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Motivation of civil engineers and architects in Turkey

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Abstract: Motivation is one of the key factors that stimulate individuals to improve their productivity. Therefore, motivation of construction workers has been debated with considerable interest by participants in the construction industry. However, motivating only construction workers, but ignoring the motivation of construction professionals, viz., architects and civil engineers, may not be enough to successfully complete a construction project. Although motivation of construction professionals may also enhance the performance of a construction project, this topic is mostly ignored in the motivation literature. This study attempts to fill this gap by (1) identifying the motivators that are of importance to architects and civil engineers and (2) exploring the statistical difference between architects' and civil engineers' motivators. For this purpose, a questionnaire survey was administered to Turkish architects and civil engineers to collect data on their perceptions of the importance of different motivators. The case of Turkey is investigated because several of the larger Turkish contractors undertake construction projects outside their home country. Statistical analysis was performed on the collected data to verify whether there are statistically significant differences in the perception of some motivators by architects and civil engineers. The study demonstrates the existence of a statistically significant difference between architects' and civil engineers' motivators. Identifying the architects' and civil engineers' motivators may help construction companies in motivating their architects and civil engineers more effectively, thus developing a quality workforce.

Keywords: construction, architect, civil engineer, motivation

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1 Introduction

Motivation is an important factor in understanding how to meet employees' needs and improve employees' performance in a construction project (Wang et al. 2016). It is commonly acknowledged that highly motivated construction workers may help to improve the performance of a construction project (Uwakweh 2006; Han et al. 2008; Oyedele 2010; Jarkas 2012). Indeed, many researchers have conducted studies to shed light on the motivation of construction workers (McQuillen 1986; Cox et al. 2005; Cox et al. 2006; Uwakweh 2006; Han et al. 2008). However, motivating only construction workers may not be enough to achieve the goals of a construction project. Actually, studies exist (e.g., Oyedele 2010, 2013; Damci 2016) claiming that the motivation of both construction professionals and construction workers plays a key role in successfully completing construction projects (Damci 2016). A nonmotivated construction professional may be ineffective in performing most tasks, such as making decisions, handling problems, and managing changes, which in turn can have a negative impact on the completion of the construction project (Pheng and Chuan 2006; Seiler et al. 2012). Unfortunately, studies on the motivation of construction professionals (e.g., architects, civil engineers, and so on) are rare in the motivation literature. This study was conducted in response to the lack of such research in the motivation literature. The objectives of this study are as follows: (1) to understand which motivators are considered by architects and civil engineers to be important; and (2) explore the existence of statistically significant differences between architects' and civil engineers' motivators in the context of Turkey.

Turkish contractors are among the leading international contractors according to *Engineering News-Record* (2019). Turkey (44 contractors) is ranked second, only behind China (75 contractors), in the *Engineering News-Record*'s Top 250 International Contractors list of 2019. In addition, the contractors reported $22.50 billion in contracting revenue in 2018 from projects outside Turkey (*Engineering News-Record* 2019). The Turkish

Contractors Association reports that Turkish contractors have undertaken 10,108 construction projects in 126 countries, with a total value of some $400 billion between 1972 and 2019 (Turkish Contractors Association 2015). This is the reason why the case of Turkey is investigated in this study by surveying the civil engineers and architects working in Turkish construction/consulting companies. For this purpose, first a questionnaire survey was sent to Turkish architects and civil engineers to collect data on their perceptions of the importance of different motivators. Subsequently, statistical analysis was performed on the collected data to confirm whether there are statistically significant differences in the perception of some motivators by civil engineers and architects. To sum up, the major contribution of this research to the body of knowledge is that it explores the existence of statistically significant differences between civil engineers' and architects' motivators, which may help construction companies in motivating their architects and civil engineers more effectively.

2 Literature review

Maslow's hierarchy of needs theory (1943), McGregor's Theory X and Theory Y (1960), Vroom's expectancy theory (1964), Herzberg's motivation–hygiene theory (1968), Alderfer's existence, relatedness, and growth (ERG) theory (1972), and Locke and Latham's goal theory (1990) are the motivation theories proposed to explain the motivation of individuals. This literature review summarizes these motivational theories and their application to the civil engineering and architecture professions.

2.1 Theories of motivation

It is commonly acknowledged that Maslow's hierarchy of needs theory (1943) is a good starting point to begin examining motivation theories. In Maslow's hierarchy of needs theory, the motivation of individuals is based on their own needs rather than on external factors, and these needs are grouped in a hierarchical order. Maslow (1943) categorizes into five main groups the needs that must be met in order to motivate individuals: (1) physiological needs (food, water, air, clothing, shelter, sleep, and so on); (2) security needs (job security, health, insurance, law and order, employment, and so on); (3) social needs (family, friends, love, affection, and so on); (4) having self-esteem (need of being respected and valued by others within society); and (5) self-actualization (an individual's search for reaching his/her full potential as a person). Physiological needs (Group 1) indicate the lowest level of needs, whereas self-actualization (Group 5) represents the highest level of needs in the hierarchy. This hierarchy is based on the principle that the higher-level needs cannot be met without meeting the lower-level needs. It should be noted, however, that Maloney (1986) has argued that Maslow's hierarchy of needs theory does not take into account the characteristics of individuals that may affect their motivation levels.

McGregor's Theories X and Y (1960) are also acknowledged as pioneering theories of motivation in the literature. The assertion of these theories is that subordinates' motivation is affected by the management style of their superiors. According to Theory X, superiors assume that their subordinates, by nature, dislike work; therefore, superiors must closely supervise their subordinates in order to increase their work efficiency. According to Theory Y, superiors assume that their subordinates do not need any close supervision because they are self-motivated to accomplish their goals in an effective and efficient manner. Even though Theories X and Y argue against each other, it should be noted that a manager may need to apply both Theory X and Theory Y in practice.

Herzberg's motivation–hygiene theory (1968) is one of the most well-known motivation theories in the literature. It is also known as the two-factor theory because it consists of (1) motivator factors and (2) hygiene factors. The motivator factors involve the work itself, advancement, achievement, responsibility, recognition, and growth. The hygiene factors consist of interpersonal relations, working conditions, security, company policy and administration, personal life, salary, status, and supervision. According to Herzberg's motivation–hygiene (1968) theory, the satisfaction of employees is linked to motivator factors, while dissatisfaction is linked to hygiene factors.

As the motivation theories were developed, researchers attempted to overcome the shortcomings of these theories by proposing novel theories. For instance, Alderfer's ERG theory (1972) was developed to overcome the shortcomings of Maslow's hierarchy of needs theory (1943). Instead of the five categories defined by Maslow (1943), Alderfer's ERG theory uses three categories to define individuals' needs, namely, (1) existence (physiological and security), (2) relatedness (social and external part of self-esteem), and (3) growth needs (internal part of self-esteem and self-actualization). It is asserted that the hierarchical pattern in Maslow's hierarchy of needs theory (1943) may possibly differ from individual to individual. In addition, Alderfer's ERG theory claims that an individual

can be motivated by different needs simultaneously, which is not consistent with Maslow's (1943) contention that an individual cannot be motivated by higher-level needs without meeting the lower-level needs.

Another important theory in the motivation literature is the expectancy theory developed by Vroom (1964), which claims that assigning difficult tasks to individuals leads to higher performance, compared to the performance while assigning easy tasks. In addition, Vroom claims that if an individual perceives a positive relationship among effort, performance, and reward, this individual would put in a high level of effort into the tasks. In Vroom's expectancy theory (1964), expectancy, instrumentality, and valence set the relationship among effort, performance, and reward. The relationship between effort and performance can be assessed by using the expectancy variable; it is asserted that a decent effort on the part of an individual is necessary to achieve expected performance goals. The relationship between performance and reward can be measured by the instrumentality variable; the contention is that an individual can receive a reward only if he/she can meet the performance expectations. Valence is the last variable used in measuring the value that is put on a reward by a person.

One of the most widely acknowledged motivation theories is Locke and Latham's goal theory (1990), which claims that the performance of individuals may differ according to their goals. The results of their study reveal that higher performance can be achieved by setting challenging goals, rather than through easy or no goals.

The studies discussed in this section represent the fundamental theories of motivation. Even though these studies propose different approaches, they all attempt to address what motivates human behavior, what guides such behavior, and how the behavior is maintained (Uwakweh 2006). These theories have contributed to the body of research that has been built subsequently. They have provided direction to the process of determining the motivators of employees in different industries. The following section summarizes the application of different motivation approaches to the civil engineering and architectural professions.

2.2 Previous studies on motivators of engineers and architects in the construction industry

Motivation theories have been discussed by several researchers in the context of construction professionals and construction workers (e.g., McQuillen 1986; Carrier 1992; Shoura and Singh 1998; Singh 2000; Venkatesan et al. 2009), but studies that reveal the specific aspects of motivators of construction professionals are limited (e.g., Oyedele 2010, 2013; Damci 2016). In McQuillen's study (1986), four pioneering theories of motivation, namely, Maslow's hierarchy of needs theory (1943), McGregor's Theory X and Theory Y (1960), Vroom's expectancy theory (1964), and Herzberg's motivation–hygiene theory (1968) were examined and analyzed to enable a better understanding of the relationship of motivators with construction professionals (i.e., civil engineers). Shoura and Singh (1998) developed several criteria based on Maslow's hierarchy of needs theory to assess the motivation levels of civil engineers. These criteria were used in a questionnaire survey administered to civil engineers. In this survey, the respondents stated that their basic needs (i.e., physical, safety, social, and esteem needs) were not fully met. The authors argued that these needs are basic and their fulfillment is not an option, but a necessity. Singh (2000) used Herzberg's motivation–hygiene theory to investigate the motivators of engineers in a public construction organization. In this study, a Development Index was developed to measure the engineers' perceptions of satisfaction and dissatisfaction in terms of motivators. Carrier (1992) attempted to address the motivators that may be of particular importance to a joint venture. The results of this study revealed that these motivators include developing a team spirit, keeping workers in the next stage of the project, and nonfavoritism. Venkatesan et al. (2009) administered a questionnaire survey to identify the key factors that are related to engineers' motivation and demotivation. They used the analytical hierarchy process to determine the relative weights of the key factors. In Damci's (2016) study, a questionnaire survey was administered to civil engineers to investigate the relationship between civil engineers' personal characteristics and their motivators. The results revealed that there are statistically significant differences in the perception of some motivators by civil engineers depending on their demographics. Based on these statistically significant differences, Damci (2016) suggested that engineers should be motivated individually rather than by using blanket motivators for all of them. Oyedele (2010) used regression analysis to predict engineers' and architects' levels of motivation. In contrast to current studies on motivation of individuals, Oyedele (2013) focused on exploring the demotivation of architects rather than their motivation.

In sum, even though construction professionals (e.g., architects and civil engineers) play a key role in the success of a construction project, only a few studies in the literature focus on identifying the critical factors affecting

their motivation (Oyedele and Tham 2007). In addition, these few studies are mostly focused on only identifying the motivators for architects or civil engineers, rather than investigating the existence/absence of statistically significant differences between architects' and civil engineers' motivators. However, identifying the most important motivators for architects and civil engineers is only the first step in fully understanding architects' and civil engineers' motivators. Even though both architects and civil engineers are employed in the building construction industry, the level of importance that civil engineers and architects attach to the same motivators may be different. Therefore, the question of whether there is a statistically significant difference in civil engineers' and architects' perceptions of motivators should also be investigated. For this reason, in addition to identifying civil engineers' and architects' motivators, this study attempts to investigate the differences between civil engineers' and architects' perceptions. The contribution of this study to the body of knowledge is that if there is a significant difference in the perception of motivators by architects and civil engineers, then this information may help managers in construction companies to motivate their architects and civil engineers more effectively.

3 Research methodology

The main hypothesis of this study is that there are statistically significant differences in the perception of motivators between architects and civil engineers. The tasks that were performed in this study can be summarized as follows: (1) conducting a literature review to identify the most-cited motivators of construction professionals; (2) carrying out a survey of Turkish architects and civil engineers to collect data on their perceptions of the importance of different motivators; and (3) performing statistical analysis on the collected data to verify whether a statistical relationship exists between architects' and civil engineers' motivators.

A questionnaire was designed that consists of two parts. The first part consists of six questions about the personal characteristics of the respondents, namely, (1) age, (2) marital status, (3) education, (4) work experience, (5) type of employer, and (6) the value of the largest project that the respondent worked on. In the second part of the questionnaire, respondents are asked to rate the importance of 20 motivators. The motivators were identified by considering the perspective of professionals employed in the construction industry (McQuillen 1986; Shoura and Singh 1998; Singh 2000; Venkatesan et al. 2009; Oyedele 2010; Damci 2016) and the perspective of professionals employed in management positions in other industries (Metcalfe 1989; Shoura and Singh 1998; Antonioni 1999; Analoui 2000). The respondents were asked to use a Likert-like scale of 1–5 in order to rate the level of importance of the motivators listed in the questionnaire, where "1" represents "not important" and "5" indicates "very important". The target population in this study was set as the members of the Istanbul Chamber of Turkish Architects and the Istanbul Chamber of Turkish Civil Engineers, as they are the largest professional bodies of architects and engineers, respectively, in Turkey. The questionnaire was sent to the members via e-mail.

The reliability of the scale used in a study can be checked by using various techniques, Cronbach's alpha (α) being the most commonly used technique to determine the internal consistency of a survey when using a Likert scale (Oyedele 2013). This method predicts the reliability of a given set (Santos 1999; Gliem and Gliem 2003). In this study, the reliability analysis was conducted using the Statistical Package for the Social Sciences (SPSS), Version 25, IBM, New York. The standardized Cronbach's alpha value can be computed using the formula in Equation 1. The Cronbach's alpha coefficient is in the range of 0–1. If the value is closer to "1", it indicates high reliability of the used scale. If the Cronbach's alpha value is equal to or higher than 0.60, it can be concluded that the reliability of the scale is satisfactory (Santos 1999; Gliem and Gliem 2003).

$$\alpha = \frac{N}{\left(N-1\right)} x \left(\frac{\sigma_x^2 - \sum_{i=1}^{N} \sigma_{yi}^2}{\sigma_x^2} \right) \tag{1}$$

where N is the number of items in the test, σ_x^2 is the variance of the observed item scores, and σ_{yi}^2 is the sum of all i item variances.

It is claimed that the use of a severity index (a nonparametric ranking analysis procedure) rather than arithmetic mean scores (parametric statistics) to rank such data would produce more significant results. The formula used to calculate the severity index is given in Equation 2 (Idrus and Newman 2002; Chen et al. 2010):

$$Severity\ Index = \sum_{i=1}^{5} \left(\frac{w_i \times f_i}{n \times a} \right) \tag{2}$$

where i is the point given to each personal value by the respondent (ranging from 1 to 5); w_i is the weight for each point (where "1" represents "not important" and "5" represents "very important"); f_i is the frequency of the point i

by all respondents; n is the total number of responses; and a is the highest weight (in this study, a=5).

Jamieson (2004) and Carifio and Perla (2008) suggest that Likert data should be analyzed by using nonparametric tests. The Mann–Whitney U-test, which is a nonparametric technique, was performed on the collected data to test the existence of statistically significant differences in the perception of motivators between architects and civil engineers. If the p-values are <0.05, it indicates that there is a statistically significant difference between them at the 95% significance level.

4 Findings

A total of 179 members of the Istanbul Chamber of Turkish Architects and a total of 394 members of the Istanbul Chamber of Turkish Civil Engineers completed the questionnaire. The personal characteristics of the respondents are presented in Table 1. Based on the information presented in Table 1, the demographic characteristics of architects and civil engineers are not exactly the same but quite similar. Indeed, if one takes a look at age, marital status, education, and experience in the construction industry, type of employer, and the value of the largest project that the respondent worked on, one can observe that the architect and civil engineer populations that are compared in this study are quite compatible.

Tab. 1: Personal characteristics of the respondents

Characteristics	Number of respondents, %	
	Architects	Civil engineers
Age, years		
<35	66	60
>35	34	40
Marital status		
Single	54	41
Married	46	59
Education		
Bachelor's degree	61	57
Master's or doctorate degree	39	43
Experience in construction industry		
<10 years	59	57
>10 years	41	43
Type of employer		
Noncontractor organizations	53	41
Contractor	47	59
The value of largest project that the respondent worked on		
< $50 million	58	41
> $50 million	42	59

In order to confirm whether the motivators and their associated Likert scale actually measure the motivation of construction professionals, Cronbach's alpha values were computed using IBM SPSS Version 25; the Cronbach's alpha coefficients calculated for each motivator are presented in Table 2. As seen in Table 2, since the overall Cronbach's alpha value for this study was found to be 0.855, which is higher than 0.60, good reliability and satisfactory internal consistency of the scale used in the questionnaire can be deduced.

Based on the average scores presented in Table 2, the motivators that are most important to architects and civil engineers are "job satisfaction", "achieving success in my work", "efficient collaboration with friendly and congenial teammates", and "participation in decisions that affect my area". In other words, this finding reveals that Turkish architects and civil engineers rate the same motivators as the most important motivators. It is understandable that both architects and civil engineers score high on "job satisfaction" and "achieving success in my work" because according to Schein (1990), technical/functional individuals attach great importance to these motivators. On the other hand, high scores on "efficient collaboration with friendly and congenial teammates" and "participation in decisions that affect my area" also make sense because, according to Schein's (1990) career anchor categories, individuals in management positions are motivated by these factors. In addition, according to Hofstede (1980), Turkish individuals place emphasis on maintaining harmony in the group to which they belong. Therefore, it is understandable to have high scores in "efficient collaboration with friendly and congenial teammates".

On the other hand, architects and civil engineers attach different levels of importance to the least important motivators. "Comfortable physical work environment" and "participation in decisions that affect organizational policies" were found to be the least important motivators for architects, while "working on projects of my choice" and "avoiding harm and trouble" were the least important motivators for civil engineers. In other words, not having these motivators does not demotivate civil engineers and architects in an organization. This finding can be explained by the fact that many civil engineers work on construction sites and are used to coping with unfavorable weather conditions and safety hazards in different geographical locations, hence their disinterest in "projects of my choice" and "harm and trouble"; and that many architects work in design offices and are used to performing in standard office accommodations and to work as part of a design team, hence their disinterest in "work environment" and "organizational decisions". In addition,

Tab. 2: Arithmetic mean scores and "Cronbach's alpha if item deleted" values for motivators

Motivators	Architects		Civil engineers		Mann–Whitney *U*-test: *p*-values
	Cronbach's alpha	Average score*	Cronbach's alpha	Average score*	
Recognition and appreciation from superior	0.843	4.3	0.851	4.2	0.214
Raise in salary	0.848	4.4	0.853	4.4	0.644
Opportunity for advancement and promotion	0.840	4.2	0.854	4.1	0.438
Efficient collaboration with friendly and congenial teammates	0.850	4.5	0.852	4.5	0.806
Job satisfaction	0.845	4.7	0.850	4.6	0.460
Gaining knowledge, ability, and confidence	0.842	4.4	0.846	4.4	0.855
Mutual trust and loyalty between you and superior	0.840	4.4	0.848	4.2	0.051
Participation in decisions that affect my area	0.845	4.5	0.847	4.4	0.438
Upper management's awareness of my job results	0.838	4.3	0.844	4.2	0.099
Fairness in how people are rewarded for work performance	0.845	4.4	0.844	4.4	0.435
Working on projects of my choice	0.848	4.0	0.846	3.7	0.001*
Achieving success in my work	0.843	4.6	0.846	4.5	0.327
Impacting my subordinates positively	0.841	4.3	0.848	4.1	0.019*
Avoiding harm and trouble	0.844	4.1	0.847	3.8	0.001*
Job security	0.840	4.2	0.845	4.1	0.265
Belonging to an organization that is highly regarded	0.841	4.4	0.847	4.0	0.493
Participation in decisions that affect organizational policies	0.844	3.8	0.851	3.8	0.374
Comfortable physical work environment	0.847	3.9	0.852	3.7	0.005*
Task and responsibilities that are clearly specified	0.849	4.3	0.848	4.0	0.006*
A job where I get feedback on how I am doing	0.840	4.1	0.845	3.9	0.085

*1: Not important; 2: Low importance; 3: Moderately important; 4: Important; 5: Very important.

having low scores on "working on projects of my choice" and "participation in decisions that affect organizational policies" is consistent with Hofstede's (1980) contention that being told what to do and being closely monitored are expected from Turkish individuals.

Turkish civil engineers rate only two motivators (i.e., "participation in decisions that affect organizational policies" and "comfortable physical work environment") lower than "important". On the other hand, Turkish architects rate five motivators lower than "important", which are "comfortable physical work environment", "participation in decisions that affect organizational policies", "a job where I get feedback on how I am doing", "working on projects of my choice", and "avoiding harm and trouble". The *p*-values obtained from the Mann–Whitney *U*-test are presented in Table 2, which show that there is a statistically significant difference (difference statistically significant at $\alpha = 0.05$) in the perception of motivators by civil engineers compared to the perception by architects. This finding reveals that even two professions that collaborate quite closely in practice may attach different levels of importance to motivators. The motivators that are found to be perceived differently by civil engineers and architects are discussed below.

- ***Working on projects of my choice*:** Architects attach more importance than civil engineers to this motivator. This result is understandable since architects do mostly design work. It can be explained by the fact that creativity is more important in finding a good solution for architectural design problems when compared to finding a solution for an engineering problem. Indeed, Mutlu-Danaci (2015) stated that the concept of creativity is crucial in the architectural profession. An architect's creativity may be restricted if the project is not within the architect's comfort zone. In other words, forcing an architect to work on a project that is not his/her choice may affect the architect's creativity (by restricting his/her imagination) and, consequently, his/her performance in a negative way. Therefore, it is not surprising that architects attach more importance than civil engineers to this motivator.
- ***Impacting my subordinates positively*:** This motivator is also perceived differently by architects and civil engineers. Architects place more importance to this

motivator than civil engineers. Architects mostly work in design offices where they have an intimate working environment defined by close proximity to their colleagues, typically in an open plan office setting. Thus, when an architect occupies a managerial position, it is only natural that he/she would influence his/her colleagues and subordinates in this intimate working environment. On the other hand, civil engineers commonly work on large construction sites, which may reduce the likelihood of having a close relationship with their colleagues. Therefore, it makes sense that architects are more interested in impacting their subordinates positively.

- ***Avoiding harm and trouble*:** Civil engineers attach less importance to this motivator than architects. At first look, this finding may not appear to be consistent with the working environments of architects and civil engineers. Civil engineers commonly work on construction sites and are commonly exposed to safety-related factors that may cause harm to workers in the form of injuries and fatalities and are therefore expected to be attentive to avoiding harm and trouble. On the other hand, architects mostly work in design offices, where they have a more sheltered and safer working environment when compared to working on a construction site. However, the design work that architects carry out has important consequences on the operation of the constructed facility, including structural reliability, functional efficiency, indoor air quality, temperature/humidity control, operational/maintenance efficiency, and overall user comfort. Any design flaw that affects even one of these issues is a potential court case. Given the inconvenience of such cases, it is understandable that architects pay extra attention to "avoiding harm and trouble".
- ***Comfortable physical work environment*:** It is understandable that civil engineers attach less importance to this motivator than architects due to civil engineers' working environment. Civil engineers commonly work on construction sites, which cannot be described as a comfortable work environment. Since civil engineers are used to working in uncomfortable physical work environments, they are not interested in this motivator. On the other hand, architects mostly work in design offices, where they expect a comfortable physical work environment. Therefore, architects are expected to be more sensitive about their working environment. The findings of Hancock's study (2000) are consistent with this study's findings that architects attach more importance to good working environment than civil engineers.
- ***Tasks and responsibilities that are clearly specified*:** Architects attach more importance to the motivator "tasks and responsibilities that are clearly specified" than do civil engineers. This finding can be explained by architects' job description, which includes mostly design work. An architect's performance highly depends on understanding the project-related needs and requirements of an owner. In other words, an architect needs a clear description of the owner's expectations of the facility to be designed, and yet, many first-time owners are quite deficient in doing so. Only if this information is clearly specified by the owner can the architect meet the owner's requirements. On the other hand, a civil engineer's work is much less ambiguous compared to an architect's work because the civil engineer's work involves constructing according to the plans and specifications provided by the architect.

5 Conclusion

Construction professionals, namely, architects and civil engineers, play an important role in managing design and construction. The success of construction projects depends on the motivation of construction professionals in making decisions, handling problems, and managing changes. Even though motivating construction professionals is an important factor in completing a construction project successfully, little research has been carried out about it. This study highlights the motivators that are considered to be important by architects and civil engineers and explores the existence of statistically significant differences between architects' and civil engineers' motivators. With this aim, a questionnaire survey was administered to Turkish architects and civil engineers to collect data on their perceptions of the importance of different motivators. Based on the survey results, the most important motivators of architects and civil engineers are "job satisfaction", "achieving success in my work", "efficient collaboration with friendly and congenial teammates", and "participation in decisions that affect my area", indicating that architects and civil engineers are on the same page concerning motivators that are widely accepted in the literature to be of importance to many professionals (e.g., Shoura and Singh 1998; Antonioni 1999; Analoui 2000; Oyedele 2010). Statistical analysis was performed on the collected data to explore whether there are statistically significant differences in the perception of some motivators by architects and civil engineers. While no statistically

significant differences exist between architects' and civil engineers' perceptions of 15 motivators, managers should note that there are statistically significant differences relative to five motivators, namely, "working on projects of my choice", "impacting my subordinates positively", "avoiding harm and trouble", "comfortable physical work environment", and "tasks and responsibilities that are clearly specified". All these five motivators are considered as more important by architects than by civil engineers.

Knowing the personal values that are considered most important or perceived differently by civil engineers and architects can assist companies in the construction industry in hiring/appointing professionals by making sure that the professionals' personal values fit the personal values desired in positions earmarked for making strategic decisions. Identifying architects' and civil engineers' motivators may help construction companies in motivating their architects and civil engineers more effectively, thus developing a workforce that performs design and construction better, which may in turn improve the performance of a construction project. The only limitation of this study is that personal values may be affected by individuals' demographics and life experiences. This issue should be investigated in future research.

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