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A Study of the Soft Skills Possessed and Required in the Construction Sector

Andries (Hennie) van Heerden [1,*], Mostafa Babaeian Jelodar [1,*], Gregory Chawynski [1] and Sean Ellison [2]

1 School of Built Environment, College of Science, Massey University, North Shore, Auckland 0745, New Zealand
2 Royal Institution of Chartered Surveyors (RICS), Asia-Pacific, Suite 317, 60 Martin Place, Sydney, NSW 2000, Australia
* Correspondence: a.vanheerden@massey.ac.nz (A.v.H.); m.b.jelodar@massey.ac.nz (M.B.J.); Tel.: +64-9-414-43610 (A.v.H.); +64-9-414-43581 (M.B.J.)

Abstract: Soft skills are essential to employability and retention; therefore, if obtained and observed, they can significantly reduce sector-wide turnover. This study aims to investigate and compare soft skills that industry professionals currently possess and soft skills the industry requires and needs to attain. A questionnaire was administered using the RICS database, and 741 respondents participated in this study. Initially, the soft skills possessed and the soft skills required were analysed and compared via descriptive statistics. Furthermore, principal component factor analysis was used to identify the underlying factors and classify the identified soft skills. It was found that there are alignments and evident discrepancies between the actual skills currently possessed and the skills required by these professionals. The soft skills currently possessed by the industry were classified into three groups: (a) Ethics and Professionalism Cluster; (b) Self-Effort Management Cluster; and (c) Management—Leadership and Power Cluster. This was different to the two clusters identified for the soft skills requirements, which were: (a) trait-based cluster—less controllable; (b) training-based cluster—more controllable. The study concludes that there are controllable and less-controllable skills, which need to be possessed and managed in building professionals. Controllable soft skills are easier to train, whereas trait-based soft skills are more difficult to train and possess. The findings of this research are significant as their understanding can be used to help mitigate turnover and guide construction sector professionals to plan for the appropriate skills they require.

Keywords: soft skills; construction turnover; principal component factor analysis; employability and retention

1. Introduction

The global construction industry is primarily fragmented and multifaceted, with individual professionals forming part of skilled cross-cultural teams that must overcome a myriad of challenges that are characterised by high levels of uncertainty in each unique project environment [1–5]. To compete in the international market, a construction professional requires practical experience, various hard and soft skills and specific personality traits, some of which are seldom found in other sectors [1,6–9].

There is an ever-increasing need for construction industry employers to seek construction professionals with employable skills [10,11]. It takes time to develop and train these professionals; therefore, it is important for the global construction industry, and even more so for private construction enterprises, to retain these critical skills. According to some researchers [1], it is a "war for talent" in projects, and this is a global phenomenon. They further explained that it takes time to build high-performance teams, and this does not happen instantly. Selecting and investing in a more purpose-fit construction professional can reduce the probability of skills being lost over time. Improving systems and processes

and adopting new technology would, to a certain extent, be in vain if construction enterprises do not invest their efforts into their intellectual capital. Even worse, if a construction enterprise invests training and development resources in a construction professional only to leave the industry and apply their knowledge and skills in another industry, this can be problematic [12]. It is challenging to retain construction individuals and, therefore, the chasm of soft skills required in these critical roles is rapidly widening [13]. Construction individuals with an abundant and experienced level of soft skills will be able to increase the efficiency of their work and better adjust to new technologies and processes. Suppose these construction professionals' critical softs skills are not properly aligned with the required hard skills in the context of the project complexity and uncertainty [14]. In that case, it could lead to the failure of a project [15]. Therefore, assessing and profiling different soft skill levels will become an essential component of organisational and recruitment planning.

In the past, young construction professionals slowly honed their project capabilities and skills over years before primary project responsibility was bestowed upon them. Modern young construction professionals do not have that luxury and, in many cases, must take on colossal project responsibilities within the first critical five years of their careers. Construction professionals with a well-developed soft skill set will be more effective in dealing with current project challenges than their underdeveloped soft skill colleagues. These sought-after soft skills are essential for modern construction professionals to survive, grow and be successful in their future construction careers [16,17]. Accordingly, gauging and understanding the desired levels of skills required for industry professionals are imperative to project success.

Furthermore, in traditional industry settings, specific skills are obtained through tertiary education providers, professional bodies and independent training schemes. However, soft skills are not well defined and conceptualised within the dominant culture of the industry. There is limited profiling and communication on these issues, and often the value of these skills remains unknown and, consequently, unexplored at the broader industry level. In contrast, the absence of knowledge and the lack of application of these skills can significantly affect project outcomes. The ability to create productive and successful working relationships relies on skills, such as communication, team building and, ultimately, establishing trust, which can be categorised as soft skills [18]. As indicated, there is a lack of assessing and profiling soft skills in construction research and practice. There are also discrepancies between the soft skills that the industry has currently attained and the soft skills the industry requires and should attain. It is critical to understand the current profile and level of soft skills amongst construction professionals and to compare these with skills at various levels. This will enhance the move forward towards creating maximum value for the sector. Accordingly, this study aimed to investigate and compare the current soft skills profile and the soft skill requirements within construction industry professionals. The study has a global focus and was implemented in multiple countries and adds value to the selection procedure and future training and development of these construction professionals.

2. Literature Review

2.1. Soft Skills in Other Industries

"What exactly are soft skills?" "Soft skills" is a difficult term to define and needs to be contextualised, as, in some industries, a soft skill might be viewed as a hard skill [19]. Non-cognitive, people, personal, applied, essential, employability and 21st century skills are all synonyms referring to "soft skills" [20–22]. Nobel prize winner James Heckman defined soft skills simply as: "soft skills predict success in life". Soft skills were traditionally "nice to have and not a necessity". This notion rapidly changed, and within most industries, it became pivotal. One study found that only 25% of long-term job success depends on technical skills [23]. Another study indicated that 85% of success is because of soft skills [24].

Various other studies emphasised the value that soft skills add to the work environment. Previous researchers identified soft skills gaps in graduates in other industries, such

as IT and engineering professionals [25], business and accounting [26] and hospitality [27]. The important role that educators play in shaping students' personalities through embedding soft skills into hard skills teaching and learning courses is highlighted by previous research [19]. A previous empirical study that investigated the effect of four soft skills on the maritime industry concluded that teamwork has the most significant influence on contextual performance. This study further concluded that employees with greater problem-solving skills earn higher salaries [28]. Another empirical literature study indicated a strong link between individuals with soft skills and their higher wage returns. The study also proposed that it could be a possible avenue to close the wage gender gap [20]. Another study proposed a research model that suggested that job requirements, such as technical skills (task) and softs skills (social), are both influenced by the individual's personality traits, which influence work behaviour and, ultimately, job performance [29].

2.2. Soft Skills and Personality Traits in the Construction Industry

Construction professionals combine and apply various unique and specific skills to perform their tasks within the construction industry [7]. These soft skills include but are not limited to: integrity, work ethic, teamwork, responsibility, communication, problem solving, decision making, leadership, adaptability, client management, stress management, conflict management, negotiation skills and so forth [1,5,7]. Their different skill levels and their ability to leverage them in their day-to-day roles might vary between individuals. These may also overlap and, given that these skills are broad-ranging, the ability to apply these at many levels at one time can increase productivity [30,31].

Construction professionals not only require a wealth of knowledge, various sets of skills and previous project experience but, ideally, also acquire certain personality traits [32]. Other research studies highlighted a positive link between personality and performance outcomes [33–35] and others supported this notion, as their meta-analytical evidence revealed that personality traits are indispensable in predicting job performance [36].

In addition to the above, these professionals must acquire the capability to manage projects well and have the proper hard (technical) and soft (people) skills to oversee the successful outcome of their project [37]. Irrespective of the type of contract or the complexity of the structure, several construction workers, each with their own specialised career skills, are required. Soft skills are essential to uplift their hard skills and should be refined as soon as an appointment is made [13,38]. Soft skills are interpersonal and intrapersonal abilities that help individuals master performance in particular social contexts [39].

Having mentioned the above, some authors disagree with the overemphasis on soft skills and believe that hard skills should be the only important criteria to measure [40,41]. However, most researchers agree that both hard and soft skills in the construction industry are pivotal. If the construction professional lacks a particular set of skills, s/he must receive the necessary training and development to increase overall productivity.

One of the skill sets that construction professionals can use to their advantage is their ability to be persuasive without initiating conflict or mistrust. For example, obtaining the best commercial outcomes from suppliers and inspiring the whole team, from labourers through to project administrators and designers, regardless of their age, gender, culture or first language. This skill can also resolve conflicts between teams, foster positive outcomes through open, clear communication and stimulate an environment that allows for creativeness. Each team player will ideally have some level of this ability that will enable them to accept and promote a mutually agreed culture within the project. Having said that, all players within a project must have a positive attitude and be supported by all levels within their organisation, including consultants and sub-contractors.

When looking at construction sites in various parts of the world, it can be concluded that there are significant levels of labour intensiveness. However, people's daily issues can be similar. Therefore, the ability to positively inspire all will create a more favourable and enjoyable work environment, thus, ensuring that aligned committed goals are met, and the latest scope changes and conditions of the contract are delivered in a positive manner using

appropriate decision-making tools. Meeting the program constraints of time, cost and quality demands, well-structured activities and competent team members can make the right decisions in a timely fashion. This process cannot be fused with routine or repetitive decisions that are counterproductive.

A construction professional's previous experience can influence the level of skills that they can effectively apply based on a situation [6]. This reinforces the notion that nothing beats site-based practical experience over a long period. This includes the opportunity to apply previously learned technical and theoretical skills under the guidance of a good mentor or team. Therefore, a good mentor program could have the ability to speed up the awareness and development of younger individuals or 'green horns' abilities to be confident and optimistic in applying soft skills [42].

Although soft skills are an encouraging contributor, it is evident from the literature that soft skills alone will not be enough to ensure a project's success. Therefore, hard and soft skills should be interwoven in supporting each other. Construction professionals further require particular personality traits, as all three factors are necessary to boost a project's success.

3. Research Methods

A mix of qualitative and quantitative approaches was used to collect primary data for the current empirical study. Mixed method research employs both techniques, repetitious and concurrently, to build a more robust research outcome. Generally, mixed methods allow for investigating more complicated facets and associations in the social world. A few of these facets and associations can be analysed both qualitatively and quantitatively. However, it is important to ensure that the inherent and uncovered concepts are legitimate representations of the phenomenon [43–45]. The "how" and "why" typically address the qualitative research questions, whereas the "how often" and "how many" typically answer the quantitative research questions. From the above, it is reasonable to propose that a mixed method can be successful in finding novel empirical insights [43]. This approach was used to determine which soft skills are currently applied by construction professionals in the built environment. Researchers followed an inductive approach to theory development [46]. Accordingly, a survey was used to collect information amongst construction industry professionals with a variety of skill sets. Based on the mixed method research approach, respondents were allowed an opportunity to share their experiences, suggestions and opinions through open-ended questions. Participant information sheets and consent forms were attached to the questionnaire (Appendix A). This project was reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 19/47.

3.1. Survey Design and Structure

The strategy to collect data was to use survey software called SoGoSurvey, and the survey was designed to address the main research question of "How does the current actual soft skills profile differ from the soft skills requirements evaluated by the global construction industry experts?" The evaluation was based on a classification of the actual soft skills and the required soft skills grounded on their underlaying factors. The SoGoSurvey online tool is a flexible and easy-to-interact-with platform that enables data processing and real-time monitoring of information. The software is compatible with different devices and incorporates easy-to-use tools to design and modify surveys with professional outcomes.

In total, 23 soft skills identified through previous literature were included in this study and incorporated into the survey. The survey consisted of 12 questions that were divided into three parts. Part A was used to collect demographic data from the respondents. Part B was more research-specific questions based on a Likert scale. Part C focused on personal directed open-ended questions [47]. The respondents were initially asked to rate the current soft skills they possess. This was followed by a question on rating the perfect soft skills requirements for their roles.

3.2. Data Collection

The data were collected and analysed at Massey University. The cross-sectional study was conducted amongst Royal Institution of Chartered Surveyors (RICS) members and their industry partners. RICS promotes qualifications and standards for the construction sector and includes a wide range of construction professionals with diverse roles within the sector. Accordingly, 742 completed surveys were obtained.

Descriptive statistics are used to provide a general overview of demographics, the data and sample formation. This is especially useful for more in-depth discussion and critical analysis of the findings. However, the demographics do not provide any insight into the underlying factors and potential latent variables, especially in mixed research methods where the investigated variables are qualitative such as soft skills. Therefore, principal component factor analysis (PCFA) was adopted as the inferential method of analysis. The method allows for both identifying factors that could influence the initial soft skills and reduction in variables for further analysis [48]. This is a solid method used to understand underlaying factors associated with a phenomenon based on empirical observation and statistical variation, lending to statistical inferences within a set of items—in this case, softs skills. This method has been used in different studies [49–51]. The method is based on identifying correlations and grouping the highly correlated variables to formulate a factor structure [52]. PCFA is used to analyse the structure of the soft skills included in the study. This, combined with the background theories and the descriptive statistics used, can provide more insight, criticality and generalisability power [52]. Factor analysis is also used for developing scales of measurement, and each variable can be an item of measurement for the associated factors. These factors provided an in-depth view of the hidden layers of information within each category of the identified soft skills [53].

4. Data Analysis and Findings

A total of 741 respondents participated in the study. Around 69% of the respondents believe there is a shortage of soft skills in the construction sector. This has been the same amongst different specialised industry sectors, roles and experiences in the sector.

In addition, around 87% of the survey participants believe that soft skills have an important role in construction practices; 68% of them stated that these skills have a very important role. This demonstrates the industry participants' recognition and willingness to invest in more skill development. As mentioned, soft skills are not organically explored within traditional construction practices. However, in more contemporary approaches, the need for special focus, investment and training is completely apparent. The sectors' recognition of the problem is the first step toward this direction.

Based on the 23 soft skills categories identified from previous studies, the respondents evaluated and rated their own soft skills profiles. This was to assess the skills they currently possess. The identified categories were the result of grouping similar identified skills. For example, self-management and time management; also, handling pressure and stress management were bundled together in one category. Figure 1 demonstrates respondents' rating of their current soft skills profiles and illustrates the average score for each of the identified soft skills. All the 23 soft skills received a score above 5.5, demonstrating the importance of these skills. This variation is comparable with the variety of soft skills identified in previse literature [1,5,7]. Integrity was the highest at 6.46, followed by work ethic, teamwork, responsibility, problem solving, etc. This rating indicates what is currently being practiced and how construction professionals are presently prioritising their soft skill capabilities and strategies. The findings are comparable with different groups in other industries, such as studies amongst IT professionals; apart from specific technical ability, skills, such as listening and communication, problem solving, teamwork, flexibility and multitasking, were considered extremely important [54]. In other studies, in the field of engineering, skills, such as communication, problem solving, client support and management, ethics and integrity, were also valued and possessed by their sector participants [55–58].

Figure 1. Respondents' rating of their current soft skills profile.

The respondents also rated the perfect soft skills required for their roles in the construction sector (Figure 2). Similarly, integrity and work ethic were the top two in the overall rating. However, the third priority was responsibility, which ranked fourth in their current soft skills profile list. Communication was ranked fourth in the perfect soft skills requirement list, significantly different from the number seven rank in the current soft skills profile list (Figure 1). Accordingly, other discrepancies were also identified; for instance, teamwork was ranked higher than problem solving, and decision making was also much higher in the required list. Workplace professionalism and leadership were also ranked higher in the required list than what the professionals currently acquired. As discussed in the literature review section, this is in line with the notion that there are gaps in soft skills required for industry-ready professionals [25–27]. A limited number of studies have gauged and evaluated the differences between the actual possessed soft skills and the soft skills required for participants within a sector. However, in a study of soft skills expectations for accountants involved in different sectors, problem solving, decision making, time management and adaptive strategies to tackle tasks, emotional self-regulation, resilience, teamwork and written and oral communication, were identified as significant skills required for the industry [59]. This demonstrates that there should be a shift in policy and investment towards some indicated soft skills to improve overall role efficiency and outcomes.

Figure 2. Respondents' rating of the perfect soft skills requirements.

4.1. Principal Component Factor Analysis (PCFA)

The above analysis is descriptive and indicative of data formation; however, for a more in-depth analysis of the data structure and the underlying factors behind the evaluated soft skills, PCFA is conducted. The first PCFA analysis is based on the respondent's self-evaluation of their current soft skill profile and their importance. The data for this were collected through respondents' rating of their soft skills, presented to them in question 10 of the survey. This was useful in identifying the underlying factors of the status quo of soft skill capability within the construction sector. Initially, data suitability tests and reliability analysis are performed via the SPSS statistical package. The Kaiser–Mayer–Olkin (KMO) measure of sampling adequacy is 0.967, well above the 0.5 threshold [60]. Bartlett's Test of sphericity shows *p*-value < 0.000, indicating all correlations within the correlation matrix are statically significant [61]. Hence, factor analysis is suitable and meaningful [62]. All anti-image correlations were minimal and close to zero, which indicates that underlaying factors exist within the dataset [62]. A Communalities table was also generated for all the variables included for PCFA. This is to specify the variance in each variable explained by each generated factor based on principal component analysis. This measure can justify the inclusion and removal of certain variables in iterations of the PCFA to identify the best possible factors [61]. Cronbach's alpha is calculated for measuring internal consistency [63]. Cronbach's alpha coefficient calculated for the soft skills profile is 0.946 and acceptable since it is well beyond the cut-off limit of 0.8 [18].

The four variables of "Handling pressure/stress management", "Critical thinking/ multi-disciplinary thinking", "Self-confidence" and "Leadership" had similar component extracts with all three factors and could not definitively be associated with any of the three factors. All four factors had very low commonalities as well. Therefore, the four variables were removed, and the PCFA was conducted again. The PCFA is performed on the eigenvalue of more than one rule. A scree plot is also used to visualise the number of loading factors. Three factors were identified based on the VARIMAX rotation of component

factors [61,62]. The three loading factors and the nineteen variables included in the PCFA are included in Table 1.

Table 1. Rotated component matrix [a].

| | Component | | |
	1	**2**	**3**
Integrity	**0.812**	0.239	0.184
Work ethic	**0.703**	0.227	0.327
Responsibility	**0.684**	0.305	0.283
Courtesy	**0.604**	0.511	0.053
Enthusiasm & positive attitude	**0.540**	0.224	0.417
Workplace professionalism	**0.532**	0.227	0.433
Emotional intelligence	0.232	**0.795**	0.163
Flexibility/adaptability	0.323	**0.729**	0.187
Creativity and curiosity	0.236	**0.665**	0.219
Cross-cultural relationships	0.153	**0.662**	0.336
Conflict management	0.326	**0.535**	0.392
Problem solving	0.274	0.219	**0.682**
Teamwork	0.303	0.130	**0.644**
Networking	−0.052	0.405	**0.624**
Self-management/time-management	0.445	0.292	**0.543**
Client management	0.274	0.366	**0.537**
Negotiation	0.204	0.485	**0.521**
Decision making	0.416	0.281	**0.520**
Communication	0.409	0.039	**0.515**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 10 iterations.

Six soft skills were loaded onto factor one: integrity; work ethic; responsibility; courtesy; enthusiasm and positive attitude; and workplace professionalism. Emotional intelligence; flexibility/adaptability; creativity and curiosity; cross-cultural relationships; and conflict management were loaded onto factor two. Finally, the remaining eight soft skills, namely problem solving; teamwork; networking; self-management/time management; client management; negotiation; decision making; and communication were associated with factor three (Table 1).

A separate PCFA analysis was conducted for the perfect soft skills required for construction professionals. The data were collected through respondents rating perfect examples of soft skills required for their roles in question 11 of the survey. All the data screening tests were performed similarly to the previous PCFA conducted.

The Kaiser–Mayer–Olkin (KMO) was 0.958, well above the 0.5 thresholds, and Bartlett's test of sphericity shows p-value < 0.000, indicating statically significant correlations. Anti-image correlations were all close to zero and indicated the suitability of factor analysis. Communalities tables were generated to specify the variance in the soft skills explained by identified factors. This is used to justify the inclusion and removal of certain variables in iterations of PCFA and detect the best possible factors. Accordingly, the Cronbach's alpha coefficient calculated for the soft skills requirements is 0.96 and acceptable since it is well beyond the cut-off limit of 0.8 [18].

Based on the scree-plots and eigenvalues above one, only two factors were identified, as demonstrated in Table 2. Factor one included soft skills: problem solving; responsibility; decision making; integrity; communication; work ethic; critical thinking/multi-disciplinary thinking; self-management/time management; enthusiasm; positive attitude; teamwork; leadership; workplace professionalism. Factor two also included soft skills: cross-cultural relationships; emotional intelligence; flexibility adaptability; courtesy; creativity; and curiosity (Table 2). The other soft skills did not load distinctly onto any of the two factors and had very low communalities scores; therefore, they were removed from the PCFA.

Table 2. Rotated component matrix [a].

	Component	
	1	**2**
Problem solving	**0.768**	0.301
Responsibility	**0.755**	0.305
Decision making	**0.733**	0.331
Integrity	**0.732**	0.258
Communication	**0.730**	0.184
Work ethic	**0.706**	0.330
Critical thinking/multidisciplinary thinking	**0.679**	0.393
Self-management/time management	**0.664**	0.388
Enthusiasm positive attitude	**0.659**	0.376
Teamwork	**0.657**	0.313
Leadership	**0.640**	0.387
Workplace professionalism	**0.631**	0.400
Cross cultural relationships	0.207	**0.823**
Emotional intelligence	0.303	**0.812**
Flexibility adaptability	0.437	**0.689**
Courtesy	0.390	**0.664**
Creativity and curiosity	0.366	**0.663**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 3 iterations.

Different factors and structures were identified based on the PCFA performed on the soft skills included in this study. Based on data collected on the current soft skill profile, which correlates with question 10 within the survey, three clusters are identified. The first cluster of basic skills can also be regarded as shared values systems, ethics and professionalism in construction. Within the second cluster, skills can be fostered and embedded within personal and organisational competencies. Therefore, this second cluster is identified as the Self-Effort Management Cluster of skills. Lastly, the third cluster was primarily management and leadership oriented; therefore, it was labelled as the Management—Leadership and Power Cluster. Some soft skills were omitted as they do not load distinctively to any identified factors. Accordingly, only two clusters are identified in further evaluation of the soft skill requirements in question 11 of the survey. The first cluster contains the more controllable soft skills and, therefore, a more training-based cluster. The second cluster contains less-controllable soft skills (more difficult to train), therefore, a trait-based cluster. The identified structures are illustrated in Figure 3. There is a significant difference in the current soft skills profile and the soft skills requirements evaluated by the industry experts. In this section, the structure for the existing soft skills is initially discussed, followed by the structure of the soft skills requirements. Finally, this difference in structure is discussed.
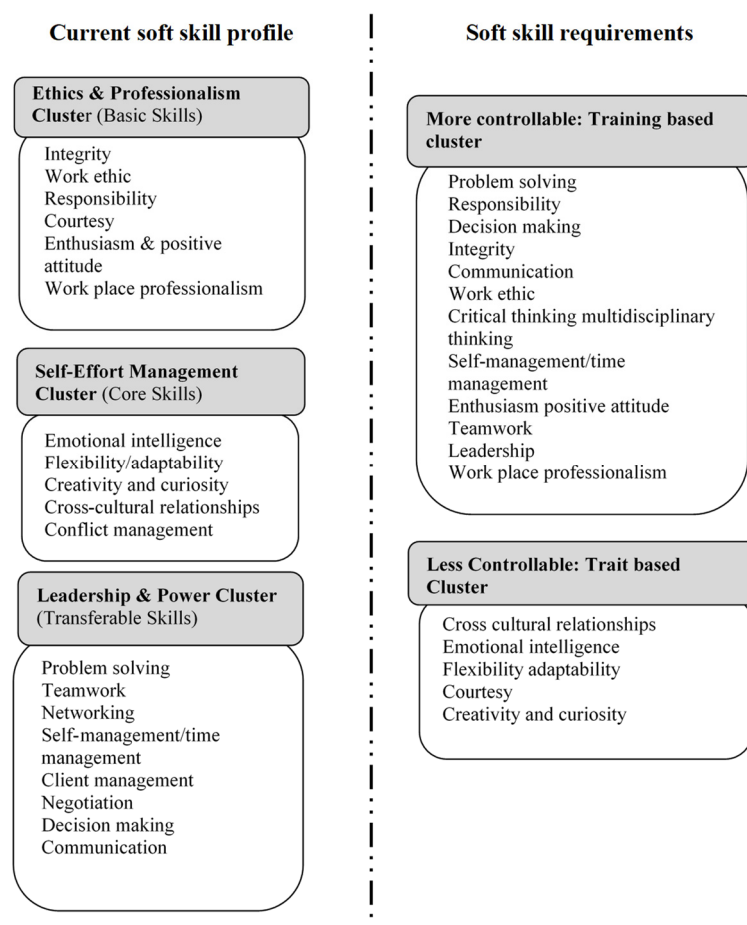
Current soft skill profile

Ethics & Professionalism Cluster (Basic Skills)

Integrity
Work ethic
Responsibility
Courtesy
Enthusiasm & positive attitude
Work place professionalism

Self-Effort Management Cluster (Core Skills)

Emotional intelligence
Flexibility/adaptability
Creativity and curiosity
Cross-cultural relationships
Conflict management

Leadership & Power Cluster (Transferable Skills)

Problem solving
Teamwork
Networking
Self-management/time management
Client management
Negotiation
Decision making
Communication

Soft skill requirements

More controllable: Training based cluster

Problem solving
Responsibility
Decision making
Integrity
Communication
Work ethic
Critical thinking multidisciplinary thinking
Self-management/time management
Enthusiasm positive attitude
Teamwork
Leadership
Work place professionalism

Less Controllable: Trait based Cluster

Cross cultural relationships
Emotional intelligence
Flexibility adaptability
Courtesy
Creativity and curiosity

Figure 3. The clustering of soft skills profile and requirements based on PCFA.

4.2. Discussion

This section describes the clusters identified through the PCFA for both the current soft skills profile and the soft skills requirements for construction professionals. In total, 23 soft skills were identified that were associated with building professionals. It was found that there are alignments and evident discrepancies between the actual skills currently possessed and the skills required by these professionals. For instance, integrity and work ethics were the top two skills possessed and were the top two in the required skills list. However, communication was considered a required skill in the top three but not necessarily highly prized by building professionals. This suggests that planning, training and professional development are required to align the possessed skills with the required skills.

The study further classified the identified soft skills using PCFA. Accordingly, three major clusters were identified for the current soft skill profile of the building professionals. This included the Ethics and Professionalism Cluster (Factor one), Self-Effort Management Cluster (Factor two) and Management—Leadership and Power Cluster (Factor three). However, soft skills requirements were classified into two more controllable and training-based clusters (factor one) and the less-controllable trait-based cluster (factor one-two). The clustering of soft skills profiles and requirements based on PCFA demonstrates a significant difference in structure and classification of what soft skills are possessed by industry professionals and what the requirement for these soft skills is (Figure 3). Their importance was also evaluated, and differences were indicated (see Figures 1 and 2).

4.2.1. The Current Soft Skills Profile

As indicated, the current soft skill profile and its important data were received as a self-evaluation question within the survey. The soft skills were clustered under a three-factor

structure, as illustrated on the left-hand side of Figure 3. These factors and the clusters they represent are discussed as follows:

4.2.2. Ethics and Professionalism Cluster (Factor One of the Current Soft Skills)

Based on the study findings, soft skills, such as integrity, work ethic, responsibility, courtesy, enthusiasm and positive attitude and workplace professionalism, were clustered together. This indicates a common underlying value founded on the basic soft skills investigated in this study. This formulates the first cluster and is identified as the Ethics and Professionalism cluster (Figure 3). Work ethic and integrity were also indicated as soft skills required in other studies [5,7].

The findings are in line with different construction-related literature and studies, suggesting that modern construction professionals require essential soft skills to be able to survive in their future career [16,17]. Globally, the nature of the construction industry creates a festering ground for hazards and various unethical dilemmas [64]. Unethical behaviour happens daily within different life-cycle phases and involves all the different project stakeholders [9]. Construction professionals should all have solid basic ethics and professionalism skills values, as they will be exposed to things, such as corruption, collusive tendering and bribery [65,66]. Construction professionalism involves certain obligations, duties and responsibilities, which will constantly be challenged by the robust competitive and low-profit-margin construction environment [67]. Therefore, the cluster of basic skills can also be regarded as shared values systems, ethics and professionalism in construction.

4.2.3. Self-Effort Management Cluster (Factor Two of the Current Soft Skills)

The second cluster identified included skills, such as emotional intelligence, flexibility/adaptability, creativity and curiosity, cross-cultural relationships and conflict management. These skills reflect the awareness required for enhancing and managing individual and organisational skills required to interact with other parties. It is imperative to be able to maintain a healthy level of relationship quality and work environment [18]. These skills can be nurtured and embedded within personal and organisational competencies. Therefore, this cluster defined by the second factor of the PFCA analysis is identified as the Self-Effort Management Cluster of skills (Figure 3).

The extremely stressful construction industry depends heavily on the self-effort management of professional individuals [64,68]. This cluster of core skills is required for construction professionals to be productive, successful and satisfied leaders throughout their careers [11]. Their effort can be determined by an individual's focus, control and energy [69]. It is important for construction professionals to have a high internal locus of control, thus, accepting responsibility and accountability for their actions. These professionals will typically have more energy and enthusiasm and cope better with daily construction issues and challenges [69]. Aligned goals and expectations will further solidify the performance of these professionals that fulfil various leadership roles. Although the classification of self-effort management is unique to this study, the promotion and uptake of soft skill training, especially in interpersonal and problem-solving capabilities at an individual level, are gaining popularity amongst European educators too [55]. This applies to a variety of engineering and industrial sectors [57,58]. In a previous study, factor analysis was used similarly, and employability skills and attributes in different engineering fields were analysed [56]. Soft skills were all classified under one group called "Personal attributes and nontechnical skills". Other attributes required for employability, such as educational performance, identity and connections, were also identified [56]. However, as discussed, the current study provides more detailed classifications of the soft skills with their theoretical underpinning.

4.2.4. Management—Leadership and Power Cluster (Factor Three of the Current Soft Skills)

A third factor was identified, which clustered skills, such as problem solving, teamwork, networking, self-management/time-management, client management, negotiation, decision making and communication. The underlying principle behind these skills was mainly management and leadership oriented. In addition, the balance of power has a major role in determining relevant strategies for acquiring and enhancing these skills. Therefore, this cluster can be identified as the Management—Leadership and Power Cluster (Figure 3).

Although all three clusters include soft skills that are not static, the Management—Leadership and Power cluster will most significantly be influenced by the professional's previous project experience. The more experienced the individual is, the more advanced the transferable skills should be developed [16,17,30]. Management leadership not only refers to the character of the individual but also what s/he can do and how effective s/he can do it [69]. These management leadership professionals should also have high levels of power. This ability to influence and persuade various stakeholders only adds to their manager leadership capabilities.

4.3. The Soft Skills Requirements

As part of the survey, information on soft skills requirements for different industry professionals was gathered. The PCFA analysis of soft skills requirements for construction professionals revealed a two-factor structure representing clusters of soft skills, as illustrated on the right-hand side of Figure 3. After carefully analysing the results and relevant theories, the following clusters were identified.

4.3.1. Training-Based Cluster—More Controllable (Factor One of the Soft Skill Requirements)

Skills, such as problem solving, responsibility, decision making, integrity, communication, work ethic, critical thinking/multidisciplinary thinking, self-management/time management, enthusiasm, positive attitude, teamwork, leadership and workplace professionalism, loaded onto factor one. These skills have underpinning attributes, such as conduct, professionalism, ethics and teamwork, which are often maturity related. These skills can be nurtured and trained and considered highly controllable compared to top trait-based skills. Therefore, the cluster is identified as the controllable and training-based cluster (Figure 3). The skills within these clusters can be enhanced and are relatively easier to obtain with appropriate training, as indicated in previse studies [19]. In addition, the training and acquisition period is reasonable and can be provisioned in the short-term or medium-term strategic goals. This allows for more effective and strategic investments, and organisations can plan and benefit from their investments in these skills within a reasonable amount of time and resources spent [42]. Industry bodies, regulatory organisations and government authorities can also plan and provide pathways, codes of practice, guidelines and even regulations for these skills as they are more tangible and controllable.

There could also be provisions and modifications to traditional and vocational training to accommodate and imbed these soft skills as requirements of the trade or job.

4.3.2. Trait-Based Cluster—Less Controllable (Factor Two of the Soft Skill Requirements)

The other skills, such as cross-cultural relationships, emotional intelligence, flexibility, adaptability, courtesy, creativity and curiosity, are the less-trainable and -controllable skills. They are often traits that are related to individual circumstances and conditions. Some of these are inherent or culturally influenced. Planning and provisions for such skillsets will be difficult. Others have also debated the large variety of employability and workplace skills required (17), which are difficult to capture, no matter how comprehensive the training programmes are. There is often limited control over the acquisition of these skills, and these are very hard to train. Their justification for investing in such skills is not apparent, and organisations are reluctant to capitalise on them [36,39]. On the other hand, these skills are

not tangible, and industry bodies and government authorities cannot develop assessments, guidelines or policy-level documents to enhance and promote them. Therefore, this cluster is identified as the less-controllable trait-based cluster (Figure 3).

The analysis revealed a three-factor construct for the construction experts' current soft skill set profile. However, the soft skill requirement had a two-factor construct. This is illustrated in Figure 3 and indicates that although the industry experts may classify the soft skills, they are across three clusters according to their nature and type; their classification of what is required is based on control, training and potential resources. This is a clear indication of differences in the underlaying factors and demonstrates how the current actual soft skills profile differs from the soft skills requirements as one of the objectives of this study. This demonstrates the industry's focus on simple and objective classification for the required soft skills. According to the comparison of the current soft skills profile and the soft skill requirements, the construction industry is more concerned with which skills can be developed and embedded into training programmes rather than the theoretical underpinning, classification and taxonomies associated with the identified soft skills in this study [33–35]. Accordingly, a study looking at entrepreneurial skills also indicated the sector's educational needs, especially for professionals such as quantity surveyors [70].

Based on the findings of the study, a range of skills, such as problem solving, responsibility, decision making, communication, work ethic to leadership and workplace professionalism, is more controllable and deemed trainable through appropriate professional development during the period of employment. Other studies in the field have also indicated that to train workplace-ready graduates, supplementary knowledge, such as human resource management, decision making, time management and problem-solving skills, is required [16,71]. This can positively affect retention amongst professionals and make them ready for specific purposes within their jobs.

Alternatively, this explains why there is a difference in strategy in acquiring some skill sets within a typical construction organisation. Skills that are not so easy to control and master by means of professional development programmes can be brought into the organisation via direct recruitment [13,38]. This implies that the recruitment processes could prioritise professionals who possess trait-based cluster skills. This includes professionals who can work across cultures with more flexibility and adaptability. In addition, skills, such as courtesy, creativity and curiosity, can also be evaluated during the recruitment process, such as problem solving, responsibility, decision making, integrity, communication, work ethic, critical thinking-multidisciplinary thinking, self-management/time management, enthusiasm, positive attitude, teamwork, leadership and workplace professionalism, loaded onto factor one.

5. Conclusions

This study investigated the perception and value of soft skills to the practitioner within the construction sector. These skills are essential to employability and retention and, if obtained and observed, can significantly reduce sector-wide turnover. The traditional perception of soft skills was found to be "nice to have and not a necessity" for the construction and building sector. Further, there was no gauge or evaluation to demonstrate what soft skills are possessed by the construction sector and what is required for the sector-related roles, or how different the soft skills requirements are to what is currently being practised or possessed by industry practitioners.

The study provides a theoretical basis for different classifications of soft skills, which can be linked to organisational staff recruitment processes and current staff development theories. The underlaying differences between the actual current skills possessed by construction industry professionals with the actual skills needed were identified and analysed. Ethics and Professionalism, Self-Effort Management, Management—Leadership and Power were found to be the key underlaying factors of current soft skills in the construction industry. This was different to a simpler classification of the required skills

needed for the industry, which was based on the training-based (more controllable) and trait-based (less controllable) factors identified.

The research provides an additional knowledge domain, which can be further explored in future multi-disciplinary and workforce-related studies. Although the analysis provides a comprehensive classification of complex soft skills based on underlaying factors for academia, it is also practically essential in understanding how building professionals currently apply these skills and how they use them to initially focus on which could be more controllable versus those that are less controllable. Industry practitioners, key stakeholders and organisations will benefit directly from the outcomes of these studies as the results can be extremely important in recruitment and professional development processes. While knowing that trait-based skills can be harder to develop and train, individuals with good skills and traits can be prioritised in the recruitment processes.

Accordingly, other more-controllable skills can be developed and trained for these individuals and professionals once recruited. Understanding this can be extremely significant as this knowledge can be used to reduce turnover and increase retention amongst building professionals and those delivering projects in the general construction sector.

The survey was questionnaire based and highly structured to fit the methodology purpose and achieve statistical inferences and significance, which creates limitations in the analysis of different circumstances and scenarios. Further qualitative analysis, such as case studies and interviews, can provide a more in-depth explanation of the soft skills within the construction sector and will be pursued in future studies. The study participants included directors, quantity surveyors, project managers, planning engineers, facility managers, senior valuers, land surveyors, business developers, contract and commercial managers in construction. Based on these limitations, further research can indicate differences among these groups.

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Appendix A

Questionnaire
Instructions:
Completion and return of the questionnaire implies consent.
You have the right to decline to answer any particular question.
If you are not comfortable in your command of the English language, please do not complete this questionnaire.
Please answer as best you can the questions listed below. The aim of this questionnaire is to provide an opportunity for individuals to share their experiences, opinions, likes, dislikes and suggestions. Please reply to this questionnaire electronically. The data (your responses) will be analysed using mixed method.

The aim (outcome) of this study is to present and provide comment on the perception and value of soft skills of senior building professionals within the construction industry. All the data collected will be handled in a confidential manner.

The responses will be used for the purposes of this research study only and related article publications. By completing this survey, you allow your responses to be used solely for research purposes and the publication of journal articles and RICS publications to members with the understanding that your identity will not be revealed.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 19/47. If you have any concerns about the conduct of this research, please contact Associate Professor David Tappin (Committee Chair), Massey University Human Ethics Committee: Northern, email humanethicsnorth@massey.ac.nz.

PART A: GENERAL STATISTICAL QUESTIONS [Use X where applicable]

1   What country are you responding from?

Australia	Canada	Hong Kong	India	Ireland	South Africa	UK
Malaysia	New Zealand	Nigeria	Qatar	Singapore	UAE	

2   If you are of New Zealand Māori descent and for the purposes of this study would like your responses to be collated and analysed according to preferred Māori values (reflected through soft skills), please indicate here by ticking **Yes**.

Yes	No

3   What is your current age?

18–25	26–35	36–45	46–55	56–65	65+

4   Are you male or female?

Male	Female	Gender Diverse

5   What is your current position (title) in the company?

CEO	MD	GM	PD	Snr PM	Snr CM	Snr QS

6   Indicate your specialised industry sector(s). More than one answer may be given.

Office	Commercial/Retail	Industrial	Residential	Educational	Defence	Infrastructure

PART B: SPECIFIC RESEARCH QUESTIONS: [Use X where applicable]

7   In your opinion, is there a soft skills shortage within the construction industry?

Yes	No	Not Sure

8   In your opinion, is it important to cultivate soft skills within the construction industry?

Likert Scale [1–5]				
1	2	3	4	5
Not important at all	Slightly unimportant	Average	Slightly important	Very important
O	O	O	O	O

9   Rate **your** soft skills in the following order of importance (where 1 = not important at all; 2 = low importance; 3 = slightly important; 4 = neutral; 5 = moderately important; 6 = very important & 7 = extremely important).

No	List of Soft Skills	Not Important at All Neutral Extremely Important						
		1	2	3	4	5	6	7
1	Communication							
2	Enthusiasm & positive attitude							
3	Teamwork							
4	Networking							
5	Problem solving							
6	Critical thinking/multi-disciplinary thinking							
7	Workplace professionalism							
8	Decision making							
9	Handling pressure/Stress management							
10	Self-confidence							
11	Negotiation							
12	Self-management/Time-management							
13	Client management							
14	Cross-cultural relationships							
15	Emotional intelligence							
16	Flexibility/adaptability							
17	Conflict management							
18	Work ethic							
19	Integrity							
20	Courtesy							
21	Responsibility							
22	Leadership							
23	Creativity and curiosity							

10   Rate **what you think a perfect example of someone in your role** should have with regards to soft skills in the following order of importance (where 1 = not important at all; 2 = low importance; 3 = slightly important; 4 = neutral; 5 = moderately important; 6 = very important & 7 = extremely important).

No	List of Soft Skills	Not Important at All Neutral Extremely Important						
		1	2	3	4	5	6	7
1	Communication							
2	Enthusiasm & positive attitude							
3	Teamwork							
4	Networking							
5	Problem solving							
6	Critical thinking/multi-disciplinary thinking							
7	Workplace professionalism							
8	Decision making							
9	Handling pressure/Stress management							
10	Self-confidence							
11	Negotiation							
12	Self-management/Time-management							
13	Client management							
14	Cross-cultural relationships							
15	Emotional intelligence							
16	Flexibility/adaptability							
17	Conflict management							
18	Work ethic							
19	Integrity							
20	Courtesy							
21	Responsibility							
22	Leadership							
23	Creativity and curiosity							

(Source: Crawford & Dalton, 2016; Robles, 2012; Taylor, 2016; Mahasneh & Thabet, 2016; van Heerden, Burger, Zulch, 2018).

PART C: PERSONAL DIRECTED QUESTIONS:

11   Name the three (3) most essential soft skills you **currently** use in your day-to-day profession?

12   Which soft skill have you found to be the most valuable **throughout your career**?

Thank you for assisting us with this research study.
Your time and knowledge to take part is greatly appreciated.

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