, succession planning has taken on various definitions, but in a general sense, the Society of Human Resource Management (Tracey, 2004) states that succession planning “[is] the process of identifying long-range needs and cultivating a supply of
internal talent to meet those future needs.” In essence, succession planning is how an organization utilizes human capital to respond to a changing workforce.

In the construction industry, employees in the project professional career drive the success of companies. If projects fail, companies fail. In the US, project professionals who start considering retirement (50 to 64 years old), are part of the baby boomer generation. This age group consists of about 65 million people (see Figure 1-1). The next age group preparing to replace them (35 to 49 years old), is about 10% smaller (about 59 million people), followed by a growth of only 4% (about 61 million). This difference in population is creating a “talent gap”. A large portion of the workforce is retiring, and the next age group set to replace them is too small. The following generation is larger, but not large enough to offset the retirement trends. Furthermore, this younger generation might not be entering into the construction due to the diversification of the job market.

![US Population by Age](http://www.censusscope.org/us/chart_age.html)

Figure 1-1. Age distribution of the US population in 2015 (in millions)
According to the US Labor Department, the number of job openings in the construction industry has risen since the 2008 recession (after a period of heavy decrease), but the number of hires has continued to decrease (see Figure 1-2) (Sparshott and Hudson, 2015). The underlying issue is that today employers are unable to find talent to fill the openings. Other important facts to note are as follows:

- Between 2010 and 2014, the number of graduates with construction related degrees decreased by six percent (1,980 students) (CareerBuilder, 2015).
- Between 2004 and 2013, the number of construction employees decreased by 28 percent, which ranked as the seventh largest decline among all industries (Department for Professional Employees, 2015).
- 79 percent of general contracting firms report a shortage of craft laborers while 52 percent report a shortage of salaried professionals (AGC, 2015).
- Construction Industry Institute Author 318 verified that not only is the craft labor cliff a reality, but its poised to have major ramifications on construction jobsite safety and cost/schedule delays (Taylor et. al., 2015).

**Now Hiring**

Percent change in the number of openings and hires in the construction industry since the start of the latest recession

![Graph showing percent change in job openings and hires](image)

Figure 1-2. The percent change of openings and hires in the construction industry.
The job requirements of project professionals are also drastically changing. As technology progresses, and the scope of projects expand, the required skillsets of industry professionals is changing. The professional leaders of the future will require a unique set of skills in order to meet the growing demands of the industry. In addition to general advancements in technology, the industry is seeing a higher demand for green construction than ever before. Although, according to 91 percent of surveyed general contractors, there are not enough people adequately trained in green construction alone (McGraw-Hill, 2012). The industry, as a whole, is unable to find new hires with the adequate skillsets for job requirements (McGraw-Hill).

The underlying issue driving the need for succession planning in the industry is the absence of qualified talent. A large percentage of the workforce is projected to leave the industry due to retirement and fewer young professionals are entering into the industry. The increased retirement rate and decreased hiring rate has resulted in a large depreciation of qualified construction employees (see Figure 1-3). Current research projects a need for 1.6 million more jobs in the construction by 2020 (Epstein, J. 2015). Over the past 10 years, the number of young construction professionals (18 – 35) has decreased by 28 percent, which is the third largest decrease compared to other major industries (DPE. 2013). According to the Project Management Institute, an estimated 15.7 million project management (PM) careers will be added by 2020, which is considerably high given that there are fewer PMs entering into the industry every year (SHRM, 2015). Since the project career path is particularly crucial in the construction industry, a widespread loss of project leaders could have a profoundly negative impact on the industry as a whole.
In a recent 2015 survey, the Associated General Contractors of America (AGC) investigated how the changing workforce was impacting contractors (AGC, 2015). The survey shows that 55 percent of respondents are having trouble finding qualified project managers and supervisors. To adjust for this, 48 percent of companies report that they are increasing pay rates, but this is not making a foreseeable impact. Furthermore, 70 percent of respondents believe that the local pipeline and training for new hires is average, below average, or poor.

Problem

The construction industry needs to develop a viable method to bridge the talent gap. Up to 35 percent of the workforce could be lost to retirement, and the population of potential successors is not large enough to fill the vacancies. This deficiency creates a critical risk to individual companies and to the industry as a whole. There are only three viable solutions:
1. Increase the size of the talent pool.
2. Increase the efficiency of mid-career employees set to fill the impending vacancies.
3. Develop talent management methodologies that enable early-career employees to outperform their age capabilities.

To achieve option 1, the industry must either increase recruitment of young talent, or pull talent from other industries. This will require a large time and financial investment, that may not yield definitive results. Option 2 is possible, but according to the AGC survey, training methods and pipelines are not yielding impressive results. Option 3 is possible, but it has not been adequately investigated in the construction industry.

Proposal

This research effort seeks to investigate methods to improve talent management practices to facilitate early identification of high performing project leaders in the construction industry. The talent drought is unavoidable, the only viable solution is to improve how companies manage and align current talent with the focus of accomplishing more with fewer resources. If the pool of mid-career employees is not large enough to fill impending vacancies, the industry must learn to more effectively utilize the larger pool of young talent. The author proposes that this can be accomplished through the following means:

- Developing structured succession planning best practices at multiple levels within and organization.
• Identifying key personality and behavior traits that correlate to high employee performance and leadership potential.

• Establish a quantitative method to evaluate the personality and behavior traits of employees in order to augment the evaluation and talent development process.
Chapter 2

METHODOLOGY

In an effort to better understand how succession planning is effectively managed in the construction industry, the author seeks to qualify the various perspectives from both academic and industry sources. The scope focuses on best practices for identifying, developing, and transitioning early to mid-career employees. The research methodology is divided into four major components:

1. Validate the industry problem.
2. Identify current succession planning practices through literature research and company interviews.
3. Analyze the usage and performance of current best practices.
4. Collect industry data in order to advance succession planning methodologies.

In order to complete steps 1 and 2, the author conducted a thorough literature review of published research related to succession planning and talent management (see Appendix B). The author specifically sought out investigations involving the construction industry, but also examined sources focused on other major industries pertaining, but not limited to: human resources, business management, public policy, talent management, and so on.

For steps 2 – 4, the author partnered with a research team of construction companies from the Construction Industry Institute (CII). This research team (RT325) was formed to investigate the best practices for succession planning. The team was
composed of research professors, and human resource executives from several different construction companies across the United States.

Problem Validation

The critical problem under investigation is twofold: first, identifying whether the shifting talent demographics are affecting the industry, and second, determining whether construction companies are prepared to address the talent shift.

In order to validate the results of the literature review with industry data, the author initiated a survey of owner and contractor practices, through structured phone interviews. The interviews were conducted with human resource and operations professionals from six construction companies. The data collected included company profiles, succession planning methodologies, project manager demographics, best practices, and company project organization charts. The data collected was limited to specific functions, US-based employees, and company employee demographics. Each call averaged approximately 30 minutes. The desired outcome of these interviews is to qualify the preparedness of the companies by measuring the completeness of succession planning practices.

Data Collection and Analysis

The data collection component of the research sought to explore the best practices for identifying potential project manager successors in a talent pool. The team elected to focus exclusively on project managers because they were found to be a crucial mid-level position in the construction industry. The process for identifying employees is based on
of two key factors, performance and potential. The Society of Human Resource Managers (SHRM) explains that the 9Box grid is a simple table graph that rates “potential” on the Y axis and “performance” on the X axis (SHRM 2015). SHRM further explains that the 9Box grid allows managers to easily view employees’ current and potential performance. Individuals in the upper most right are deemed as “High Potential” candidates and individual in the lower left are considered to be “at-risk”. An example of a 9Box grid is presented in Figure 2-1.

![9Box Grid Example](image)

Figure 2-1. Example of a 9Box diagram

Before surveying company employees, the author created an organizational diagram template that enable employees from different companies to be compared at the same level despite having different functional titles. The levels are as follows:

- Level 0 – Individual contributors or team coordinator
- Level 1 – Manager of level 0 employees
- Level 2 – Manager of level 1 employees
Next, the author asked all three levels of employees to complete five different personality and behavior analyses (Myers Briggs, DISC, HEXACO, and Emotional Intelligence) (see Appendix F). Additionally, the Level 1 and 2 employees completed a performance review for their subordinates in which they rated employees on both their individual performance and potential. This performance review was developed by compiling different questions used by construction companies in their individual performance reviews (see Appendix D). The panel of experts on RT325 approved this performance review.

The author assessed 203 individual pieces of personality and behavior questions based upon 278 decisions made by 113 project employees in order to collect personality and behavior information. In addition, the team surveyed employee supervisors to collect performance and personality ratings. A complete dataset for an employee consists of personality and behavior traits along with performance and potential ratings. In total, there are 76 complete datasets.

A data analysis was conducted in order to determine if the personality and behavior traits of project managers correlate with the performance and potential ratings given by employees’ superiors. The author used Pearson’s Correlation Formula in conjunction with a multivariable linear analysis. These result of these statistical tools yield a formula that can be used to predict employee potential ratings.
Chapter 3

PROBLEM VALIDATION

The critical issue examined in this research is that the construction industry is on the verge of losing a large portion of its talent to retirement, but there are not enough young professionals entering into the construction industry to fill the impending vacancies. In order to mitigate this challenge, construction companies will need to adopt talent management and succession planning methods capable of using resources more efficiently. Thus, the purpose of the research in this chapter is to validate the following:

1. There is an impending talent drought.
2. Companies lack clear and viable methods of succession planning.

The Talent Drought

The underlying issue driving the need for earlier succession planning in the industry is the absence of qualified talent in the industry. As shown in Chapter 1, a large percentage of the workforce is projected to leave the industry due to retirement. Even more unsettling is that fewer young professionals are entering into the industry. Current research projects a need for 1.6 million more jobs in the construction by 2020 (Epstein, J. 2015). Over the past 10 years, the number of young professionals (18 – 35) has decreased by 28%, which is the third largest decrease compared to other major industries (DPE. 2013). The increased retirement rate and decreased hiring rate has resulted in a large depreciation of qualified construction employees.

This research seeks to specifically examine the effects of the talent drought on early to mid-level career employees. Under the guidance of RT325, the author elected to
focus primarily on project management (PM) careers because of the critical role they play in the construction industry. Additionally, according to the Project Management Institute, an estimated 15.7 million PM careers will be added by 2020, which is considerably high given that there are fewer PMs entering into the industry every year (SHRM, 2015).

Thus, RT 325 identified seven CII member companies who were willing to share employee demographic data. Together, the seven companies are fairly representative of contractors in the US (oil, vertical/horizontal construction, capital projects, residential, etc.) The companies range from 900 employees to over 50,000 and each work across different sectors. Companies were asked to provide data on employee job titles, ages, and years of experience. Over 2,500 data points were reported and analyzed. The number of data points per field are shown in the Table 3-1 below.

Table 3-1.

Summary of Data Points per Field for Each Company

<table>
<thead>
<tr>
<th>Company</th>
<th>Total Entries</th>
<th>Job Titles</th>
<th>Years in Position</th>
<th>Years in the Company</th>
<th>Years Prior to Company</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>332</td>
<td>333</td>
</tr>
<tr>
<td>B</td>
<td>61</td>
<td>61</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>170</td>
<td>170</td>
<td>-</td>
<td>170</td>
<td>-</td>
<td>170</td>
</tr>
<tr>
<td>D</td>
<td>320</td>
<td>245</td>
<td>-</td>
<td>318</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>-</td>
<td>24</td>
</tr>
<tr>
<td>F</td>
<td>1714</td>
<td>1714</td>
<td>1704</td>
<td>1658</td>
<td>1713</td>
<td>-</td>
</tr>
<tr>
<td>G</td>
<td>55</td>
<td>55</td>
<td>-</td>
<td>55</td>
<td>-</td>
<td>55</td>
</tr>
</tbody>
</table>

Based off of the response rate, the data can be broken into three major categories used to assess the population of the risk group. The categories are as follows:
1. Employee age – Figure 3-1

2. Total years an employee has worked within a company – Figure 3-2

3. Total years an employee has held his or her current position – Figure 3-3

Figure 3-1. Box plot of reported employee age in the project management career path
Figure 3-2. Box plot of reported working years of project employees within a given company.

Figure 3-3. Box plot of reported working years of project employees his or her job position.
The data suggests that 52 percent of project managers are 50 or older, and 41 percent of those are older than 60. In 12 years, half of all project managers within the sample will be within retirement range. The statistics of this risk group in comparison to the overall sample population are summarized in Table 3-2.

Table 3-2.

Comparison of the risk group to the full sample population

<table>
<thead>
<tr>
<th></th>
<th>Risk Group</th>
<th>Full Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Size</td>
<td>307 (52%)</td>
<td>581</td>
</tr>
<tr>
<td>Average Age</td>
<td>58</td>
<td>49</td>
</tr>
<tr>
<td>Average Years Within Company</td>
<td>14.46</td>
<td>11.65</td>
</tr>
<tr>
<td>Average Years in Current Position</td>
<td>3.01</td>
<td>4.32</td>
</tr>
</tbody>
</table>

It is interesting to note that 30 percent of the risk group is currently within retirement age (62 or older). This suggests that employees may not rush to retire immediately. Nevertheless, companies are still at risk of all of these employees retiring with little to no notice. Other key observations of this data are as follows:

- Only 2 percent of project employees are younger than 30.
- The majority of employees have been with their companies for less than 10 years, suggesting that there is a minority who remain in a company for their full career.
- On average, the more aged population, has been with their companies for longer, but only by about 3 years. Since this population is over 50, it is safe to assume that the majority have worked with multiple companies throughout their careers.
On average, the more aged population has been in their current position for 1 year less than the general population. No definitive conclusions can be draw, but this could likely be due to many of this group recently being promoted to higher level position.

Company Demography Profiles

The age demography of each company is shown in Table 3-3. Along with the average employee age, Table 3-3 also shows the percent of employees from each company that are included in the Risk Group. Other than Company D, the majority of each company’s project professions are within 12 years of retirement age. Company D, is unique in that it is the smallest and youngest company in terms of when it was founded, thus making it an outlier in the data. Of the 2,294 employees in this given dataset, 974 (43%) are in the Risk Group. Examining companies individually shows that the average amount of employees within the risk group per company is 47 percent. Removing company D from the dataset, yields an average amount of employees within a risk group per company of 57 percent.
Table 3-3.

Age Demography of Employees from Each Participating Company (*values are a rough estimate)

<table>
<thead>
<tr>
<th>Company</th>
<th>Sample Size</th>
<th>Average Age</th>
<th>Percent of Employees in Risk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>333</td>
<td>49.5</td>
<td>51%</td>
</tr>
<tr>
<td>B</td>
<td>170</td>
<td>52.1</td>
<td>62%</td>
</tr>
<tr>
<td>C</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>D</td>
<td>24</td>
<td>33.1</td>
<td>8%</td>
</tr>
<tr>
<td>E</td>
<td>1,712</td>
<td>44.9*</td>
<td>59%*</td>
</tr>
<tr>
<td>F</td>
<td>55</td>
<td>51.0</td>
<td>55%</td>
</tr>
</tbody>
</table>

All of the companies except for C and E provided age demographics for their employees. Company C was unable to release the data, or any data that would allow an accurate estimate of employee ages. On the other hand, while Company E could not provide age data, the author was able to create an age estimation for each employee, by using other available information.

Company E provided information in regards to employee years within the company, years in a current position, and years in the industry before joining the company. Assuming that employees typically enter into the workforce at the average age of 21 (median age between 16 and 25), current age can be roughly estimated using the number of total years within the industry. The author used this method to estimate the average age of employees in company E. Subsequently, this estimate is within a
reasonable range of the other large companies. Figure X considers the age of the full data sample, including the Company E estimations. With the inclusion the age estimations the trends shift slightly: 12 percent of employees are younger than 30 years old while 43% of employees may retire within 12 years. The mean age decreases slightly to 46 years old.

![Age Distribution](image)

<table>
<thead>
<tr>
<th>Age</th>
<th>Description</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>278</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>508</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>531</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>558</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>60+</td>
<td>416</td>
<td>18%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-4. Box plot of reported employee age in the project management career path including the estimated age of employees from Company E

**Succession Planning Practices**

At the beginning stages of the research, the author conducted a thorough literature review of published research related to succession planning and talent management. The author specifically sought out investigations involving the construction industry, but also examined sources focused on other major industries pertaining, but not limited to: human
resources, business management, public policy, talent management, and so on. After an extensive web search on three different academic databases, the researchers identified 40 relevant papers, and found 14 papers with quantitative and measurable findings.

In addition to an academic literature review, the author investigated past research from CII research teams. The author identified nine other authors that investigated fields closely related to succession planning and talent management. These research efforts are arranged into four different categories which focus on different career stages connected to the project management field. The CII research efforts and their categorization are shown in Figure 3-5 below. Figure 3-5 also depicts the different generic “positions” that an employee (or prospective employee) may have through their life in the PM career path. Figure 3-5 also shows how RT 325 presents research that can be implemented as early as pre-hire stages and as late as mid-career development.

Figure 3-5. The project management career path and relevant CII research citations.
Literature research shows that the field of succession planning is closely tied to other talent management processes. Given this, many other research efforts that focus on succession planning also incorporate an in-depth discourse about other human resource processes such as replacement planning and leadership development. In efforts to provide a more defined scope, the author used Hor’s interpretation of Ibara’s critical succession planning aspects:

(i) Leadership competency models that provide a blueprint for high performers.
(ii) A functioning performance management system that measures individuals against the leadership competency models.
(iii) An individual development planning process that helps narrow the present gap between current competencies and current performance.
(iv) A measurement method that assesses how well the succession program is functioning over time (Hor, F. C. et al. 2010) (Ibarra P. 2005).

By consolidating items (i) and (ii), the model can be further simplified into three key focuses: identification, development, and transition (see Figure 3-6). The goal of each subsequent phase is to funnel qualified successors into vacancies with minimal instability and maximum performance. The purpose of identification is to find candidates that exemplify key competencies and a level of comprehension that can lead to an effective succession later in their career. These competencies provide a performance baseline that are conducive to further development. Development takes place throughout the duration of employment. The goal is to train talent to further progress their core competencies in order to later fill a vacancy. This process can take various forms
depending on company preference. In this research effort transition is assumed to occur once a vacancy opens up and a qualified successor has been adequately prepared to take the role. Transition focuses on individual and company performance after succession takes place.

![Diagram of the three phases of a succession planning process]

Figure 3-6. Three phases of a succession planning process

In an effort to more clearly identify how the industry currently utilizes succession planning, the author interviewed six construction companies (some of which were included in the demographics analysis). The interviews were based on three main phase parameters of succession planning: identification, development, and transition. The interview questions were built on measuring the extent of each company’s succession plan as well as the key positions in which a succession plan is used (see Appendix C). The criteria for a key position is solely defined by the individual company. The results of the interviews, and information about each company, are shown in Table 3-4 below.
Table 3-4.

Company Information and Succession Plan Overview

<table>
<thead>
<tr>
<th>Company</th>
<th>Type</th>
<th>Number of Employees</th>
<th>Succession Plan</th>
<th>Key Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Owner</td>
<td>500</td>
<td>Informal</td>
<td>President Only</td>
</tr>
<tr>
<td>B</td>
<td>Contractor</td>
<td>10,000</td>
<td>Formal</td>
<td>Executive Leadership Only</td>
</tr>
<tr>
<td>C</td>
<td>Contractor</td>
<td>50,000</td>
<td>Formal</td>
<td>Executive Leadership &amp; High Impact PMs Only</td>
</tr>
<tr>
<td>D</td>
<td>Contractor</td>
<td>30,000</td>
<td>Semi-Formal</td>
<td>Executive Leadership Only</td>
</tr>
<tr>
<td>E</td>
<td>Contractor</td>
<td>12,000</td>
<td>Formal</td>
<td>Executive Leadership Only</td>
</tr>
<tr>
<td>F</td>
<td>Contractor</td>
<td>900</td>
<td>Informal</td>
<td>Executive Leadership Only</td>
</tr>
</tbody>
</table>

The names of the companies are removed in order to maintain anonymity. The company size is reported to provide research context. It is assumed that as company size increases, so do the leadership requirements of executive positions. Furthermore, larger companies are assumed to have a higher need for succession planning due to the increased number of leadership positions across the organization as a whole.

The author assigned three general categories to classify the extensiveness of a company’s succession plan: formal, semi-formal, and informal. A formal plan is one in which the company fully acknowledges an organization-wide succession planning methodology and utilizes models developed through past research. A semi-formal plan is one in which the company incorporates a few elements of the succession planning
processes but does not fully implement a pre-defined model. In the formal process, planning begins well before succession takes place, whereas the semi-formal method is ad-hoc based. Semi-formal methods tend to ere more towards replacement planning, which a reactive talent management measure that fills unexpected, or unplanned vacancies. Lastly, an informal plan is one in which no written plan exists for succession or replacement. Companies with informal plans profess to allow incumbents the full responsibility and control of choosing their own successor. Every company reports that succession plans are only defined for select key positions in the company. Most claim that the only key positions were executive leadership roles with the exception of Company C which outlined the additional importance of creating a succession plans for project management and mid-level management positions directly involved in high impact and high profile projects.

Identification. A review of current literature suggests that identification is the most crucial aspect of succession planning (Sharma, Chrisman, & Chua, 2003). Current perspective on identification and competency definition is widely contested among researchers, but the process remains relatively consistent. In identifying key talent, supervisors typically look at an employee’s performance in a current job function, and his or her potential to perform if promoted or moved to another position. The Society of Human Resource Managers (SHRM) explains

![9Box diagram](image)
that the 9Box grid is a simple table graph that rates “potential” on the Y axis and “performance” on the X axis (SHRM, 2015). SHRM further explains that the 9Box grid allows managers to easily view employees’ current and potential performance. Individuals in the upper most right are deemed as “High Potential” candidates and individual in the lower left are considered to be “at-risk”. An example of a 9Box Grid is presented in Figure 3-7.

Performance measurements vary depending job functions and requirements. Often, performance can be tracked using quantitative measurements called metrics. Potential is not as clear-cut as performance because it is a projection of future performance. This projection can be made based off of past performance, personality traits, and behaviors. There is an abundance of research focused on identifying which characteristics are most critical for leadership or management roles.

Through broad literature search spanning different industries, the author sought information identifying key characteristics of employees with a high potential to become managers. Tables 3-3, 3-4, and 3-5 below summarizes the results of this literature review along with the top competencies determined by seven different research efforts. The authors sorted the competencies in Table 3-5 by research citation, and grouped each competency in a general category; these categories are shown in Table 3-6 below. Lastly, each category was summed and listed by research citation shown in Table 3-7.
Table 3-5.

Top Competencies of High Performers by Citation

<table>
<thead>
<tr>
<th>Directiveness</th>
<th>Passion for Results</th>
<th>Clarity</th>
<th>Strategic Planning</th>
<th>Breadth of Experience</th>
<th>Intuitive</th>
<th>Problem Solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>Adaptability</td>
<td>Business Aptitude</td>
<td>Emotional Intelligence</td>
<td>Depth</td>
<td>Orqintional</td>
<td>Flexibility</td>
</tr>
<tr>
<td>Orientation</td>
<td>Composure</td>
<td>Brings out the best in people</td>
<td>Internal Attunement</td>
<td>Customer Centricity</td>
<td>Cooperation</td>
<td>Emotional Intelligence</td>
</tr>
<tr>
<td>Team Leadership</td>
<td>Authenticity</td>
<td>Responsibility</td>
<td>Ethics</td>
<td>Communication</td>
<td>Spiritual Intelligence</td>
<td>Cost Management</td>
</tr>
</tbody>
</table>

Table 3-6.

Key Competency Categories and Color Code

- Strategic Planning & Problem Solving
- Interpersonal Skills
- Experience & Technical Skills
- Personality Characteristics
Table 3-7.

Summation of Competency Categories by Citation

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Planning &amp; Problem Solving</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Experience &amp; Technical Skills</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Personality Characteristics</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

The results of Table 3-7 suggest very little correlation between categories. While the interpersonal skills category is the most prevalent between each author, individual authors do not agree on which aspects are most important. These results seem to echo Hölzle’s findings which state that by changing the scope of a given project, the desirable competencies change radically. Hölzle’s findings show: 90 percent of surveyed companies saw management experience to be the most critical competency for a potential leader, while in another instance, 80 percent of surveyed companies found social competence to be the most important attribute (Hölzle, 2010).
The author found similar results after interviewing the six companies mentioned in Table 3-4. Out of the six companies, only Company C report to maintain a written list of key competencies used for identification. One reported that instead of using a list of characteristics, the leadership team provides subjective performance scores and ratings of a candidate’s future potential. The remaining four companies all report that either incumbents or executive leaders define and identify their own competencies based off of past experience and knowledge of the vacant position. Each of the six express frustrations in the challenge of finding high performing successors, but none purport an extensive identification plan directly connected to succession planning. The overall consensus is that incumbents would either be familiar enough with potential successors to make a decision, or the company would instead focus on external replacement planning using a new hire.

**Development.** In a more developed succession plan, measures are taken by the company to facility employee growth and education. The development process helps an employee shape their current skills and characteristics to increase their performance and potential in order to prepare for advancement within the company. “[G]ood succession planning does not just look at who is next in the line for a slot, but also targets people early in their careers and determines what kind of training and experiences they need in order to become effective leaders” (Hor, F. C. et al. 2010), which thus creates the foundation for good development.

Most current research agrees that the success of development should be measured by overall organizational performance (Hor, F. C. et al. 2010). Researchers are split on
whether or not performance is positively correlated with development. For example, Collins and Holton claim no empirical evidence linking development with organizational performance, while Hor et al strongly argue for the contrary (Collins and Holton, 2004) (Hor, F. C. et al. 2010).

The interview results show that companies place the greatest concern and focus on the development of their employees regardless of how formal their succession planning is. Every company voiced that a major challenge is the lack of available time and resources needed to train up-and-coming employees. The companies struggle to understand the ideal training methodology and whether or not to develop using in-house resources or to outsource. Although Company F, for example, does not have a formal succession plan, they, nonetheless, are partnered with a local university to help with leadership development. The reported development methodologies for each company are shown in Table 3-8 below. Along with development methods, each company also has a tracking procedure to measure progress and competencies for employees. Of the six, only one company reports the use of a centralized database and tracking system, while three rely on managers to track individual employees, and one uses over 30 databases across various divisions and company locations.
Table 3-8.

Company Development Methodology

<table>
<thead>
<tr>
<th>Company</th>
<th>Development Method</th>
<th>Tracking Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mentorship</td>
<td>Manager Tracked</td>
</tr>
<tr>
<td>B</td>
<td>Professional Development Model</td>
<td>Centralized Database</td>
</tr>
<tr>
<td>C</td>
<td>Mentorship</td>
<td>30+ Databases</td>
</tr>
<tr>
<td>D</td>
<td>None</td>
<td>Manager Tracked</td>
</tr>
<tr>
<td>E</td>
<td>Professional Development Model</td>
<td>Not Reported</td>
</tr>
<tr>
<td>F</td>
<td>External Training</td>
<td>Manager Tracked</td>
</tr>
</tbody>
</table>

**Transition.** In general, the transition phase can vary in scope depending on the definition. In the case of this research, it is assumed that transition focuses on the time period just before and several years after a succession. The transition phase serves as the time frame it takes for the new successor to reach full productivity in their new position. The goal of transition is to minimize the instability of a company after succession and maintain overall productivity. The majority of new managers report that the transition phase is a result of trying to acclimate to “corporate culture, management and communication styles, and the detail of recent events” (Krandsdorff, 1996). According to recent research by Perrenoud and Sullivan, on average, the transition phase lasts about four years (Perrenoud and Sullivan, 2013).

The author was unable to identify current research and methodology surrounding the time after a succession specifically in the construction industry. The team was also
unable to identify current literature that provides conclusive best practices or methodologies leading to a successful transition. Additionally, the companies interviewed were unable to provide any data or commentary on transition aside from speculation. All of the companies state that the transition phase is how a successful succession is ultimately determined, but none had accessible metrics that suggested an effective transition.
Overview

As the author has sought to improve succession planning by creating a talent identification tool. The primary aim of this succession planning (SP) tool is to use measurable, quantitative data to increase the effectiveness of identifying, developing, and evaluating talent. This tool would provide supervisors with a supplementary method to better understand their employees.

Research Scope. The SP tool is envisioned to have the ability to accurately evaluate employees from a broad spectrum of career fields and positions within a company. Since the tool is developed based off of quantitative human measurements, it will translate to a variety of uses.

In order to establish a manageable scope, the team set out to analyze results for only early to mid-career construction project professionals (for more info see Chapter 2). Six CII member companies volunteered to survey their employees (see Table 4-1). The author assessed 254 individual pieces of personality and behavior data based upon 864 decisions made by 113 project employees.
Table 4-1.

Data collection overview of the companies who participated in the survey

<table>
<thead>
<tr>
<th>Company</th>
<th>Company Size</th>
<th>Survey Participants</th>
<th>Complete Datasets</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30,000</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>37,000</td>
<td>55</td>
<td>26</td>
</tr>
<tr>
<td>C</td>
<td>95,000</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>12,000</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>E</td>
<td>1,500</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>G</td>
<td>9,000</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>113</td>
<td>76</td>
<td></td>
</tr>
</tbody>
</table>

**Sample Size Validation.** The total sample size consists of 113 respondents. Out of those responses, 76 are complete and usable datasets. A complete dataset consists is a survey response that includes both personality/behavior data and performance/potential ratings as given by the respondent’s respective supervisor.

In an effort to determine whether or not the sample size is adequate, the author employed the margin of error formula (see equation 4.1). The margin of error formula calculates the acceptable range of error allotted for in the case of a miscalculation or measurement error. It considers four values: the margin of error (m), the confidence level (z), the standard deviation (σ), and the sample size (n). Both z and σ are known values. It is common practice to choose a 95 percent confidence level which yields a z of 1.96. The standard deviation (σ) is derived from analyzing the sample size (see Appendix H). In
many instances, the margin of error can be estimated, thus the formula can be reworked in order to calculate $n$.

$$m = z^* \frac{\sigma}{\sqrt{n}} \quad \Rightarrow \quad n = \left( \frac{z^* \sigma}{m} \right)^2$$  \hspace{1cm} (4.1)

The margin of error ($m$) is commonly attributed to either faulty instrumentation or human error. In the case of this research, the values of interest are performance ratings and potential ratings. Both of these ratings are evaluated on a 1 to 10 scale, thus the smallest conceivable $m$ is 1. As $m$ increases, $n$ increases, therefore, $m = 1$, yields the maximum needed sample size.

The results of the formula using standard deviation data from Appendix H show that the minimum needed sample size is 7 for employee performance ratings and 36 for employee potential ratings. Given that the available sample is 76, it can be concluded that this dataset is an adequate representation for the population.

**Description of the Data.** The tool draws from two main sources of data:

1. Personality and behavior information.
2. Performance and potential evaluations given by supervisors.

Personality and behavior information is collected through a variety of existing surveys used mainly for human resources and psychology. These surveys ask respondents a series of self-evaluation questions and output list of factors based on the responses. Each survey evaluates respondents on different factors depending on the survey’s key objectives.
The author selected four of the more commonly used personality and behavior surveys: Myers-Briggs Type Indicator, HEXACO, Emotional Intelligence, and DISC (see Appendix F). The number of questions and output factors for each survey are shown in Table 4-2 below. Combining each of these surveys yields 203 questions, 278 decisions, and 48 evaluation factors. In the pilot test stage, this high number of questions and factors is appropriate in order to provide a wide array of potential evaluation factors. The number of survey questions can be reduced in future iterations. The author projects that further iterations of the SP tool will yield a more concise and focused survey.

Table 4-2.
Overview of Personality Analysis Tools Used

<table>
<thead>
<tr>
<th>Survey</th>
<th>Questions</th>
<th>Evaluation Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myers-Briggs</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>HEXACO</td>
<td>100</td>
<td>32</td>
</tr>
<tr>
<td>Emotional Intelligence</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>DISC</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>203</td>
<td>48</td>
</tr>
</tbody>
</table>

Supervisors provide performance and potential ratings for each of their employees. In many organizations, supervisors are accustomed to using a 9Box tool for the evaluations (see Chapter 3). Using currently existing evaluation questions and techniques, the author created an employee evaluation survey for supervisors to complete for each employee. The performance evaluation consisted of 24 questions regarding both performance and long-term potential within the organization (see Appendix D). Given
that the scope of this research focuses on early to mid-level employees, the author is most interested in employee potential to become a project manager (PM potential).

**Data Analysis**

Using the two primary sources of data, the author seeks to identify the personality and behavior factors that contribute the most to overall performance and potential. The data analysis was conducted in the following steps:

1. Survey Results Evaluation
2. Data standardization
3. Data correlation
4. Multiple linear regression
5. Formula Derivation

**Survey Results Evaluation.** Each of the personality/behavior surveys used in this study ask a series of situational and qualitative questions. The possible answers for each of these questions vary from survey to survey. The answers are then graded and calculated into different output factors. Excluding Myers-Briggs, each survey results in a series of numerical values for each given output factor. Myers-Briggs outputs textual values that can then be translated into numerical values using a simple key. The numerical values can be analyzed, compared, and correlated.

**Standardization.** Each survey outputs a different range of numerical values, which vary in distribution depending on the question. Major outliers tend to have a large effect on the data, skewing the overall distribution curve. In order to make the data more comparable
and decrease the impact of outliers, the author used a standardized normal distribution (see Equation 4.2). In a standardized distribution, the average is always 0, and the standard deviation is 1, which means that 68% of the data in a given sample will fall between -1 and 1.

\[ z = \frac{x - \mu}{\sigma} \]  

(4.2)

\( \mu \) is the mean
\( \sigma \) is the standard deviation

**Correlation.** After the data is standardized, it can be more precisely compared and correlated. The team is interested in identifying any factors that directly correlate with either performance or PM potential. The correlation between two sets of data is calculated using the Pearson’s correlation coefficient (see Equation 4.3). The Pearson’s formula calculates a single coefficient \( r \) based on two separate sets of data \( x \) and \( y \).

The coefficient takes into consideration the slope of the linear regression line and the overall spread of the data \( (R^2) \). The slope shows whether there is a positive or negative correlation, therefore a slope of zero shows no correlation. The \( R^2 \) value ranges from 0 to 1, and a value close to 1 suggests that the data is exactly consistent with the linear regression model. Likewise, the Pearson’s coefficient is also given on a scale of 0 to 1.

\[ r = r_{xy} = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^{n} (y_i - \bar{y})^2}} \]  

(4.3)

Using the Pearson’s correlation coefficient formula, the various personality and behavior output factors can be compared to the performance and personality survey results. The team compared all of the different factors and results amongst each other in a
data correlation matrix (see Appendix I). This matrix shows the Pearson’s coefficient for every possible comparison of the survey results.

This research is only concerned with identifying factors that correlate closely with overall performance ratings and the employee’s PM potential. The ideal $r$ value depends on the sample size population and the desired level of accuracy. An ideal $r$ value is determined by using a table of critical values of Pearson’s coefficient (see Appendix L).

There are a total of 76 survey respondents that have complete data sets (performance, potential, and personality factors). With 76 responses, using a two-tailed probability distribution model, and solving for 99% accuracy ($p = 0.01$), the optimal $r$ value is approximately 0.30. Any $r$ values, greater than 0.30 or less than -0.30 suggest that the two factors being compared are closely correlated.

The data reveals that there are no factors that correlate with performance within the desired range of accuracy. The closest factor (with an $r$ value of 0.27) is social self-esteem which comes from HEXACO. Given this $r$ value and using Appendix L, this analysis is predicted to be 95% accurate. Further analysis (which will be shown later) suggests that this single factor is not enough to significantly estimate employee performance.

There are several factors that very closely correlate to PM potential. These factors include:

- Employee leadership level within a company ($r = 0.52$)
• DISC: Declared Influence \((r = 0.37)\)

• HEXACO: Sentimentality \((r = -0.37)\)

• DISC: Declared Conscientiousness \((r = -0.31)\)

Of these factors, only the employee level and declared influence show a positive correlation, while the others are negatively correlated. The definitions of these terms are as follows:

• **Leadership Level:** a reflection of an employee’s position within a company. A leadership level of 0 suggests that the employee does not supervise or manage any other employees. Level 1 suggests that the employee is manager or supervisor or level 0 employees. Level 2 suggests that the employee manages or supervises both level 2 and level 0 employees.

• **Declared Influence:** A person with a high score in declared influence, is someone who highly values leadership and social behavior. They are very comfortable leading and counseling others, but might show signs of impulsiveness. (Roodt, 2009)

• **Sentimentality:** High scores suggest that the subject forms very strong bonds with others and often has difficulty saying goodbye or hurting others’ feelings. (Lee, 2004)

• **Declared Conscientiousness:** A person with high scores in declared conscientiousness is very accurate and precise in his or her work often at the expense of being overly critical. (Roodt)
**Formula Derivation.** Four factors are shown to be significantly correlated: leadership level (L), declared influence (I), sentimentality (S), and declared conscientiousness (C). Using the datasets from each of these factors we can derive a formula used to predict PM potential. This can be done using a multilinear regression analysis tool. This tool uses the analysis of variance (ANOVA) (see Appendix K) in order to determine how each variable contributes to a linear regression formula to best fit the data. In addition, this analysis also provides an additional filter to determine the accuracy of the correlations by calculating the p-value for each variable. (this same toolset further verified that no factors clearly correlate with performance). A p-value typically smaller than 0.05 indicates strong evidence of correlation, whereas greater than 0.05 indicates that there is likely no correlation between the data. Table 4-3 shows the coefficients, standard error, and p-values for each of the variables included in the regression analysis. The coefficients and the intercept are components of the regression formula. The standard error is range of accuracy of the coefficients

Table 4-3.

Statistical Values of the Multilinear Regression Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.75</td>
<td>±1.52</td>
<td>0.000</td>
</tr>
<tr>
<td>L</td>
<td>3.35</td>
<td>±0.59</td>
<td>0.000</td>
</tr>
<tr>
<td>S</td>
<td>-1.23</td>
<td>±0.41</td>
<td>0.003</td>
</tr>
<tr>
<td>I</td>
<td>1.22</td>
<td>±0.41</td>
<td>0.004</td>
</tr>
<tr>
<td>C</td>
<td>0.19</td>
<td>±0.50</td>
<td>0.700</td>
</tr>
</tbody>
</table>
The data suggests that *Declared Conscientiousness* is well above an acceptable *p*-value range, thus it is not included in the final formula. Using the intercept, and the variable coefficients, the final formula is shown below (Equation 4.4). The value of $P_{PM}$ is the predicted PM potential of an employee.

$$P_{PM} = 3.35L - 1.23S + 1.22I + 7.75$$  \hspace{1cm} (4.4)

The accuracy of the formula can be evaluated by comparing the formula results to actual PM potential by plugging data from each of the survey respondents into the derived formula. The results of this comparison are shown in Figure 4-1. Line $\mathbf{b}$ in the figure represents the linear regression, and lines $\mathbf{a}$ and $\mathbf{c}$, represent the range of data between $1\sigma$ (68% of all responses). The scatterplot is divided into two sectors based off the spread of the data. Sector 1 of chart shows a wide spread of the data outside of the $1\sigma$ range, whereas the data from Sector 2 is almost entirely within the $1\sigma$ range.

This scatter plot presents a few key observations in regards to the two sectors that are significant in understanding the impact of this research. Sector 2 is divided from Sector 1 at approximately $P_{PM} = 7.75$. This division occurs because this is the point at which all of the input variables of the formula are zero. In other words, all respondents within Sector 1 scored a 7.75 or below in the predicted potential formula. Respondents within this sector show a wide range of actual potential values, while respondents in Sector 2 are rated as a six or higher (the majority of which are rated at a 10). It can be concluded that if an employee were to score a 7.75 or above in the formula, there is a very high likelihood that they have a high actual potential to become a project manager. If an employee scores below a 7.75, the results are inconclusive.
Figure 4-1. The comparison of the actual employee potential versus the predicted potential.

The final component of the formula derivation is determining the overall impact that each variable has on the output. This is done by using the covariance function within Excel and multiplying by the variable coefficient. The results of this analysis are shown in Table 5-4. This suggests that Leadership Level \((L)\) contributes the most to the final value. All of the variables combined account for 47% of the factors needed for determining PM potential. The other 53% can attributed to unknown variables. This suggests the reason why the formula is only effective at \(P_{PM} \geq 7.75\).
Table 4-4.

The Variable Contribution to the PM Potential Prediction Formula

<table>
<thead>
<tr>
<th>Variable</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>L</td>
<td>28%</td>
</tr>
<tr>
<td>S</td>
<td>10%</td>
</tr>
<tr>
<td>D</td>
<td>9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>47%</td>
</tr>
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</table>
Chapter 5

APPLYING THE RESEARCH RESULTS

The results of the data analysis show that several key attributes closely correlate with an employee’s overall potential to become a project manager, whereas no known attributes highly correlate with an employee’s overall performance (Appendix I). This information has a profound impact on how organizations can identify, prepare, and evaluate talent. The information in this chapter is the primary contribution of this research.

Assessing Employee Potential. According to the PM potential formula derivation, the most key factors are Leadership Level (L), Sentimentality (S), and Declared Influence (I). In a practical setting (such as an interview or a performance review) these factors cannot be easily quantified. Nevertheless, as these factors are more clearly understood, supervisors can adjust how they identify and measure talent. Each of these factors have a different practical translation to real-world traits.

The author has evaluated the measurement practices for each factor and has created an interview tool that employers can use to better identify high potential employees early on in their career. The purpose of this tool is to expand the talent pool to include additional candidates. It is not meant for exclusionary purposes. The follow sections provide practical translations for each factor and offer interview evaluation techniques to help improve identification practices.

Leadership Level
Leadership Level is an employee’s past experience in management or supervisory roles within any organization or company (i.e. multiple subordinates reported to the employee). The research results suggest that there is a tangible difference between leading a team and operating as a manager. A team leader (or project coordinator), may still be responsible for accomplishing project tasks, whereas a manager is responsible for delegating and supervising work. The results show that project managers more likely have a higher potential, and project coordinators are statistically no different than and director contributors or engineers. Therefore, employees with a higher potential have held management roles of any kind.

Interview Practices:

- If an employee has multiple years of management experience, they have a greater chance of being high potential PM.
- In interviews/evaluations, supervisors should ask employees to quantify their past leadership experience in terms of years and number of employees supervised.
- When searching through a pool of talent, supervisors should closely examine employees with any past management experience.
- If employees do not have prior leadership experience, they may still be a high potential. The author would recommend evaluating S and I to gather more information.

Sentimentality
Sentimentality ($S$) is the tendency to rely on emotional intuition and personal relationships to make business decisions. A highly $S$ individual, is not likely to have a high potential rating. $S$ is derived from the HEXACO Personality Inventory (Appendix F). The questions used to measure $S$ is evaluated by asking respondents to rate the statements below on a five-point scale of “strongly agree” to “strongly disagree”. Highly $S$ individuals will strongly agree with questions 1 – 3 and strongly disagree with question 4 (Lee et. al. 2004).

1. I feel like crying when I see other people crying.
2. When someone I know well is unhappy, I can almost feel that person's pain myself.
3. I feel strong emotions when someone close to me is going away for a long time.
4. I remain unemotional even in situations where most people get very sentimental.

Interview Practices:

- In interviews/evaluations, supervisors should ask employees for a personal experience in which they had to make a difficult decision which negatively affected a personal relationship (e.g. firing, disciplinary actions, promotions, etc.)

- Example interview question: “Can you recall a time when you were asked to reprimand or dismiss a co-worker who you considered a close friend? Describe the situation.”
  - If an employee has a history of giving special treatment or favor to close “friends”, he or she is not a high potential.
If an employee provides a concrete example in which they negatively affected another’s feelings in favor for a beneficial business decision, he or she is more likely a high potential candidate.

Declared Influence

*Declared Influence* (*I*) is a behavior style of an individual that is characterized by a tendency to persuade, convince, or influence others (C.S., & Hartley N.T., 2013). The individual thrives on social recognition and group activities. *I* is evaluated through the DISC profile assessment (Appendix F). In DISC, respondents are asked to identify traits that are “most-like” and “least-like” them. An individual with a high *I* score describes themselves using some of the following traits:

<table>
<thead>
<tr>
<th>Expressive</th>
<th>Companionable</th>
<th>Confident</th>
<th>Life-of-the-party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>Playful</td>
<td>Inspiring</td>
<td>Persuasive</td>
</tr>
<tr>
<td>Influential</td>
<td>Talkative</td>
<td>Optimistic</td>
<td>Eloquent</td>
</tr>
<tr>
<td>Attractive</td>
<td>Convincing</td>
<td>Eager</td>
<td>Animated</td>
</tr>
<tr>
<td>Stimulating</td>
<td>Good mixer</td>
<td>Enthusiastic</td>
<td>Gregarious</td>
</tr>
<tr>
<td>Captivating</td>
<td>Poised</td>
<td>Entertaining</td>
<td>Outgoing</td>
</tr>
</tbody>
</table>

DISC is used to describe human behavior, thus, the traits are very often observable. As employers are interviewing candidates, they should pay close attention to special behaviors and attitudes that suggest a high *I* individual, and therefore suggests a candidate with a high potential.

Interview Practices:
- During an interview, supervisors should ask employees to describe a situation in which he or she did not agree with a supervisor. The interview should look for the following (Bullwinkle K. 2013):

  - Example interview question: “Can you recall a situation in which your supervisor made a decision or took a stance that you didn’t agree with? How did you respond?”
    - As high I candidates recount the story, they will often be very expressive and enthusiastic. They will be comfortable discussing the situation and standing by their convictions. Nonetheless, they will look at the experience in a very optimistic light.
    - Low I candidates will not be as comfortable or enthusiastic. As they recount the story, they may seem pessimistic or defeated. Their story will show that they did not defend their stance. Often, these candidates may not be able to recall any such situation.

Supervisors should also note that employees with influential behavior tend to be observably outgoing, social, talkative, well-spoken, animated, and enthusiastic. If these behaviors are plainly evident, then the employee should likely be considered as a high potential.

**The Interview Flowchart.** Supervisors or hiring managers can easily implement all of these key factors by using the flow chart shown in Figure 5-2 below. This flowchart illustrates that the most important factor is managerial experience. If an employee has held a managerial position, then there is no need to conduct any further analysis. That
employee should always be considered in the pool of potential candidates. If an employee does not have managerial experience, then the interviewer should evaluate the candidate to identify:

1. Does he or she show signs of influential behavior (i.e. very enthusiastic and willing to defend personal convictions where needed)?
2. Does he or she have a past experience that clearly shows a willingness to make a difficult business decision regardless of their emotional bias?

If the employee answers affirmative to questions 1 and 2, then the supervisor should add the employee into the pool of potential candidates. This information can also be indirectly evaluated by talking to employee’s past supervisors. In this case, it is not imperative that the employee is interviewed.

Figure 5-1. Interview Question Flowchart for Expanding the Pool of Available Candidates

**Measuring Employee Performance.** The data analysis suggests that none of the personality or behavior factors highly correlate with employee performance ratings
This finding is counter-intuitive. It is not logically valid to suggest that an employee’s performance is arbitrary and irrelevant to his or her personality and behavior. The author proposes that this discrepancy could be a result of various unknown circumstances. Most likely, the discrepancy is due to differing opinions between supervisors and companies in regards to the parameters of high performance. In other words, different job functions within the project career path may require different personalities in order to be successful.

Although this research does not clearly identify personality and behavior measurements that correlate to high performance, the author still suggests that supervisors seek to quantify employee performance using their own means. By doing so, companies will be able to compare performance across different sectors and levels within the company. It is recommended that supervisors identify key, quantitative metrics that showcase an employee’s ability to deliver an end product or service that meets or exceeds expectations.

This research also suggests that performance should be evaluated separately from potential ratings. Surprisingly, these two factors do not closely correlate with each other \( (r = 0.24) \) (Appendix I, Section J). While the author cannot provide conclusive evidence to explain this finding, conjecture suggests that performance in one job position may not translate to high performance in another job position. For example, a construction engineer may be performing above and beyond his or her job requirements, but they lack the necessary social skills to make an effective project manager. The implication of this would relate to how supervisors decide to promote employees. The expert panel who
participated in this research suggested that when a supervisor is unsure about a potential promotion, he or she tends to favor high performance over high potential. If this research is true, perhaps supervisors should more closely consider high potential in exchange for average performance. Applying this to the 9Box tool discussed in Chapter 2 (Figure 5-3), when employers cannot identify a “9 candidate”, they will often defer to promoting a “6” or “8” candidate. The findings relating performance and potential suggest that perhaps a “7” candidate would be more suited.

Figure 5-2: Example of a 9Box diagram
Chapter 6

THE FUTURE OF TALENT DEVELOPMENT

This research seeks to investigate methodologies to improve succession planning for early to mid-level construction employees. Early on in the research, three stages of succession planning naturally revealed themselves: identification, development, and transition (see Chapter 3). The author began research primarily in the identification stage. Unfortunately, the author did not have adequate time to collect company data in regards to development or transition, but nevertheless, the team was able to form several hypotheses surrounding talent development based off of the literature research and the collective experience of the human resource executives on the team.

The purpose of this chapter is to expound further on the hypotheses regarding talent development that have arisen from this research. The three stages of succession planning are highly intertwined. Transition and development cannot begin without proper identification and talent analysis. Likewise, identification could be greatly improved if companies were to clearly define developmental objectives in a succession plan. If an organization knows skills and traits that are important for succession and development, then it would be in the organization’s best interest to identify employees who already possess these skills or have a greater propensity to learn them.

One of the critical challenges that companies face is identifying which skills are the most important to develop in employees. Commonly, skills are perceived as either technical skills (which apply to a more esoteric knowledge base), or soft skills (which are more closely related to human interaction and personal management). The Society for
Human Resource Management identifies that 93 percent of companies believe that technical skills are easier to teach than soft skills but soft skills are just as critical (SHRM, 2015). The industry representatives on RT325 also agree with this sentiment, stating that an employee can be taught specific knowledge, but it is harder to teach him or her how to think critically or act more professional.

According to the National Center for Construction Education and Research (NCCER), 40,000 construction companies across 39 countries and found have made very little progress in advancing talent development programs over the past 20 years (Whyte, 2013). In 1992, a special report released by CII suggested that “Most owners and contractors do not perceive current construction education and training to be adequate, particularly in regard to advancing technologies” (CII, 1992). Over 20 years later, the NCCER validates this notion in stating: “Even students that successfully complete training and plan to enter the construction industry may not be adequately qualified, because many of the training programs do not meet industry’s needs due to a skills gap” (NCCER, 2013). Talent development programs are lacking across the industry.

The author proposes that the industry is hard pressed to create effective talent development programs because companies cannot train employees on all of the necessary skills. While companies can train employees on technical skills with ease, many, most likely, cannot adequately train softer skills. This is because companies are good at measuring technical expertise, because it is easier to measure, and therefore, the company, as a whole, possess abundant technical knowledge. As shown in earlier chapters, softer skills are more subjective, depending on supervisors and company
preference. Therefore, it is much more complex to decide which soft skills are important. Furthermore, one would imagine that since soft skills are closely related to engrained human behaviors, it can be assumed that learning new soft skills takes more time and discipline than technical skills. RT 325 proposes that the path to resolving this issue lies in earlier intervention.

**Looking to Education**

Companies are well equipped to train young employees on technical skills, but they lack the necessary resources to adequately develop softer skills. The author proposes that it might not be efficient for companies to train employees on softer skills, if companies do not possess the training ability. Nevertheless, employees still need to develop softer skills, but young employees are significantly deficient in this area. A Harvard study concludes that young professionals are inadequately prepared to be successful, noting that many recent graduates lack professionalism, critical thinking, and communication skills. SHRM supports this idea through a survey of companies showing that the most deficient skills in young employees are professionalism, writing, soft skills, and critical thinking (SHRM, 2015). In other words, the weakest area for recent grads is also the weakest area of talent development: soft skills. According to the research, companies are less worried about students’ technical skills. Even if students are not adequately trained in all technical areas, companies state that it is very easy to make up for this, but it is not easy to make up for the lack of soft skills.

In the modern education system, students are asked to learn a broad range of topics throughout their academic career in order to prepare to become professionals.
Ideally, education should respond to the needs of the professional world, but that is not the case. In a study done to show the effectiveness of the current higher education system, researchers assessed exam scores and survey results of 2,322 students over a four-year period. Test results identified that 45 percent of the students made no significant improvement in their critical thinking, reasoning or writing skills during the first two years of college. After four years, no improvement was shown in thinking skills (Rimer, 2011). These results show that the traditional approach of education does not improve students’ thinking capabilities.

Researchers suggest that another issue is that young employees do not like their career choice, so they naturally do not feel motivated to improve. More than 50 percent of college graduates pursue careers that are not related to their degrees (University of La Verne, 2015). Less than 50 percent of recent graduates possess the 17 most desirable skillsets as identified by the majority of employers (Jaschik, 2015). McKinsey and Company identify that 61 percent of new graduates are unhappy with their careers, and 57 percent of employers agree that they cannot find enough skilled entry-level workers (McKinsey & Company, 2013).

The author proposes that a critical next step in researching succession planning best practices requires a further analysis of education. This research shows that soft skills and human behaviors are a weak area of talent management. Many companies do not understand which qualities are most important for management positions, or how to develop specific qualities. Therefore, the author recommends that more specific research should be done on educating softer skills. The knowledge gap between academia and the
industry could be closed if more companies were involved with earlier education and training.

This new shift to engage students with the industry is currently occurring at Arizona State University (ASU) and the University of Oklahoma (OU). At ASU, leadership and management courses are now being taught in the school of construction, and through the honors program, that specifically aims to teach students critical thinking skills, the value of professionalism, and how to learn new concepts quicker by using logic and reasoning (Rivera et. al. 2015). This course has been taught for over six years at the university level, and three years at the high school level. The program has shown promising results such as a drastic decrease in student stress levels, an increase in student confidence for their futures, and increased academic and career performance.

In conjunction with this program, professors and graduate students at ASU have created a pipeline that connects students from the leadership courses with professionals in the industry. Students have the option to enroll in a class that allows them to work with one local company on a semester-long project. As a result of this new course, and other research opportunities that allow students to work with construction companies, students have gone on to receive high level positions in the industry that are typically only given to employees with more experience. These results suggest that further, long-term research on leadership and personal development courses such as the ones at ASU and OU, may help companies identify early employees with great potential, and create education techniques to improve talent development methodologies.
Chapter 7

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Conclusions

The construction industry is faced with the unique challenge of addressing a large demographic shift in the labor force. Observation suggests that because the outflow of retiring talent is significantly larger than the inflow of rising talent, the industry will need to use this smaller talent pool more effectively. In order to adequately respond to the shifting trends in the talent pool, the industry will need to develop more efficient talent management techniques; more specifically, succession planning, in order to mitigate the impact of future vacancies. The solution falls on how the industry understands, measures, and aligns the available talent in order to accomplish more with less.

The goal of this research was to identify succession planning best practices in order to better facilitate talent management for early to mid-level employees. This research identified the underlying challenge is that in order to better prepare construction companies for the impending talent exodus, companies must have methods to identify, develop, and transition employees in an effective manner. Early on, the author realized that the uniqueness of this challenge rests on the fact that this topic is a human resource problem opposed to a technical or engineering-based problem which is more familiar to most leaders in the construction industry. Given this fact, this research seeks to address the problem of talent management through a more familiar and industry-applicable lens. While this research offers statistical analyses of psychological traits, the crux of this

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research is the interview tool that the author created in order to expand the talent pool of early-career high potential leaders.

The preliminary stages of this research focus on reviewing current academic literature and interviewing CII member construction companies in order to validate the underlying problem. The results show that 40 percent of early to mid-level career employees are within 10 years of retirement, while only 22 percent employees are under the age of 40. This information paints an even more drastic picture than what is being seen across the entire US workforce. In addition to validating the talent drought, the preliminary research results also have shown the following surprising conclusions:

- Current literature best practices are inconsistent.
- Current literature does not provide quantitative methodologies for identifying and developing employees. These methodologies are thereby largely subjective depending on supervisors.
- Six out of six interviewed companies do not have any form of succession planning for early to mid-level employees.

The current employee talent identification and evaluation systems are shown to be subjective. Although many of the interviewed companies utilize a 9Box performance and potential evaluation method based on numerical ratings, the ratings are not justified with measureable observations. Given this fact, the author aims to provide a quantitative evaluation tool to help augment the current system. This new tool is shaped to improved talent management effectiveness by providing employers a way to identify young talent that may have been previously overlooked. This tool seeks to mitigate the effects of the
talent drought by enabling employers to being utilizing young employees more
effectively and fast-tracking them into leadership positions.

The new model was developed by utilizing personality and behavior assessments
currently being used in the industry and comparing the results to employee performance
and potential ratings as given by supervisors. After evaluating 142 employees across
eight different construction contracting companies, the data was analyzed to identify any
key correlations between specific human traits performance/potential. The following
conclusions are observed:

• Performance ratings do not correlate with any human traits or with potential
  ratings.
• The potential for employees to become project managers correlates closely with
  leadership experience, the ability to separate emotional bias from business
  decisions, and the ability to disregard finer details when executing big picture
  tasks.

The underlying goal of the tools presented within this report is to provide additional
methods for organizations to improve their talent management and succession planning
practices by focusing on understanding and aligning employees by utilizing quantitative
measurements. Evaluating talent performance is an ever-increase complex field of study.
In order to make tangible improvements in the way that talent is managed, the industry
need to focus on low-resource efforts that produce a measurable impact.
Recommendations for Future Research

Continual research on this topic is highly recommend. The results shown herein are a representative sample of the construction industry. If individual organizations are interested in using the methodology developed in this study, the author would recommend that each organization seek to profile and evaluate their company. The evaluation methodology shown in this report can be used to create a baseline profile for high performers within an organization. Using this profile, organizations can then have an additional tool to simplify employee evaluations or create development plans which can lead to better succession. The author intends to conduct future research to advance these methods by:

- Examining how traits affect projects on a small-scale
- Measuring the effectiveness of the 9Box tool
- Correlating personality traits of employers with their supervisors
- Measuring how personality traits relate to observable behaviors and factors to simplify the interview process.
REFERENCES


APPENDIX A

DEFINITION OF TERMS AND ABBREVIATIONS
Throughout this research various specific terms relating to human resource management are used. For the sake of clarity, the authors have included definitions for several key terms below. These definitions are defined, in part, using the Society of Human Resources Management’s Glossary of Human Resources Terms and shaped based off of RT 325’s collective experience.

9Box Diagram – A diagram used to evaluate employees on their performance and potential ratings as given by supervisors.

CII - The Construction Industry Institute. An academic-industry organization founded to facilitate cutting edge construction research.

DISC - DISC is a behavior assessment tool based on the DISC theory of psychologist William Moulton Marston, which centers on four different behavioral traits, which today are called: dominance, influence, steadiness (or supportiveness), and compliance (or cautious).

HEXACO – A personality analysis tool based of the original Big Five personality test. HEXACO adds one more personality trait to the Big Five, Honesty-Humility. HEXACO was developed by observing lexical patterns from a number of different languages. It has been tested across a variety of industries, age groups, and countries. It has been statistically validated through numerous psychology and business research efforts.

High Potential Employee (HiPo) – An employee who is likely going perform in a specific role. RT 325 focused primarily on evaluating the potential for employees to become project managers.
**Influential Behavior** - A behavior style of an individual that is characterized by a tendency to persuade, convince, or influence others. The individual thrives on social recognition and group activities.

**Leadership development:** Formal and informal training and professional development programs designed for all management and executive-level employees to assist them in developing the leadership skills and styles required to deal with a variety of situations.

**Management development:** Training and developmental programs designed to provide new managers and existing managers with the resources needed to become more effective in their roles.

**Management/Supervisory Experience** – An employee’s past experience in management or supervisory roles (i.e. multiple subordinates reported to the employee).

**Myers-Briggs Type Indicator (MBTI)** – A personality test developed to measure the psychological profiles of individuals and qualify how they perceive the world and make decisions. MBTI has been tested, developed, and shaped for nearly a century. It has been used in a variety of applications and settings.

**Project Manager** – An employee who plans, oversees, and tracks the resources in order to successfully meet desired outcomes of a project.

**RT325** – A CII research team founded to investigate best practices in succession planning. The team was composed of Human Resources professionals from construction companies.
Sentimentality – The tendency to rely on emotional intuition and personal relationships to make business decisions.

Succession planning: The process of identifying long-range needs and cultivating a supply of internal talent to meet those future needs. Used to anticipate the future needs of the organization and assist in finding, assessing and developing the human capital necessary to the strategy of the organization.

Talent Management: Broadly defined as the implementation of an integrated strategies or systems designed to increase workplace productivity by developing improved processes for attracting, developing, retaining and utilizing people with the required skills and aptitude to meet current and future business needs.
APPENDIX B

LITERATURE SEARCH OVERVIEW
The following section is included to summarize the effort taken by the authors to review the current relevant literature. The authors reviewed 40 papers (six of which are not considered in the table below), and found 14 papers with relevant and useful metrics. This literature search was not intended to be exhaustive, but rather provide a general overview of topics pertaining to succession planning and talent management specifically in the construction industry or early to mid-level employees. The results of the research are summarized in the table below.
Table D-1

Summary of Literature Review and Analysis

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<thead>
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<th>Search Term</th>
<th>Search Results</th>
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<td>Science Direct</td>
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<td>Succession Planning</td>
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<td>Talent Retention</td>
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</table>

**Literature Findings Related to the Succession Planning Best Practices**

Previous literature validates the importance of the best practices identified by the expert panel. Below is a brief description of best practices with related research. This list of best practices was later revised by RT 325 based on the Delphi panel results (see Chapter 4).
1. An employee development mindset is present within the company (talent management is consistent and valued).
   a. “Talent Management is the process of recruiting, on-boarding, and developing, as well as the strategies associated with those activities in organizations” (Hartley, 2004). Companies that demonstrate high importance with developing internal talent will in turn develop a culture that employees recognize their value to the company and will be less likely to risk leaving the company for another in the industry. This culture of value and trust between employer and employee makes succession planning easier also because employees will be motivated to be develop skills and talents to be promoted within the company (Perrenoud & Sullivan, 2016; Carey & Ogden, 1997; Hall, 1986). Companies that do not foster a talent improvement culture, run the risk of losing knowledge, experience, and seniority when employees find better external opportunities. These same companies also run the risk of lower productivity from a lack of engagement from their workforce (Chavez, 2011).

2. CEO actively participates in the company's succession planning procedures.
   a. Active participation is needed from senior leadership to ensure they have ownership and accountability to the plan (Ibrahim et al, 2001; Morris, et al, 1997). Often succession planning requires critical decision making that requires the authority of the CEO. Developing a culture of talent
development without the participation of the top leadership is impossible (Carey & Ogden, 1997).

3. Maintain a formal succession plan that is aligned with the company's business strategies.
   a. Companies that align their company’s business strategies to formal succession planning have been found in multiple studies to be more successful with transitioning employees and more profitable over time (Perrenoud & Sullivan, 2016; Behn et al, 2005; Lee et al, 2003; Sharma et al, 2003b). Formal succession plans typically consists of many of the best practices listed in this report. Companies must answer questions related to the best practices, such as: how often will candidates be identified annually; what data will be collected to help identification of high potentials; and when will potential candidates be notified that they have been selected to transition into a new role. Value is added to the plan by discussing and answering these questions during the planning phases (Hansen & Wexler, 1988).

4. Prepare individual development plans for identified successors.
   a. Once a candidate has been identified to transition into a new role SWOT analysis can be conducted to identify what will benefit the successor to prepare for their new role (Dyck et al, 2002). This individual development plan should be clear and easy for the successor to manage to ensure they are not over burden with their current responsibilities (Fulmer, 2002). Included on the development plans can be activities such as: workshops;
special projects; articles or books; tests, assessments, or other measures of skills; coaching with internal or external mentors; computer based learning; new assignments. (Bernthal and Wellins, 2006)

5. Consistently review and updating of the succession plan.
   a. Included in the succession plan should always include opportunities to review that the plan is align with the company’s vision and strategic goals (Hadelman & Spitaels-Genser, 2005). Needs within the company often change over time and a succession plan developed in the past might not always align with current strategies. Each transition of leadership should include a review and approval of the succession plan (Ibrahim et al, 2001).

6. Provide the successor time with the predecessor to complete turnover of responsibilities, knowledge transfer, understand areas of concern/risk.
   a. The predecessor does not need to leave a position before responsibilities of the role are transition to the successor, effective planning will allow the successor time to take over in smaller portions (Kirschner & Ungashick, 2005). Giving the successor time with the predecessor will allow for knowledge transfer to ensure knowledge is not lost (Sambrook, 2005). Understanding the roles within the company (Practice #12) will assist the transition of the responsibilities to the successor.

7. Provide advisor for the early part of the transition.
   a. If the predecessor is not available, advisors can be very helpful after transitions. Advisors can help understand office processes, introduce key relationships, and warn of challenges that the successor may face. Multiple
studies have suggested that advisors ease the transition into new roles (Hadelman & Spitaels-Genser, 2005; Sharma et al, 2003b). Bernthal and Wellins (2006) recommended that coaching successors with internal mentors is more effective then external mentors, although both are helpful.

8. CEO provides full support of the company's efforts with succession planning.
   a. Support of the company’s succession planning methodology from the top leadership in the company is critical. If the employees perceive that the CEO lacks commitment to the succession plan it will soon become ineffective (Fulmer, 2002). Decisions made during the identification and development of successors may be overturned due to unknown factors known solely with leadership (Sambrook, 2005). Alternate decisions from the succession plan will lower moral responsible for conducting the planning, which in turn will decrease future efforts.

9. Collect data on company's personal that will help decision making with succession planning.
   a. Performance metrics such as: education, competencies, experiences, career interests, and mobility can provide invaluable information when selecting future replacements. Several studies have recommended capturing employee information to assist decision making in succession planning (Bernthall & Wellins, 2006; Groves 2006; Fulmer, 2002; Chavez, 2001). Data collected before and after transition will provide insight on the effectiveness of succession planning efforts (Miles & Bennet, 2007).
10. Ensure that both the predecessor and successor agree on the expectations with the succession/transition plan.
   
   a. Previous transitions have experienced difficulties due to miscommunication on the transition timelines, responsibilities, and identified successors (Perrenoud & Sullivan, 2016). Effective communication to both parties that will be leaving and coming is critical for the success of each transition. Misaligned expectations can quickly demotivate and disappoint a successor after transition when they are not properly prepared (Sharma et al, 2003a). Lack of trust or communication breakdowns between the predecessor and the successor can give the impression that information is being withheld from the successor (Ward 1987).

11. People and transitions are held accountable with the company's succession planning procedures. (No relevant published literature was found)

12. Identify roles and when positions are expected to be available.
   
   a. Each role will require unique skills and personalities, it is important that the company understands the needs of the organization in order to ensure they are selecting the right candidate for the job (Perrenoud & Sullivan, 2016)

13. Identify and or segmenting of potential candidates for succession (Example: 9-Box Performance/Potential Matrix).
a. The identification and selection of potential candidates is important to ensure that the right successor is selected for each new role (Christensen, 1953).

14. Develop formal plans with measurable metrics for the predecessor and the successor.

a. Formal succession timelines should include: development, transition, and commencement dates. Clear communication of the transition will help mitigate confusion during transition (Sharma et al, 2003a; Sharma et al, 2003b).

15. Identify initial competencies required for each position. (No relevant published literature was found)
As part of this research, the authors interviewed six companies regarding their succession planning methodology and best practices. The purpose of these interviews was to profile each company to understand exactly what they do in regards to succession planning. In order to achieve this, the authors asked each company representative the following questions:

1. What is the leadership structure for your company (eg COs, VPs, Directors, etc…)?
2. What positions does your company create a succession plan for?
3. Who is currently in charge of managing your company’s succession planning?
4. How are potential successors identified?
5. How is talent tracked (excel, hard data, others…)?
6. What are your key strategies?
7. What metrics are tracked throughout implementation?
8. What determines a successful succession plan?
9. How does your current company’s best practice differ from others that you’ve seen/worked with?
10. Do you have a model or a methodology that you reference for SP?
11. What are the biggest challenges faced by your company in regards to SP?
12. Do you currently have any SP for PMs?
13. How effective is your company at replacing PMs?
14. Is your company facing any challenges hiring PMs?
APPENDIX D

PERFORMANCE SURVEY
Employee Performance Survey

To: ________________________________
   (Name of person completing survey)
Phone: ____________________________ Email: ____________________________

Company Name: _____________________
CII RT Member Name: ______________________

[Company Name] is working with the Construction Industry Institute (CII) to investigate the best practices for succession planning and talent management for early to mid-level employees. The purpose of this tool is measure the correlation between employee performance and personality/behaviors. You will be completing this survey on behalf of one of your subordinates.

Subordinate Name: ____________________
Subordinate Email: ____________________
Subordinate Position: ____________________

Section 1 – Employee Performance Ratings

Rate each of the criteria on a scale of 1 to 10, with 10 representing that you were very satisfied and 1 representing that you were very unsatisfied. Please rate each of the criteria to the best of your knowledge. If you do not have sufficient knowledge of past performance in a particular area, leave it blank.
<table>
<thead>
<tr>
<th>NO</th>
<th>CRITERIA</th>
<th>UNIT</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overall performance in current position within the company</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Job knowledge (technical skills)</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ability to effectively lead and manager others</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ability to meet deadlines in a timely manner</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ability to communicate effectively</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ability to take initiative</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Aptitude for logic and reasoning</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Overall supervisor satisfaction rating of the employee</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Of all of the individuals you’ve worked with, this employee's overall <em>performance</em> would be ranked among the top:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>5%</td>
<td>10%</td>
</tr>
</tbody>
</table>

84
Section 2 – Employee Potential Ratings

Rate each of the criteria on a scale of 1 to 10, with 10 representing that you were very satisfied and 1 representing that you were very unsatisfied. Please rate each of the criteria to the best of your knowledge. If you do not have sufficient knowledge of past performance in a particular area, leave it blank.

<table>
<thead>
<tr>
<th>NO</th>
<th>CRITERIA</th>
<th>UNIT</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overall potential to become a project manager (N/A if already a PM)</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Overall potential to become a project director</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Overall potential to become a company executive</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Aspiration to be advance within their career field</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adaptability to new challenges</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Self-Awareness (accurate recognition of their own performance and potential)</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Emotional Intelligence (ability to identify and manage emotions of self and others)</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Trustworthiness</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Humility</td>
<td>(1-10)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Of all of the individuals you’ve worked with, this employee’s overall potential would be ranked among the top:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>5%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Section 3 – Other Questions

1. Given what I know of this person’s performance, and if it were my money, I would award this person the highest possible compensation increase and bonus.

   Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

2. Given what I know of this person’s performance, I would always want him or her on my team.

   Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

3. This person is at risk for low performance.

   Yes                 No

4. This person is ready for a promotion today.

   Yes                 No
Personality & Performance Survey Overview

Research Objective

The objective of the research is to create a “toolbox” of effective and efficient tools that will allow companies to improve their succession planning within critical early and mid-career job functions. This portion of the research is in effort to develop and effective performance survey tool.

Survey Tool Overview

The purpose of this tool is measure the correlation between employee performance and personality/behaviors. The survey process has three major components:

1. Identification of employees ranging from high to average performance.
2. Performance review of identified employees.
3. Surveying employee personality/behavior.

Research Scope

Pilot Study

The objective of the pilot study is to identify the critical personality survey components that most closely correlate with employee performance. During this phase of the research, we anticipate 8-15 participating companies.

Core Study
At the conclusion of the pilot study, the author will compile a consolidated performance and personality/behavior survey. This survey will be distributed among a larger pool of construction companies.

Survey Participants

Companies participating in the pilot study will provide 16 names of employees in project management career path. These 16 employees will come from one of the follow classifications determined by the author:

- Project Employee Level 1 - Direct contributor (responsible for own work, does not assign work to others) [9 names]
- Project Employee Level 2 – Coordinator (job responsibilities include assigning work to Direct Contributors) [4 names]
- Project Employee Level 3 – Manager (job responsibilities include assigning work to Coordinators and/or others) [3 names]
- Project Employee Level 4 – Director (job responsibilities include assigning work to managers, Coordinators, and/or others) [1 name]
Diagram of Project Employee Levels

PEL 4
Director

PEL 3
PM

PEL 2
Coordinator

PEL 1
Contributor  Contributor  Contributor
Myers-Briggs

First established in 1943, the Myers-Briggs Type Indicator Personality Inventory (MBTI) theorizes that a person’s behavior is based upon how they perceive events and how they choose to react to such information (Shoemaker et. al, 1993). The test evaluates subjects on four binary categories (Myers et. al., 1980):

- **Extravert/Introvert (E/I):** This component categorizes one’s central focus, whether it be externally or internally. E/I is categorized as an attitude. It determines whether a person draws more fulfillment from actions and people (E), or from reflection and solitude (I).

- **Sensing/Intuition (S/N):** This component defines how one perceives information. S/N is categorized as a perceiving function. It determines whether a person tends to rely more on tangible data (S), or conceptual ideas (N)

- **Thinking/Feeling (T/F):** This component categorizes how one comes to a conclusion about a subject. T/F is categorized as a decision making function. It determines whether a person makes decisions using logical, causal observations (T), or through empathetic or emotional appeal (F).

- **Judging/Perceiving (J/P):** This component defines how a person structures their external environment. J/P is typically how outside parties see the individual. J type individuals appear to be more rigid and stable, while P type individuals appear to be more flexible and adaptable.
Table I-1 shows the 16 different possible personality types and their estimated percentages applied to the U.S. population. (CAPT, 2016)

Table I-1.

The distribution of MBTI personality types across the U.S.

<table>
<thead>
<tr>
<th></th>
<th>ISTJ</th>
<th>ISFJ</th>
<th>INFJ</th>
<th>INTJ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11–14%</td>
<td>9–14%</td>
<td>1–3%</td>
<td>2–4%</td>
</tr>
<tr>
<td>ISTP</td>
<td>4–6%</td>
<td>ISFP</td>
<td>INFP</td>
<td>INTP</td>
</tr>
<tr>
<td></td>
<td>5–9%</td>
<td></td>
<td>4–5%</td>
<td>3–5%</td>
</tr>
<tr>
<td>ESTP</td>
<td>4–5%</td>
<td>ESFP</td>
<td>ENFP</td>
<td>ENTP</td>
</tr>
<tr>
<td></td>
<td>4–9%</td>
<td></td>
<td>6–8%</td>
<td>2–5%</td>
</tr>
<tr>
<td>ESTJ</td>
<td>8–12%</td>
<td>ESFJ</td>
<td>ENFJ</td>
<td>ENTJ</td>
</tr>
<tr>
<td></td>
<td>9–13%</td>
<td></td>
<td>2–5%</td>
<td>2–5%</td>
</tr>
</tbody>
</table>

**DISC**

First established in the 1920s, DISC theory categorizes personality and behavior. DISC uses a unique questionnaire in which it asks respondents to examine a list of four traits or actions, and choose one trait as “most like me” and “least like me”. DISC is commonly labelled for use in instances such as candidate and job matching. A study claims the test is reliable based on a confidence of 99.9% (Roodt, K., 2009). The DISC test consists of four major criteria:

- Dominance (D): associated with control, power, and assertiveness. Actions are focused on accomplishing results. Individuals with high D scores are perceived as demanding, determined, and pioneering.
• Influence (I): associated with social interaction skills and communication. Actions are focused on building relationships and persuading others. Individuals with high I scores are perceived as convincing, magnetic, and optimistic.

• Steadiness (S): associated with patience, resilience, and thoughtfulness. Actions are focused on compliance and cooperation. Individuals with high S scores are perceived as calm, stable, and unemotional.

• Compliance/Conscientious (C): associated with structure and organization. Individuals with high C scores are perceived as cautious, precise, and tactful.

Figure I-1. DISC criteria diagram

Personal Motivation

HEXACO Personality Inventory
Established in 2006, the HEXACO Personality Inventory defines personality based upon six factors based off of the initial Big Five personality factors (Lee et. al. 2004). These six factors were found to be commonly used to describe personality in seven different languages. Each of the six factors also have four subcategories that contribute to the overall score. The six factors are and their subcategories are:

- **Honesty-Humility**: measures willingness to manipulate others, real breaking, interest in luxuries, and perception on social status, etc. The subcategories are:
  - Sincerity
  - Fairness
  - Greed Avoidance
  - Modesty

- **Emotionality**: measures fear of physical dangers, anxiety in response to stimuli, need for emotional support, empathy, and sentimental attachment. The subcategories are:
  - Fearfulness
  - Anxiety
  - Dependence
  - Sentimentality

- **Extraversion**: measures self-assurance, confidence, leadership abilities, tendency to choose social situations, and so on. The subcategories are:
  - Social Self-Esteem
  - Social Boldness
  - Sociability
• Liveliness

• Agreeableness: measures the ability to forgive, compromise, cooperate, control temper, and refrain from judging others. The subcategories are:
  o Forgiveness
  o Gentleness
  o Flexibility
  o Patience

• Conscientiousness: measures how organized a person is with task, time, and environment. This component also measures a person’s ability to adhere to goals and discipline when it comes to their work. The subcategories are:
  o Organization
  o Diligence
  o Perfectionism
  o Prudence

• Openness to Experience: measures appreciation for aesthetically pleasing objects, inquisitiveness, and interest in atypical topics
  o Aesthetic Appreciation
  o Inquisitiveness
  o Creativity
  o Unconventionality

**Emotional Intelligence**
“Emotional intelligence is the ability to use awareness of emotions to manage behavior and relationships with others” (TalentSmart 2011). Emotional Intelligence (EI) is expressed by four key skills:

- **Self-Awareness:** The ability to understand your own emotions as they occur.
- **Self-Management:** The ability to use emotional awareness to positively direct emotional reactions in all situations.
- **Social Awareness:** The ability to understand the emotions of other people even if you do not share the same feelings.
- **Social Management:** The ability to use emotional awareness of self and others to manage interactions successfully.

The scoring system for EI is given on a 1 – 100 scale based off a “normal sample” of the general population. Figure I-2 shows the scoring guidelines for EI.
Figure I-2. Scoring guidelines for the Emotional Intelligence analysis (TalentSmart. 2011)

Appendix I References


APPENDIX G

SURVEY RESULTS TEMPLATE
Thank you once again for participating in this collaborative research effort between COMPANY NAME and the Construction Industry Institute (CII). The objective of the research is to create a “toolbox” of effective and efficient tools that will allow companies to improve their succession planning within critical early and mid-career job functions. The portion of the research you participated in is an effort to develop an effective performance survey tool. Your responses will help us shape a more compact and streamlined survey and performance tool for your organization to use in the future.

The results we’ve included in this document are for your use only. These results will not be shared with anyone else in your organization. All of your survey responses are anonymized. This document is intended to be for your personal reference. We are unable to provide any conclusive results at this stage in our research. Over the next year, we will be analyzing the survey data and comparing to other employees, companies, and industries. At the conclusion of our research you may receive a copy of our findings.

The surveys you have completed are as follows:

1. DISC
2. Myers Briggs
3. HEXACO
4. Emotional Intelligence

We have broken your survey results into corresponding sections shown below. Along with your results we have included web links to provide you with more information.
1. DISC

For information on your DISC results, click HERE

Your Declared DISC profile is: 1123
2. Myers Briggs

For information on your Myers Briggs (MBTI) results, click HERE.

Your MBTI Type is: ISTJ

Website excerpt on personality type goes here
### 3. HEXACO

For more information on HEXACO, click [HERE](#). The table below displays the different HEXACO categories, and compares your individual scores, with average population scores (collected through past research). To understand the meaning behind each of these categories, click [HERE](#) 

<table>
<thead>
<tr>
<th>Population</th>
<th>Average</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Honesty-Humility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sincerity</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Fairness</td>
<td>3.34</td>
<td></td>
</tr>
<tr>
<td>Greed Avoidance</td>
<td>2.72</td>
<td></td>
</tr>
<tr>
<td>Modesty</td>
<td>3.49</td>
<td></td>
</tr>
<tr>
<td><strong>Emotionality</strong></td>
<td>3.43</td>
<td></td>
</tr>
<tr>
<td>Fearfulness</td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>3.69</td>
<td></td>
</tr>
<tr>
<td>Dependence</td>
<td>3.38</td>
<td></td>
</tr>
<tr>
<td>Sentimentality</td>
<td>3.58</td>
<td></td>
</tr>
<tr>
<td><strong>Extraversion</strong></td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Social Self-Esteem</td>
<td>3.85</td>
<td></td>
</tr>
<tr>
<td>Social Boldness</td>
<td>3.03</td>
<td></td>
</tr>
<tr>
<td>Sociability</td>
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<td></td>
</tr>
<tr>
<td>Liveliness</td>
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<tr>
<td><strong>Agreeableness</strong></td>
<td>2.94</td>
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<tr>
<td>Trait</td>
<td>Score</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Forgiveness</td>
<td>2.75</td>
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<tr>
<td>Gentleness</td>
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<td></td>
</tr>
<tr>
<td>Flexibility</td>
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<tr>
<td>Patience</td>
<td>3.11</td>
<td></td>
</tr>
<tr>
<td><strong>Conscientiousness</strong></td>
<td><strong>3.44</strong></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>3.26</td>
<td></td>
</tr>
<tr>
<td>Diligence</td>
<td>3.79</td>
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</tr>
<tr>
<td>Perfectionism</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Prudence</td>
<td>3.18</td>
<td></td>
</tr>
<tr>
<td><strong>Openness to Experience</strong></td>
<td><strong>3.41</strong></td>
<td></td>
</tr>
<tr>
<td>Aesthetic Appreciation</td>
<td>3.34</td>
<td></td>
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<tr>
<td>Inquisitiveness</td>
<td>3.19</td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>3.63</td>
<td></td>
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<tr>
<td>Unconventionality</td>
<td>3.46</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX H

STATISTICAL RESULTS OF THE DATA COLLECTION
The appendix summarizes the results of both the personality/behavior analysis survey and the supervisor performance survey. Each subsequent table shows the results of various demographic factors seen in the respondents. The numerical values in the table represent to the average score of each factor or the standard deviation of the factors. Each evaluation average value is scored as follows:

- DISC – A scale of 1 (low) to 3 (high).
- MBTI – A scale of 1 to 2. Each MBTI category has two possible factors. For example, the I/E factor has two possible results I or E. A score closer two 1 means more respondents are I, whereas a score closer to 2 means more respondents are E.
- HEXACO – A scale of 1 (low) to 5 (high).
- EI – A scale of 0 (low) to 100 (high)
- Potential & Performance – A scale of 1 (low) to 10 (high)
Table K-1

The average response for each question answered by all the males and females in the 6 companies.

<table>
<thead>
<tr>
<th>Averages</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISC_D</td>
<td>1.9</td>
<td>2.2</td>
<td>1.93</td>
</tr>
<tr>
<td>DISC_I</td>
<td>1.7</td>
<td>2.1</td>
<td>1.79</td>
</tr>
<tr>
<td>DISC_S</td>
<td>2.1</td>
<td>1.9</td>
<td>2.06</td>
</tr>
<tr>
<td>DISC_C</td>
<td>2.0</td>
<td>2.1</td>
<td>2.05</td>
</tr>
<tr>
<td>MBTI_I/E</td>
<td>1.5</td>
<td>1.5</td>
<td>1.49</td>
</tr>
<tr>
<td>MBTI_S/N</td>
<td>1.3</td>
<td>1.3</td>
<td>1.27</td>
</tr>
<tr>
<td>MBTI_T/F</td>
<td>1.1</td>
<td>1.3</td>
<td>1.13</td>
</tr>
<tr>
<td>MBTI_P/J</td>
<td>1.8</td>
<td>1.8</td>
<td>1.80</td>
</tr>
<tr>
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Table K-2

The standard deviation for each question answered from all males and females in the 6 companies.

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Table K-3.

The average response from all males and females in each company.

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**Table K-4**

The standard deviation from all males and females in each company.

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Table K-5

Average response by all the men and women within the following job titles.

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<th>Manager</th>
<th>Director, VP, exec</th>
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Table K-6

The standard deviation by all men and women within the following job titles.

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<th></th>
<th>Engineer, Tech</th>
<th>Coordinator, Supervisor, lead</th>
<th>Manager</th>
<th>Director, VP, exec</th>
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<td>-----</td>
<td>-----</td>
</tr>
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<td>8.2</td>
<td>10.6</td>
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<td>Management</td>
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<td>1.2</td>
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<td>2.4</td>
<td>2.6</td>
<td>2.1</td>
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Table K-7.

The average response by all the men and women within the following degree types.

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<th>Degree Type</th>
<th>Engineering</th>
<th>Business</th>
<th>Technical Trade</th>
<th>Science</th>
<th>Liberal Arts</th>
</tr>
</thead>
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<td>2</td>
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<td>DISC_C</td>
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<td>1.4</td>
<td>2.1</td>
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<td>1.3</td>
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<td>1.3</td>
<td>1.3</td>
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118
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<td>73.6</td>
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<td>79.3</td>
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<td>77</td>
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<td>75.1</td>
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Table K-8

The standard deviation of all the men and women within the following degree types.

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<th>Degree Type</th>
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<th>Technical Trade</th>
<th>Science</th>
<th>Liberal Arts</th>
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<td>MBTI_T/F</td>
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<td>0.3</td>
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<td>MBTI_P/J</td>
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<tr>
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Table K-9

The average response categorized by intervals of 10 starting with professionals that were currently in their 20s.

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<td>1.3</td>
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<td>1.1</td>
<td>1.1</td>
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</tr>
<tr>
<td>MBTI_P/J</td>
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<tr>
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APPENDIX I

CORRELATION MATRIX
As part of the data analysis, the author used the Pearson’s Correlation Formula to identify which factors are most related to employee performance and potential ratings as given by their supervisors. The team created correlation table which compared all of the factors with each other in order to identify significant correlations. The value of Pearson’s correlation ranges from 1 (positive correlation) to -1 (negative correlation). The further the value is from zero, the greater the correlation. The factors with a positive correlation are highlighted in green, whereas the factors with a negative correlation are highlighted in yellow.

The original correlation table generated in excel is too large to show clearly on one page. In order to make reading the table more convenient, the authors have divided the table into twelve sections (A – L). Each section is shown in the figures below.

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|                          | HEX_Diligence | HEX_Perfectionism | HEX_Prudence | HEX_Openness to Experience | HEX_Aesthetic Appreciation | HEX_Inquisitiveness | HEX_Creativity | HEX_Unconventionality | EI_EQ | EI_Self-Awareness | EI_Self-Management | EI_Social Awareness | EI_Relationship Management | Performance Rating | Potential to become a PM Rating | Company Satisfaction | Job Position Satisfaction | Supervisor Satisfaction | Coworker Satisfaction | Career Satisfaction | Personal Life Satisfaction | Years in the industry | Years with the company | Years in your current position | What is your birth order? (1st, 2nd, 3rd, etc.) | Job knowledge (technical skills) | Leadership Ability | Ability to meet deadlines in a timely manner | Ability to communicate effectively | Ability to take initiative | Aptitude for logic and reasoning | Employee Satisfaction Rating | Career Aspiration | Adaptability to new challenges | Self-Awareness | Emotional Intelligence | Trustworthiness | Humility |
|-------------------------|--------------|------------------|--------------|----------------------------|----------------------------|------------------------|-------------------|--------------------|-----------------------|------|------------------|----------------------|----------------------|---------------------------|-----------------------|---------------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|---------------------|---------------------|----------------------|-------------------|------------------|-------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-------------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|----------------|
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<td>0.53</td>
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<td>0.66</td>
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<td>0.52</td>
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The figures in this appendix represent scatter plot correlations between factors measured through the data collection discussed in Chapter 5. The data includes personality and behavior information is collected through a variety of existing surveys used mainly for human resources and psychology. These surveys ask respondents a series of self-evaluation questions and output list of factors based on the responses. The supervisors of each respondent are also surveyed and asked to provide performance and long-term potential information for each employee. In total, the author surveyed 113 employees of which included 76 complete datasets (both personality/behavior information and performance information).

To fit the objective of the research, the author was most interested in seeing how survey responses correlate with overall employee performance and potential. Though there were very few significant correlations, these results are discussed in detail in Chapter 5. This appendix serves as an additional reference to showcase other interesting correlations that were identified in the research. Additional research is needed to draw any further conclusions regarding the significance of these correlations. This appendix is not intended to draw or support any conclusions.

Each figure in this appendix is formatted in the same manner. The X and Y axes represented a different factor respectively, and information is displayed as a standard scatter plot. The linear regression is shown as a blue dotted line, and the respective formulae are included on the charts. The key value in the formula is the $R^2$ which identifies how closely the linear regression model fits the data. The greater the $R^2$, the more accurate the fit.
Figure M-1. The employee leadership level compared to his or her potential to become a project manager in the future.

Figure M-2. The employee leadership level compared to his or her potential to become a project director in the future.
Figure M-3. The employee age compared to his or her potential to become a project director in the future.

Figure M-4. The employee DISC_I compared to his or her potential to become a project manager in the future.
Figure M-5. The employee DISC_I compared to his or her potential to become a project manager in the future.

Figure M-6. The employee DISC_C compared to his or her potential to become a project manager in the future.
Figure M-7. The employee HEX_Anxiety compared to his or her potential to become a project director in the future.

Figure M-8. The employee HEX_Anxiety compared to his or her potential to become a project exec in the future.
Figure M-9. The employee HEX_Sentimentality compared to his or her potential to become a project manager in the future.

Figure M-10. The employee HEX_Sentimentality compared to his or her potential to become a project director in the future.
Figure M-11. The employee HEX_Sentimentality compared to his or her potential to become a project exec in the future.

Figure M-12. The employee HEX_Extraversion compared to his or her emotional quotient (EI) in the future.
Figure M-13. The employee HEX_Social Self-Esteem compared to his or her performance rating in the future.

Figure M-14. The employee HEX_Aesthetic Appreciation compared to his or her potential to become a project manager in the future.
Figure M-15. The employee performance rating compared to his or her ability to meet deadlines in a timely manner in the future.

Figure M-16. The employee performance rating compared to his or her ability to communicate effectively in the future.
Figure M-17. The employee performance rating compared to his or her overall supervisor satisfaction.

Figure M-18. The employee potential to become a PM rating compared to his or her aspiration to advance within their career field in the future.
APPENDIX K

ANOVA ANALYSIS RESULTS
The data shown in this appendix is the output data for the Microsoft Excel ANOVA (or analysis of variance). The ANOVA analysis is a component of Excels’ automated Regression analysis accessible in the “Data Analysis” add-on feature. This tool calculates various statistics of a data set given the input of one Y variable and one or more X variables. The values of interest are sown in the last section of the output report (highlighted in yellow).

The last section of the report shows the estimated linear regression analysis, or the predicted regression formula given the specified variables. In analyzing these numbers, the researchers are first concerned with the P-value. A desired P-value should be as close to zero as possible, which suggests that the value is relatively consistent and reliable. As seen below, all of the variables have a P-value very close to zero. The next values of concern are the coefficients, which determine the final values of the coefficients and the intercept in the linear regression formula (see Chapter 5).
## Regression Statistics

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## ANOVA

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## Coefficients

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APPENDIX O

PEARSON’S R VALUES
The Pearson correlation coefficient, $r$, can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association; that is, as the value of one variable increases, so does the value of the other variable.

Figure O-1. Examples of possible Pearson’s $r$ values.
The recommend desired R value of the Person’s formula based on the number (N) of entries.

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Table O-1B.

The recommend desired R value of the Person’s formula based on the number (N) of entries.

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