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Distinguishing Human Factors of Top-Performing Project Managers in the Sheet Metal and Air Conditioning Trades

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The construction trades seek strategies to overcome the labor shortages currently affecting the marketplace. One innovative tool that has gained increased attention is the application of human dimension assessments from the social sciences to the construction trades. For example, this study utilized three human dimension measures – assessments of personality, emotional intelligence, and behavioral tendencies – in the context of project managers (PMs) in the sheet metal and air conditioning trades. This preliminary study assessed 42 PMs from across the United States. The direct supervisors of each PM completed a detailed performance review which was then used to identify the absolute top performers “cream of the crop” from this nationwide pilot study. Analysis revealed several statistically significant differences between the Top-Performing PMs and the remaining participants. Such information is beneficial to the specialty trades in several ways: First, moving toward a nationwide benchmark of human dimensions for PMs from across the country (albeit on a pilot-scale), which can be used for recruitment and talent development purposes. Second, the results contributed to the distinguishing characteristics of Top-Performing PMs, which may be beneficial for internal talent development purposes.

Key Words: Specialty Trades, Project Managers, Personality, Emotional Intelligence

Introduction

The construction trades are experiencing labor shortages throughout the United States and beyond, as highlighted by the Engineering News-Record (ENR) (Rubin et al. 2021). In response, contractors are increasingly seeking tools to overcome this challenge. One strategy that contractors use is to expand their internal recruitment and talent development programs. Enhanced recruiting practices enable contractors to attract and assess candidates that may be a “best fit” for specific job roles. Expanded talent development programs typically seek to utilize additional tools to assist existing employees in

improving their technical abilities and their so-called “soft skills”, which can improve collaboration, leadership, and communication in a project team setting.

As one example of this, a nation-wide study of the top 400 commercial general contractors (GCs) found that one-third of GCs have started using personality profile assessments (Childs et al. 2017). Among these GCs, the primary purposes of utilizing such tools were stated to be for (1) hiring, (2) leadership development, (3) promotions, and (4) team placement. The study also noted that several GCs felt these tools could be used in their retention programs to reduce employee turnover.

The objective of this study was to build upon the above-noted industry needs and increased usage of tools from the social sciences, such as personality profiles noted by Childs et al. (2017). A pilot study was commissioned by the New Horizons Foundation (NHF) on behalf of the Sheet Metal and Air Conditioning Contractors’ National Association (SMACNA). A total of 42 PMs from SMACNA contractors participated in the pilot study. Each PM completed three assessments: personality inventory, emotional intelligence diagnostic, and behavioral assessment. In addition, direct supervisors of each PM also completed a detailed performance review which was standardized across all participants. Results illustrated the beginnings of a nationwide benchmark of SMACNA PM human dimensions and revealed the distinguishing characteristics of the Top-Performing PMs from the data sample.

Literature Review

Literature on organizational behavior and management has long been a well-established academic discipline, where many approaches and techniques have been created to assist employee talent development. Numerous studies have explained the importance of human resource management to organizational performance (Delaney and Huselid 1996; Ericksen and Dyer 2005; Youndt et al. 1996). However, little have addressed the specific context and challenges in project-based industries. Furthermore, very little has sought to capture effective approaches within the construction sector or examine how these activities could be adapted and implemented to improve the performance and job satisfaction of the industry’s workforce (Loosemore et al. 2003; Maali et al. 2020).

Construction is one of the most labor-intensive industries, yet human resource management issues are given insufficient attention in the literature, as noted by previous researchers (Raidén et al. 2001; Tabassi and Bakar 2009). Throughout the years, the need for young talent in the construction industry is becoming more apparent, and the pool of new talent is shrinking due to shifting demographics and other market constraints. Most project leaders within the industry will leave for retirement in the next handful of years, and companies are faced with challenges to fill up those job vacancies with new, qualified professionals (Wiesel et al. 2016).

Druker and White (1995) stated that Human Resource Management (HRM) practices in the industry remain under-researched and underdeveloped, despite representing one of the United Kingdom’s largest industries. Therefore, the identification of a competency profile for top-performing project managers should be highlighted. It is crucial to help people find places within a company where their personalities mesh well to help them be the most productive and enjoy high job satisfaction. Their understanding of personality and behavior can directly relate to turnover (Deviney et al. 2009). With increased job satisfaction and productivity, companies can maintain low employee turnover, which will help them achieve greater levels of economics and experience and reduce the cost of training and human resource issues that arise in a conflicted setting (Oedekoven and Hay 2010; Maali et al. 2021).

Given the importance of managing people at the operational level, this will be an important procedure in developing new and improved approaches in human resource management within the construction industry (Cheng et al. 2005).

Methodology

Data Collection

Invitations to participate in the study were provided to SMACNA members. A total of 42 PMs participated in full. Each participant completed a detailed Human Dimension Assessment and had their direct supervisor submit a Performance Assessment to assess the participant's skill set and job performance. For this study, the PM job role was defined as individuals responsible for the contract administration and performance of awarded projects and marketing the company's services. This definition was crafted with input from a steering committee of SMACNA company owners and was included since different companies tend to vary their job titles.

Supervisor Ratings of PM Performance

Performance Assessments were collected from the direct supervisor of every participating PM. The performance assessment comprised the seven major performance categories, each of which is described below.

The first four performance categories were designed to measure PM performance in the areas of Technical Skills, Leadership & Communication Skills, Ability to Change & Adapt, and overall Job Performance. Each of these categories consisted of multiple questions, measured on a scale of 1-10. For example, technical skills included PM abilities in job site layout, safety, scheduling, means & methods, and more. The 1-10 scale was defined as:

- Scores of 9 to 10 referred to top performers based on the supervisor's experience.
- Scores of 5 referred to performers who were roughly average in their role.
- Scores of 1 to 2 referred to the lowest performances in the supervisor's experience.

Fifth, a percentile assessment scale was used for each participant's overall performance relative to their peers. The scale was Top 1%, Top 2%, Top 5%, Top 10%, Top 15%, Top 25%, Top 50% (Above average), and Bottom 50% (Below Average). Sixth, a scale of 1-10 was used to rate how comfortable the company would be assigning the participant to a high-profile project. The scale ranged from 10 = Definitely Yes, 8 = Probably Yes; 5 = Maybe; 3 = Probably Not to 1 = Definitely Not. Finally, the supervisors were asked a Yes-vs.-No question of whether the PM was absolutely considered the "cream of the crop" among all PMs in their company.

Human Dimension Assessments used in this Study

Participants completed a human dimensions (HD) assessment with three components: the HEXACO Personality Inventory, Emotional Intelligence Diagnostic, and the QDiSC-101 Behavioral Assessment.

HEXACO Personality Inventory

A widely used assessment that contains 60 questions to measure the "Big 6" personality domains. The assessment was developed by Ashton & Lee (2007) and is an open-source tool provided for

researchers to use in a wide array of contexts. Each domain contains four sub-domains that provide more specific personality descriptors. The domains, sub-domains, and personality descriptors are summarized below:

- **Honesty-Humility (H):** contains the sub-domains of Sincerity, Fairness, Greed Avoidance, and Modesty. Typical personality descriptors include sincere, honest, faithful, loyal, modest/unassuming *versus* sly, deceitful, greedy, pretentious, hypocritical, boastful, pompous.
- **Emotionality (E):** contains the sub-domains of Fearfulness, Anxiety, Dependence, and Sentimentality. Personality descriptors include emotional, oversensitive, sentimental, fearful, anxious, vulnerable *versus* brave, tough, independent, self-assured, stable.
- **Extraversion (X):** contains the sub-domains of Social Self-Esteem, Social Boldness, Sociability, and Liveliness. Personality-descriptors include outgoing, lively, extraverted, sociable, talkative, cheerful, active *versus* shy, passive, withdrawn, introverted, quiet, reserved.
- **Agreeableness (A):** contains the sub-domains of Forgivingness, Gentleness, Flexibility, and Patience. Personality-descriptors include patient, tolerant, peaceful, mild, agreeable, lenient, gentle *versus* ill-tempered, quarrelsome, stubborn, choleric.
- **Conscientiousness (C):** contains the sub-domains of Organization, Diligence, Perfectionism, and Prudence. Personality descriptors include organized, disciplined, diligent, careful, thorough, precise *versus* sloppy, negligent, reckless, lazy, irresponsible, absent-minded.
- **Openness (O):** contains the sub-domains of Aesthetic Appreciation, Inquisitiveness, Creativity, and Unconventionality. Personality-descriptors include intellectual, creative, unconventional, innovative, ironic *versus* shallow, unimaginative, conventional.

For HEXACO scores, it is important to note that higher scores are not necessarily considered to be “better” nor “worse.” Each domain is simply a spectrum or range of personality traits, and each domain's high vs. low side is completely arbitrary. Therefore, readers should not assume that higher scores are “better” nor that lower scores are “worse.”

Emotional Intelligence Diagnostic

An assessment of the participant’s capability to recognize and manage their own emotions and the emotions of others. The 28-question diagnostic (TalentSmart 2011) provides an Emotional Intelligence Quotient (EQ) measured on a scale of 1 to 100, where EQ is a compilation of four skills:

- **Self-Awareness:** the ability to understand your emotions as they happen.
- **Self-Management:** the ability to control your emotional reactions.
- **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 to create more successful interactions.

QDisc-101 Behavioral Assessment

QDISC-101 (pronounced “QueDISC one O one”) is a simplified version of the four-quadrant behavior diagnostic tool (or instrument) known commonly as DISC. Dr. Avi Wiesel derived this instrument from Jones & Hartley (2013) and was granted a Creative Commons License by the authors of the paper. This assessment contains 24-questions in each of the following four groups:

- **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.

The four behavior types in DISC are determined by two sub-scales of:

- **Work Orientation:** rated on a scale ranging from -4 to 4 (-4= task-oriented; 4 = people-oriented).
- **Communication Style:** rated on a scale ranging from -4 to 4 (-4= reserved communication; 4 = open-style communication).

Method of Analysis

Data analysis was performed in four steps. First, the overall collected performance ratings from participant's supervisors were analyzed to understand participants' average performance and skillset. Second, human dimensions assessment scores of non-construction population obtained from the original research of the three human dimension assessments (HEXACO, EQ, and QDisc-101) were compared with the collected human dimensions assessment scores for SMACNA PMs to highlight differences between construction PMs and other non-construction population. Third, the collected performance ratings were used to identify the absolute top performing SMACNA PMs "cream of the crop" among the 42 PMs who participated in the study. Finally, human dimensions assessment scores of the identified top-performing PMs were compared with scores of the other participating PMs to distinguish characteristics of top-Performing PMs "cream of the crop".

Results & Discussion

This section is organized into three sections: first, the overall results of the supervisors' performance ratings; second, the general human dimensions across all 42 participating PMs compared with typical results for the general non-construction populations; and third, the distinguishing characteristics of the Top-Performing PMs.

Supervisor Ratings of PM Performance

Table 1 on the next page shows that the participants had very strong performance assessments as rated by their direct supervisors. In the 1-10 scales, the average performance assessments ranged from 7.7 to 8.1 out of 10. These results indicate that the participants had skillsets that were substantially above average. In addition, when compared to all other peers in their job role, the average participant rating was rated as being in the top 10% of all peer performers. Finally, 86% of the PMs were rated as between "Yes" and "Definitely Yes" regarding whether their supervisors would assign them to a high-profile project, and 76% were classified as representing the "cream of the crop" of all the company's PMs.

Comparison with the General (Non-Construction) Population

The human dimensions assessment results from the participating PMs were compared with typical measurements of the general non-construction population. The non-construction scores were obtained from the original research for each of the three human dimension scales used in the study.

For the HEXACO Personality Inventory, the SMACNA PM results were compared with the average results reported by the creators Ashton & Lee (2007, 2009, 2017). The participating PMs scored in the top 20% of the general population in Honesty-Humility (H) and Conscientiousness (C). In addition, scored in the low range of Emotionality (E) and slightly so for Openness (O). Also, PMs scores were roughly in line with the non-construction population for the remaining scales of Extraversion (X) and Agreeableness (A).

For Emotional Intelligence, PMs scores in the range of 70-79, interpreted by TalentSmart (2011) as “could become a strength with some improvement.” Since all scores were in the 70-79 range, SMACNA PMs can be considered to having a balanced emotional intelligence.

For the QDiSC-101 behavioral assessment, PMs had a balanced preference for task-oriented vs. people-oriented work and reserved vs. open styles of communication, with scores around zero for both subscales.

Table 1

Average Performance Ratings Provided by Supervisors

| Performance Category | Scale of the Performance Assessment | Average Performance Assessment for PMs |
|--|--|---|
| Number of Individuals in the Sample | # | 42 |
| Technical Skills | 1-10 | 8.0 |
| Leadership & Communication Skills | 1-10 | 7.7 |
| Ability to Change & Adapt | 1-10 | 8.1 |
| Overall Job Performance | 1-10 | 8.1 |
| Percentile vs. all peers | Percentile | Top 10% |
| Would your company put this PM on a high-profile project? | 1-10 | 8.6 |
| This PM is absolute “cream of the crop” compared with all PMs at your company? | % of Yes | 76% |

Distinguishing Characteristics of Top-Performing PMs

The absolute top-performing PMs among the 42 PMs who participated in this study were identified using the collected supervisor ratings of each PM performance; top-performing PMs represent the top 10% of all participants, essentially representing the top PM from the four separate SMACNA contractors located across the country.

The human dimensions assessment results were compared between top-performing PMs and other participating PMs, and the following characteristics were distinguished.

Compared with other PMs, the Top-Performing PMs have **lower scores** in:

- **Extraversion (–20% vs. other PMs) including the three sub-dimensions of Sociability (–25%), Liveliness (–31%); and Social Boldness (–22%):** Lower scores in these areas correspond with individuals who are less driven by a need for social interaction and tend to be more quiet, serious, and introspective. They tend to prioritize tangible things over relationships and are analytical and matter-of-fact in their interactions. When they do interact and communicate, they are thoughtful and sincere. However, this is not to say that less-extraverted individuals necessarily avoid social interaction. Top-Performing PMs can become comfortable with a small group of close co-workers, particularly when mutual trust is earned over time
- **Fearfulness (–21% vs. other PMs):** Top-Performing PMs may be bolder and less sensitive to failure (more resilient)
- **Flexibility (–15% vs. other PMs):** More willing to stand up against another person’s unreasonable suggestions. Less tendency to compromise and accommodate to avoid arguments (prefer to address disagreements head-on when in the project’s best interest).
- **Creativity (–18% vs. other PMs):** Tendency to stick to what works because the “tried-and-true” is their preferred way forward; avoids the pursuit of new solutions to problems unless necessary (less experimental).

Compared with other PMs, the Top-Performing PMs have **higher scores** in:

- **A more Reserved Communication Style (3-times more reserved than other PMs):** This means that Top-Performing PMs are more reserved (as opposed to assertive) in their communication style. Top-Performing PMs prefer to consider things carefully and thoroughly before speaking or deciding.
- **Gentleness (+19% vs. other PMs):** Top-Performing PMs tend not to dwell on past mistakes of others (do not hold past mistakes against employees). Instead, they focus on moving forward to get the project done and are more willing to allow people to grow and improve.

Conclusion

In today’s hyper-competitive environment, contractors must attract, develop, and maintain talent in their construction management workforce. Results from this study suggest several applications for Hiring & Recruitment and broader Talent Development efforts.

There were several distinctive characteristics of Top-Performing PMs. Compared with others, the Top-Performing PMs tended to be less extroverted and more reserved in their communication style. Top-Performing PMs also had lower fearfulness (greater resiliency and boldness), lower flexibility (prefer to address disagreements head-on when in the best interest of the project), and lower creativity (PMs are problem-solvers who will stick to “tried-and-true solutions when available). Finally, Top-Performing PMs are more gentle (willing to allow people to grow and improve). These results are intended as a pilot study but eventually aimed at helping specialty contractors hire, develop, and maintain talent in their construction management workforce, which are increasingly challenging issues in the current environment with a workforce in transition.

- **Hiring New Personnel:** increased probability of finding employees who are the right “fit” for the project management job role and can develop into top-performers. Contractors can use interview questions designed to investigate the human dimension traits that are most important for the job role. This is helpful because these traits can be hard to evaluate “on paper”, such as a traditional resume.
- **Internal Talent Development:** help employees grow and achieve their maximum potential by developing the skills most associated with top performance in their job roles. Help employees who may not naturally have those strengths by providing coaching and awareness. Mentorship and performance evaluations can focus on developing the most needed skills in the employee’s job role. Several suggestions are provided in the report.

Limitations and Recommendations for Future Research

One limitation was that the study did not attempt to measure the unique company culture present at different specialty contractor organizations. Further, no distinctions were made for the slightly different responsibilities each contractor might include for the PM job role; for example, some contractors might engage their PMs more heavily in sales and business development, whereas other contractors might promote a much higher level of PM engagement in the management of field labor productivity. In each of those cases, the model of successful traits may differ depending on the responsibilities prioritized in the job role. Future research is recommended to account for these potential differences. Furthermore, these results are specific to the sheet metal and air conditioning trades and may not represent other specialty trades in the construction industry (such as electrical trades or others). Finally, these results are only intended as a pilot study. They should not be taken to represent a finalized nor fully confirmed national benchmark of the human dimensions of PMs in the specialty trades. Additional data collection is recommended to add greater statistical power to the results.

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