

The Additive Value of Psychological Capital in Predicting Structural Project Success and Life Satisfaction of Structural Engineers

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Abstract—This study presented the survey carried out among structural engineers of the Association of Structural Engineers of the Philippines. The aim of this research was to investigate psychological capital leading to structural project success and life satisfaction. The critical factors leading to structural project success have been investigated through interview among top-level managers of the construction companies. According to the results, Big “5” personality traits were perceived the most important factors contributing to structural project success. On the other hand, extraversion trait is the best predictor in life satisfaction.

Index Terms—Big five personality traits, life satisfaction, psychological capital, structural engineer, structural project.

I. INTRODUCTION

A career can be defined as related positions, roles, activities, and experiences encountered by a person. But, in everyday conversation, a career is often spoken about a high status occupation or line of work which offers structural projects and life satisfaction. The success of structural engineers will depend on the projects he performed in a job or career.

Structural engineers are employed primarily by government agencies for inspecting construction projects for safety and adherence to local and federal building standards. Structural engineers work with people in related professions such as electricians and drywallers to obtain information about construction sites and about these workers' roles in any project. Structural engineers do not mind that some see them as the police of the construction industry. Most enjoy making sure that the structures are safe and sound. People just assume the places for living, playing and working are all safe since if a structural engineer will not do his job, everyone pays.

The characteristics or preferences of one's personality have been demonstrated in numerous research studies to be factors impacting job performance. The dimensions of an individual's personality must therefore be recognized as a significant factor impacting job performance. Furthermore, these personality factors are acknowledged to hold potential in the construction companies of optimal performance.

Therefore, in order to examine the relationship, the researcher comes up with this study. First, identify the profile

of structural engineers in terms of psychological capital. Secondly, it attempts to determine the level of success in terms of structural project worked and life satisfaction. Third, determine the relationship between structural project success and life satisfaction by psychological capital and Fourth, identify the factors predict the structural project success and life satisfaction.

II. STUDY POPULATION, SAMPLING AND UNIT OF ANALYSIS

The selection of study population was from the members of the Association of Structural Engineers of the Philippines consisting of 50 construction companies. Through a multi-stage sampling technique, involving the industry selection, sample organization selection and sample respondent selection, a sample size of 110 was considered decided for this study. The researcher found it appropriate to seeks at least 5 respondents from each randomly selected construction companies. From the random selection of 22 construction companies out of 50 construction companies, with a sample size of 110 people, and 95% confidence in the results, the margin error would be $\pm 1.96\%$.

The unit of analysis was anyone with managerial role as determined by the construction companies s/he works for. It includes those with who had been given responsibility of carrying out management function by the management of the construction companies; with at least one subordinate reported directly to him/her.

III. LITERATURE REVIEW

A. Psychological Capital

Psychological capital can be defined as an individual's level of self-esteem and a stronger predictor of project success [1]. Personality trait and efficacy significantly influenced project success and contributes to project success in one's profession [1]. Personality might directly associate with structural project success if traits such as assertiveness, emotional stability, and leadership motivation fit the task of the structural engineer's role, enhancing effective leadership, managing social interactions, and making complex and high impact decisions [2].

A direct association between personality and life satisfaction could occur if personality traits such as extraversion create a general tendency to react positively to outcomes of executive work to act in ways compatible with the executive environment or to strive for success [3].

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Personality psychologists from a range of perspectives have found the Five-Factor model to be an effective tool for identifying and structuring personality attributes. The model provides a common language for the field of personality psychology, while at the same time it supports widely divergent approaches. This theory incorporates five different variables into a conceptual model for describing personality. These five different factors are often referred to as the “Big 5” [4].

The Five-Factor theory is among the newest models developed for the description of personality, and this model shows promise to be among the most practical and applicable models available in the field of personality psychology [5].

The Five-Factor model dominates the landscape of current psychological research. Through extensive debating and experimenting, there is currently a general consensus as to identify of the five factors. The five factors are emotional stability, extraversion, openness, agreeableness, and conscientiousness [4], [5].

Emotional stability refers to individuals with high in emotional stability tend to handle stress well, are relaxed emotional stable, and remain calm when in tense situations. Individual low in emotional stability is worry, anger, discouragement, self consciousness, impulsiveness and vulnerability [5], [6].

Extraversion refers to the number of relationships with which one is comfortable. High extraversion is characterized by a larger number of relationships and a larger proportion of one’s time spent in enjoying them [5]. Low extraversion is characterized by a smaller number of relationships and smaller proportions of one’s time spent in pursuing those relationships [5]. The six facets of extraversion are warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotions [6].

Openness refers to the number of interests to which ones are attracted and the depth to which one those interests are pursued [5]. High openness refers to a person with relatively more interests and consequently relatively few interests and relatively more depth in each of those interests [6]. The six facets of openness are fantasy, aesthetics, feelings, actions, ideas and values [5], [6].

Agreeableness refers to the number of sources which a person takes his or her norms for right behavior [5]. High agreeableness describes a person who defers to a great many norm sources such as spouse, religious leader, friend, boss or pop culture idol [5], [6]. Low agreeableness describes one who in the extreme only follows one’s inner voice [6]. High agreeable persons will march to the drumbeat of many different drummers, while low agreeable persons march only to their own drumbeat. The six facets of agreeableness which are: trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness [5], [6].

Conscientiousness refers to the number of goals on which one is focused [6]. High conscientiousness refers to a person who focuses on fewer goals and exhibits the discipline associated with such focus [5], [6]. Low conscientiousness refers to one who pursues a large number of goals and exhibits the destructibility and spontaneity associated with diffused focus [5]. The six facets associate with the conscientiousness factor are competence, order, dutifulness,

achievement striving, self-discipline, and deliberation[5], [6].

The Big Five traits were measured with the NEO Personality Inventory; the most widely used and extensively validated measure of the five-factor model [6]. Each of the five traits in the NEO-FFI is measured by asking respondents to indicate their agreement with 15 statements, using a 1=Strongly disagree to 4=Strongly agree scale. Example statements include, “I see myself as someone who is not tense” (emotional stability), “I see myself as someone who is full of energy, (extroversion), “I see myself as someone who is curious about many different things” (openness), “I see myself as someone who has forgiving in nature” (agreeableness), and I see myself as someone who work hard to reach my goals“(conscientiousness).

B. Structural Engineering

Structural Engineering is concerned with the research, planning, design, construction, inspection, monitoring, maintenance, rehabilitation and demolition of permanent and temporary structures, as well as structural systems and their components [7].

Structural engineering attracts a broad range of people because it offers so much profession and draws on a whole range of artistic and scientific talents. There are also international and managerial opportunities and have extra benefits that will push up the value of Structural engineers package which include bonus, a company car, life insurance, overtime pay, and medical care which make structural engineering a very appealing profession [8].

Such studies support that engineers need to be independent learning professionals who can determine gaps in their learning, plan career and education activities, and proceed independently.

Moreover, they need to develop strategic career skills, and become experts in career planning. Plenty of good jobs with good pay exist for technically current engineers who have valued skills, are flexible enough to adapt, and have strategic career plans firmly in place. Engineers need to take charge of retirement planning activities, so they can ensure their own long-term security [7], [8].

C. Structural Project

A structural engineering project utilizes a number of simple structural elements to build up structural systems that can be very complex.

The Manual of Professional Practice for Structural Engineers classified the type of structural projects. These are: Group 1-Simple structures such as lofts, warehouse, garages, sheds, market buildings, and comparable projects of one but not more than two stories; Group 11-Buildings of 3 stories up to 14 stories, towers, tanks, exhibition buildings, memorials, industrial buildings, simple bridges, low dams, piers, wharves, bins and silos and comparable projects; Group 111-Buildings with fifteen (15) or more floors, long span and complex bridges, high dams, major port works power plants and other complex structures not covered in Group 1 and 11; and Group 1V-Hotels, large apartment buildings, office buildings, shopping center, store buildings, resort, hospitals and comparable projects [7].

The success of structural project worked is based on average project construction cost, structural engineers' responsibility, scope of structural projects and construction technology [8].

D. Life Satisfaction

Life satisfaction is an appraisal of one's satisfaction individuals derived from aspects of their lives. Life satisfaction is important because achieving satisfaction with one's job or career at the expense of life satisfaction suggests limited career success [9]. Adding life satisfaction to career success also acknowledges the importance of work life (or work family) balance. Life satisfaction seems particularly relevant in research, as the challenge of achieving balance between life facets (work and family) may differ with social policies.

Life Satisfaction was measured with Life Scale measures asks individuals to respond to five general statements about their life [8], [9]. The five items are (1) In most ways my life is close to my ideal; (2) The condition of my life are excellent; (3) I am satisfied with my life; (4) So far I have gotten the important things I want in life; and (5) If I could live my life over, I would change almost nothing. The acceptable level of internal consistency for this scale is 0.88 [9].

IV. RESEARCH DESIGN AND INSTRUMENTATION

A. Research Design

This study was a one-shot study design incorporating a cross-sectional survey using quantitative techniques. The descriptive research was used to explore the current status of the subjects' perception on quantitative variables in this study without manipulating or influencing any variable components of NEO Five-Facto Inventory measurement.

The selection of study population was based on Category AAA construction companies, as per report by Panorama Magazine 2012 [10].

A target sample of 110 managers, involving a total of 22 construction companies selected to seek these respondents. From the stratified random selection of 22 out of 50 construction companies, with a sample size of 110 people, and 95% confidence in the results, the margin error would be ±1.96.

B. Instrumentation

The major tool for data gathering was the questionnaire. The questionnaire was divided into 2 parts. The first part dwelt on the status of structural engineers in terms of psychological capital.

The second part focused on the level of success of structural engineer in terms of structural project work including the average project construction cost, structural engineers' responsibility, scope of structural projects and construction technology.

The researcher also used unstructured interview. It was administered to the respondents to further clarify the opinions reflected in the questionnaire.

The Statistical Package for Social science (SPSS) software was used to generate statistical data to arrive these findings and conclusions.

Statistical tests of Regression Analysis, percentage and

weighted mean values were used to enable researcher give appropriate responses to the statement of the problem

V. FINDINGS

A. Profile of the Structural Engineers

Psychological Capital: Structural engineers view themselves as extraversion shown in Figure 1. Likewise, this is the only among the "Big Five" Personality traits in which a participant scored a high of 3.86 which means structural engineers strongly agree possess extraversion trait.

Moreover, respondent's perception on each personality traits has a mean between 3.78 and 3.86 and over-all mean of 3.8 which is very high among structural engineers.

Hence, structural engineers possess very high positive personality traits in terms of agreeableness, conscientiousness, extraversion, emotional stability and openness.

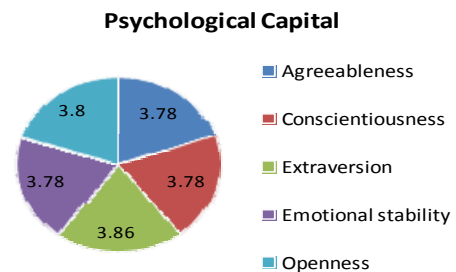


Fig. 1. Mean responses of structural engineers by Big "5" personality traits

B. Level of the Structural Project Worked

Structural engineer possess a high degree level of skills in innovation and creativity shown in Figure 2.

They are fraught with engineering challenged and these become their pride to humankind and major achievement.

The level of their opportunities, responsibility and excitement are very high since all of their structural projects presented are more than 15 stories.

Structural engineers who are in charge of overall coordinator cost over \$700,000 received a minimum compensation of \$51,163 plus 5.5% in excess of \$700,000 [11].

Therefore, the level of engineering services fees by structural engineers for every project is highly competitive with regards to the number of stories and project construction cost.

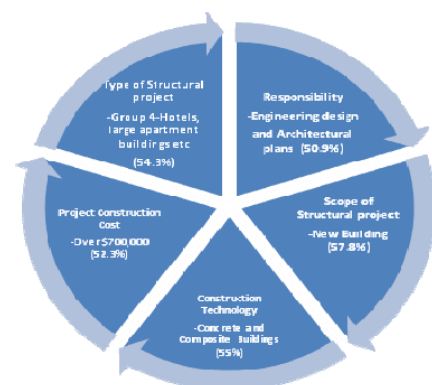


Fig. 2. Frequency and percentage distribution of structural engineers by structural project worked

C. Level of Life Satisfaction

Respondents claimed that structural engineers “agree” that they are satisfied with the conditions of their life which is excellent shown in figure 3. This statement received high mean responses of 3.29 from structural engineer. Moreover, a closer look on the figure further exhibited the mean responses on the respondents’ perception as regard that the structural engineer “agree” that their ways of life is closer to their ideal and if they would have their life over, they would change almost nothing where the respondents register a mean response of 3.25. Furthermore, the same table presented that they are satisfied with the important things they want in their life and satisfied with their life. The mean responses were 3.18 and 3.13. All of which were interpreted as “agree”. Generally, the level of career success of structural engineers in terms of life satisfaction was satisfied only. With a composite mean response of 3.22, it was interpreted “agree”. Therefore, the level of satisfaction received in life satisfaction for structural engineers is not as high in job and career. This happens when a career and job are given more emphasis rather than a family which is also determinants of life satisfaction.

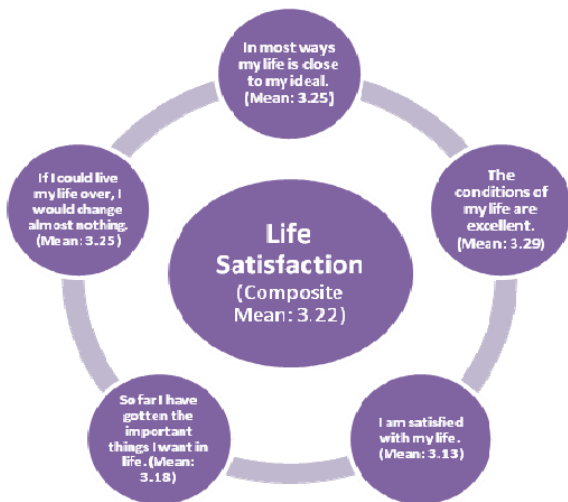


Fig. 3. Mean responses of structural engineers by life satisfaction.

D. Correlation between Structural Project and Level of Life Satisfaction by Psychological Capital

Structural Project. Psychological capital such as agreeableness, extraversion, conscientiousness, emotional stability and openness traits were found to have correlation with r values of 0.427, 0.225, 0.418, 0.896 and 0.292 in structural projects shown in figure 4. In general, the above cited variables influenced the structural project worked.

In terms of agreeableness, structural engineers who have high agreeableness can easily negotiate projects to their clients. Structural engineers have the ability to influence others and their hardworking in dealing structural project.

Regardless of extraversion, structural engineers are innovative and creative in solving case problems in structural project. They are expert in handling engineering design and architectural plans as part of their responsibilities in construction projects.

Engineers who have a high conscientiousness received project contract ranges from \$700000 or more because of

their hardworking to reach goals [12].

In terms of emotional stability, structural engineers are very competent in decision making. They are systematic in performing the five stages of project management for structural projects.

Level of Life Satisfaction. Agreeableness, extraversion, conscientiousness, emotional stability and openness traits were found to have correlation with r values of 0.248, 0.381, 0.002, -0.040 and -0.001 in life satisfaction shown in figure 4. The finding implies that agreeableness and extraversion traits are significant to life satisfaction but not significant to conscientiousness, emotional stability and openness. Generally, structural engineers who have high agreeableness and extraversion traits are satisfied with their life.

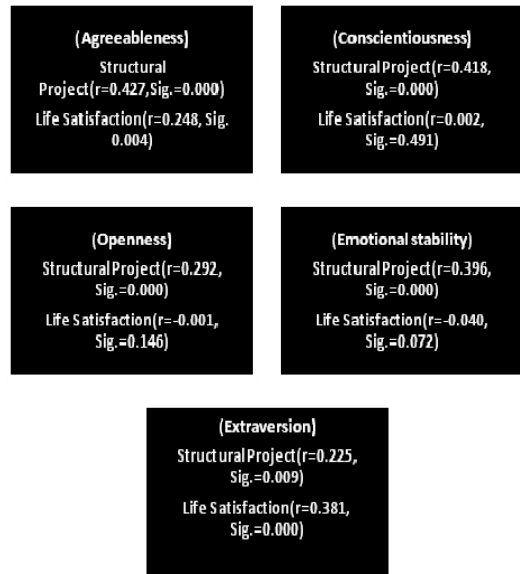


Fig. 4. Correlation between structural project and level of life satisfaction by psychological capital.

E. Predictors of Structural Project Success and Life Satisfaction by Psychological Capital

Agreeableness was found to have regression of structural project and life satisfaction indicated by beta coefficient of 0.427 and 0.248 as indicated by the R square 0.183 and 0.162 and computed significant values of 0.000 and 0.009. The result indicated that regression values are significant to structural project and life satisfaction shown in figure 5. The finding implies that agreeableness trait is a predictor of structural project success and life satisfaction.

Extraversion trait has regression of structural project and life satisfaction indicated by beta coefficient of 0.225 and 0.381 as indicated by the R square 0.191 and 0.245 and computed significance values of 0.000 and 0.001. The result indicated that regression values are significant to structural project and life satisfaction. Like agreeableness trait, extraversion trait is a predictor of structural project success and life satisfaction.

In terms of conscientiousness, emotional stability and openness traits, the regression values of structural project indicated by beta coefficient of 0.418, 0.396 and 0.292 as indicated by the R squared values of 0.175, 0.570 and 0.108 and a computed significant values of 0.000, 0.000 and 0.000. Thus, conscientiousness, emotional stability and openness traits are predictors of structural project success.

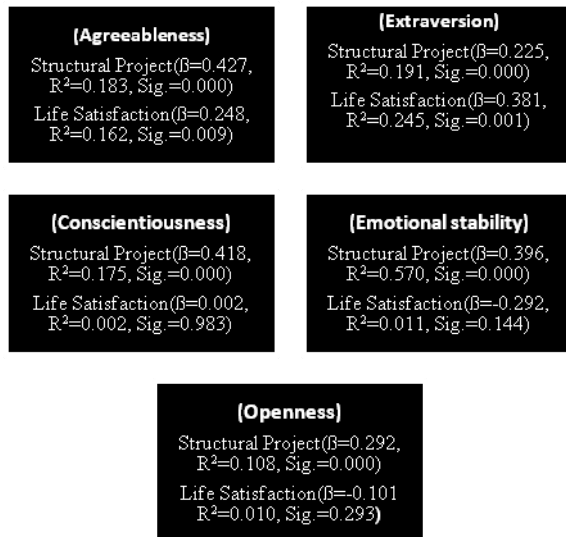


Fig. 5. Predictors of structural project success and life satisfaction.

VI. CONCLUSION

The findings that psychological capital impact and therefore, correlate with structural engineer structural project success and level of satisfaction are unique discovery of this research. It can be concluded from this investigation on structural engineers that the measures of “Big 5” personality traits are positive related to structural projects success. The findings revealed that structural engineers with higher levels of intuitive (openness) data gathering would outperform those with higher preferences for a sensing approach to data collections seems logical. In the planning phase of a structural project, the service activities require sensitivity to “complex interactions”, a unique intuitive function. Moreover, the theoretical possibilities and the continuous flow of new implications are actions most common to the planning process, a process in which the intuitive is quite comfortable. High levels of a judging (conscientiousness) are connected with achievement and a focused discipline to the task at hand performance in the preparation of contract documents in the design phase of a structural project was found in those subjects who demonstrated a preference for judging.

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