Social Capital on Civil Engineer Career Success

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***Abstract*—Although research has uncovered important social capital of civil engineer extrinsic and intrinsic career success, the casual relationship between social capitals has not been fully explored. This descriptive study aimed to analyze the degree to which social capital predicted civil engineer career success towards designing career path. Career success was assumed compromise extrinsic (fringe benefits and promotions) and intrinsic (career satisfaction, job satisfaction and life satisfaction) elements. The individual respondents were selected from the members of Philippine Institute of Civil Engineers using purposive sampling. It utilized validated researcher-made questionnaire, unstructured interview, and documentary analysis as its data gathering instruments. The data gathered were treated using frequency and percentage count, weighted mean, and multiple regressions analysis. The level of significance was set at 0.05 as probability basis for decision**

***Index Terms*—Career path, extrinsic success, intrinsic success, social capital.**

I. Introduction

Since time immemorial, human beings have been engaged in building all kinds of edifices from Banawe Rice Terraces made of mud to Great Pyramid of Giza. As civilizations matured, it simultaneously led to the development of bigger, better and diverse structures from cave dwellings, human beings had moved on to construct houses, high rise buildings, skyscrapers, palaces, canals, dams and highways. These civilian structures played a significant role in the development of human race and gave various dimensions to human life as various activities evolved: social, political, economic and recreational.

The range and application of civil engineering is the broadest and the most visible [1]. In fact, the entire infrastructural framework of a modern nation is the creation of Civil engineers. The credit of building mighty power plants, dams, airports, sea ports, highways, inland waterways and industrial plants goes to civil engineers [1]. . As the need for more increases, the focus on the diversity of individuals participating in Civil engineer jobs is highlighted. The initiatives and programs have been established to recruit a more diverse labor force, the under representation persists. In an effort to address the problem of underrepresented populations in the Civil engineer workforce, it is necessary to evaluate the situation from a variety of angles and views. Social capital is a multi-dimensional concept that emphasizes both the quality and structure of social relationships [2]. Social capital among workers in the organization has been attributed to career success due to increased access to information, resources, and sponsorship [2]-[3]. One of the ways that social capital can be gained is through participation in networks [3]. Overall, the benefits or advantages gained through the networking process are attributed to an increase in access to and sharing of information.

To become successful in a Civil engineer career, researchers need to identify the status of Civil engineers in terms of social capital, determine the level of career success of civil engineer in terms of extrinsic and intrinsic success, identify the factors predict the extrinsic and intrinsic success and, designed career paths which serve as a guide for young Civil engineers to be successful that will help them to manage their career in the near future. The aim of this research is to achieve these four objectives by an empirical analysis of a specific component of data.

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II. Literature Review

A. Career Success

Career Success is defined as the positive psychological outcomes or achievements one has accumulated as a result of experiences over the span of working life [3]. Moreover, career success is extrinsic and intrinsic outcomes or achievements individuals have accumulated from their work experiences [4]. Extrinsic success (fringe benefits & promotions) is directly observable, measurable and verifiable by an impartial third party, while the intrinsic success (career satisfaction, job satisfaction and life satisfaction) is only experienced directly by the person engaged in her or his career [3]-[4]. Thus, extrinsic success is defined by verifiable attainments, such as pay, promotions and occupational status, which have long been considered the hallmarks of career success across a wide range of societies [5].

B. Social Capital

Social capital can be seen as an important asset for creating and maintaining clients for construction companies, robust organizations, and vibrant civil societies. In an organization, social capital refers to features of a social organization such as information, trust, and norms of reciprocity inherent in one's social networks that can facilitate coordinated actions.

In social capital terms, both network structure and quality of relationships are thought to be important in achieving various outcomes. Social networks can be categorized into three types [5]-[6]. The first type of social network is "informal ties", which include relationships with members of household, family, friends, neighbors, and workmates [6]. The second type is "generalized relationships", which are community based, and "societal" relationships people have

with people they do not know personally, including local people, people in general, and people in civic groups [6]. The third type of social network is "institutional relationships", which are the ties individuals have with institutions including the legal system, the police, the media, unions, governments, political parties, universities, and the corporate world [6]. Hence, engaged in networking itself might lead one to perceive one's career as successful because of one's active engagement in improving level of knowledge and expertise and self-perceived increase in commitment to career. People with rich social capital are paid better, promoted faster, and promoted at younger ages. In the study of Holland, he discovered that social capital in the form of entrepreneurial opportunities yields these rewards [7]. Entrepreneurial opportunities arise when a network contains many "structural holes" or gaps. A structural holes means a person is linked with two other people who are no themselves directly connected.

Networks and professional linkages play a vital role in improving technical skills of one's profession. There are six (6) technical skills learned from networks and professional linkages. These are: creativity and an innovative approach to solving problems; ability to analyze and interpret complex data; ability to evaluate designs, plans and projects; effective assessment and management of risk, resources and time; highly developed numeracy and computer literacy; and clear written and oral communication skills [8].

Role models and mentors found to be the greatest positive social influence [9]. Research has indicated that the presence or absence of role models may affect a man's work status, persistence in science and engineering and career success [10]. Civil engineers defined role model as someone in greater authority in whom they saw things that were strong that they wanted to emulate and who played an important role in their careers [10]. Role models demonstrated valued behavior. The lack of role models in non-traditional professionals and senior level administrative positions as a significant barrier to career development impeding from pursuing nontraditional careers "unpublished" [11]. There are eleven (11) employability skills and aptitudes learned from a mentor. These are: flexibility, adaptability and the capacity to cope with and manage change, self-motivation and drive, analytical ability and decision making, communication and interpersonal skills, team working abilities and skills, organization, planning and prioritization abilities, ability to innovate, mental and physical resilience, leadership ability, managing long term projects, and time management "unpublished" [12].

The first key concept of social capital is social trust. Social trust can be viewed as the product that is nurtured through social relationships [10], [12] .The most effective groups and organizations are those with the highest level of trust or social capital [12]. There are many benefits for organizations with high levels of social capital, one of which is lower turnover rates, which suggests higher job satisfaction among employees. On the other hand, from a social network perspective, social capital exists in the relationships between and among persons and extends even more when the position one occupies in the social network constitutes a valuable resource [12]. This perspective was founded on a premise that a network provides value to its members by allowing them access to the social resources embedded within the network [9], [11].The amount of social capital possessed is determined by whether individuals can occupy an advantageous network where they get tied to others who possess desirable resources, such as information and financial support, in order to achieve positive work-related and career outcomes [11]. Hence, network is necessary for social capital, because it represents opportunities to gain access to and interact with others. Managers with more social capital are promoted faster than those with less social capital [12]. Social capital is also positively related to promotions and career satisfaction [13]. Social capital is more subtle and less tangible than other forms of capital that can have intrinsic value, such as good relationships, friendships, and cooperation among colleagues that can be valued for their own sake and beyond their instrumental importance as factors of production [13]-[14].

Many books and articles in the practitioner literature suggest that networking behaviors, such as going for out for drinks to discuss business matters informally, attending conferences, or staying in contact with former colleagues, are essential to career success. Similarly, scholarly research has shown that networking is positively related to objective and subjective measures of career success [9], [12]. Networking is also associated with favorable performance ratings and may be a viable job search [12]. Networking behaviors are used to build and maintain informal contacts that enhance career success [12].

The lack of social capital and access to resources and information may result in a decrease in upward mobility, turnover, and career satisfaction [12]-[13]. These factors can be detrimental to maintaining employees and specifically a diverse workforce

C. Fringe Benefits and Promotions

Fringe benefits and promotions are the most widely used and readily accessible indicators of extrinsic career success [13]. These extrinsic measures can have the substantial benefits of being readily available from existing records, standardized at least within firms, and efficient to collect. They are free from self-serving and common-method variance, if collected by means other than self-support. They are valued by many engineers and executives [14]. Promotion refers to increase in job level of Civil engineer. They are promoted because of their experience and background, personality traits (creativity & loyalty), hardworking and performance history [13].

D. Career Satisfaction and Job Satisfaction

Career satisfaction and job satisfaction both relates to happiness with one's work life, but contributes to contentment in separate ways [16]. Career satisfaction defined as the level of overall happiness experienced through one's choice of occupations. Job satisfaction relates to one's current work conditions, job location, and other dynamic influences [14]. Job satisfaction level is attained if the finished project and in accordance to his expectation .If the end product/building is not what he envisioned it to be, then there's no satisfaction at all. Civil engineering attracts a broad range of people because it offers so much profession

and draws on a whole range of artistic and scientific talents [14]. As Civil engineer, he is involved in seeing through a project from design stage to construction and completion. These projects include the development and construction of bridges, tunnels, roads, railways, dams, pipelines, and major buildings. One reason that young engineers give for choosing civil engineering is 'variety of responsibilities. Civil engineer might be in the office, working on designs at a computer or ensuring the client kept up to date. He could be on site, leading teams, solving problems, and literally being 'hands-on'.

Surveys show that civil engineer's career has a high degree of job satisfaction with 71% being satisfied with their employer and 75% being satisfied with their present role [14]. This could also mean that there are international and managerial opportunities and have extra benefits that will push up the value of his package which include bonus, a company car, life insurance, overtime pay, and medical care which make structural engineering a very appealing profession.

Moreover, career satisfaction was measured with the five-item scale developed by Greenhaus which appears to be the best measure available in the literature [15].

Greenhaus (1990) reported an acceptable level of internal consistency for this scale is 0.88; and job satisfaction was measured by the Minnesota Satisfaction Questionnaire (MSQ) generates satisfaction scores for 20 facets [15]-[16]. The facets are ability, achievement, activity, advancement, authority, company policies and practices, compensation, co-workers, creativity, independence, moral values, recognition, responsibility, security, social service, supervision-human relations, supervision-technical, variety, and working conditions [16]. The Minnesota Satisfaction Questionnaire has an acceptable level of internal consistency for this scale is 0.91 [15].

E. Life Satisfaction

Life satisfaction attributes engagement or having ones mental and /or physical capabilities deeply occupied by work, hobbies, or family activities is a component of happiness and individuals need to combine mental, emotional and social engagement or personal engagement to go beyond job satisfaction and career satisfaction [17].

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 [18].

Life satisfaction was measured with Life Scale measure 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 [17]-[18].

III. Hypotheses

The following hypotheses were tested in the study:

Ho1: There is no significant relationship between the factors of career success in terms of social capital and level of career success of Civil engineers.

Ho2: None of the following factors such as mentor, network and professional linkages predict the extrinsic and intrinsic career success of civil engineers.

IV. Research Design and Instrumentation

A. Research Design

The study used both inferential and descriptive method of research with questionnaires as the main data-gathering instrument. The subjects of this study were the companies located in the Philippines where vertical and horizontal structures projects are in progress.

Purposive sampling was utilized in order to determine the participation of the knowledgeable employees only by considering those who meet the five criteria. The criteria are (1) Registered Civil engineer; (2) Minimum of fifteen to twenty (15-20) years of work experience in construction companies since graduation; and (3) Member of the Philippine Institute of Civil Engineers. The respondents were purposively selected and have included 500 Civil engineers who are members of Philippine Institute of Civil Engineers.

B. Instrumentations

The major tool for data gathering was the questionnaire. The questionnaire was divided into 2 parts. The first part dwelt on the status of civil engineers in terms of social capital. The second part focused on the level of career success of civil engineer in terms of fringe benefits, promotions, career satisfaction job satisfaction and life satisfaction.

Extrinsic career success was measured through four two distinct variables: Fringe benefits (salary benefits salary advance, Christmas bonus/other special hours, housing allowance/house rent subsidy, retirement benefits(gratuities & pensions) and disability retirement; and Promotion(basis of promotion and present position).

To further ensure the validity of the questionnaire, the researcher read various books regarding institutional relations and corporate values in order to develop appropriate questions and choices. Likewise, the researchers also repeatedly went to the prospective respondents and asked them about the possible questions that could be asked in relation to the research topic.

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 researchers give appropriate responses to the objectives of this study.

V. Findings

A. Profile of Civil Engineers by Social Capital

1) Network and professional linkages

Respondents perception that the level of confidence to

demonstrates technical skills gained from networks and professional linkages have an over-all mean of 3.66 which is "Very High (VH)". Each technical skill gained from networks and professional linkages shown in Table I have a mean between 3.49 and 3.69. This means that civil engineers are very much interested in the technical skills gained from networks and professional linkages.

TABLE I: MEAN RESPONSES OF CIVIL ENGINEERS ON TECHNICAL SKILLS GAINED FROM NETWORK AND PROFESSIONAL LINKAGES

Networks and Professional Linkages	Mean	Interpretation
1. Creativity and an innovative approach to solving problems	3.64	VH
2. Ability to analyze and interpret complex data	3.60	VH
3. Ability to evaluate designs, plans and projects.	3.64	VH
4. Effective assessment and management of risk, resources and time.	3.60	VH
5. Highly developed numeracy and computer literacy.	3.69	VH
6. Clear written and oral communication skills.	3.49	VH
Over-all mean	3.66	VH

2) Mentor

Respondents' perception that the level of confidence to demonstrate employability skills and aptitude learned from a mentor have an over-all mean of 3.71 which is "Very High (VH)". Each employability skill and aptitudes learned from a mentor shown in Table II have a mean between 3.65 and 3.77. Most mentors who have high employability skills and aptitudes are role models of Civil engineers.

TABLE II: MEAN RESPONSES OF CIVIL ENGINEERS ON EMPLOYABILITY SKILLS LEARNED FROM A MENTOR

Mentor	Mean	Interpretation
1. Flexibility to cope with and manage change.	3.69	VH
2. Self-motivation and drive.	3.71	VH
3. Analytical ability and decision making.	3.67	VH
4. Communication and interpersonal skills.	3.71	VH
5. Team working abilities and skills.	3.72	VH
6. Organization and planning abilities	3.71	VH
7. Ability to innovate.	3.71	VH
8. Mental and physical resilience.	3.65	VH
9. Leadership ability.	3.73	VH
10. Managing long term projects.	3.71	VH
11. Time Management		
Over-all mean		

B. Level of Career Success

1) Fringe benefits

Respondents were given two or more choices to indicate fringe benefits received from the company for the last two years. As shown in the Fig. 1, more than half of the respondents received Christmas bonus/other special bonus (77.3%), housing allowance/house rent subsidy (68.2%) and salary advance (61.8%).Therefore, the level of the fringe benefits received by Civil engineers is highly competitive compared with other professions

TABLE III: PERCENTAGE DISTRIBUTION OF CIVIL ENGINEERS BY FRINGE BENEFITS

Fringe benefits	Percentage
1. Salary advance	61.8
2. Christmas bonus/other special bonus	77.3
3. Housing allowance/house rent subsidy	68.2
4. Retirement benefits-gratuities, pensions.	44.5
5. Death benefits	30.9
6. Disability retirement	30

2) Promotions

As shown in Fig. 1, Civil engineers are promoted because of their personality traits (33.6%), work experiences (32.7%), hardwork (24.5%) and performance history (9.1%).

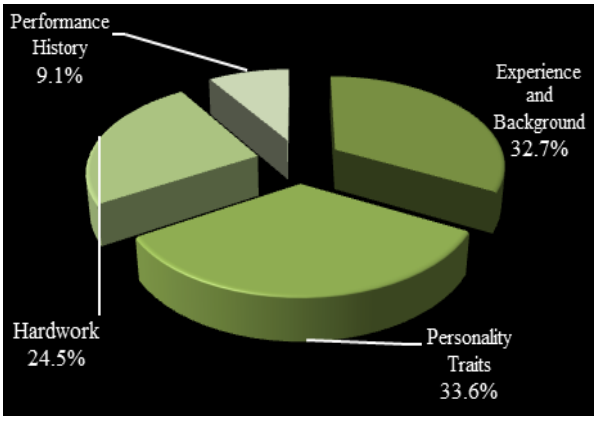

Fig. 1. Percentage of civil engineers personality traits by promotions

As shown in Fig. 2, the positions of the Civil engineers are: Construction Manager (28.2%), Project Engineer (29.1%), Project Manager (27.3%) and Vice President (15.5%). Therefore, majority of administrative level in construction industries are occupied by structural engineers and most of them are promoted because of their very high positive personality traits, experience and backgrounds.

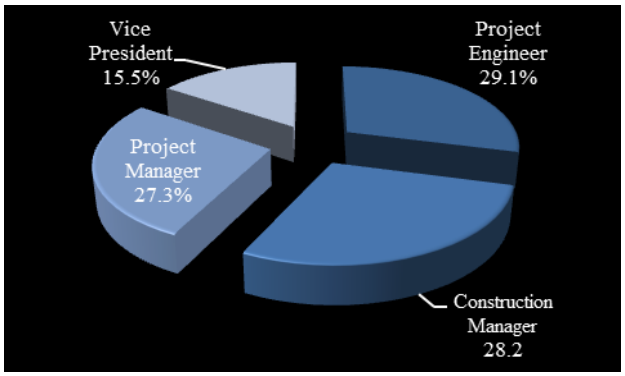

Fig. 2. Percentage of civil engineers positions by promotions

3) Career satisfaction

As shown in Table Ⅳ, respondents' perception that Civil engineers "Strongly Agree (SA)" that they are satisfied with their career with a mean composite response of 3.83. In general, the level of career success for civil engineers in terms of career satisfaction was very satisfied.

4) Job satisfaction

As shown in Table 4, respondents' perception that Civil engineers "Strongly Agree (SA)" that they are satisfied with their career with a mean composite response of 3.86. Therefore, the level of career success for civil engineers in

terms of career satisfaction was very satisfied.

TABLE IV (A): MEAN RESPONSES OF CIVIL ENGINEERS BY CAREER SATISFACTION

Career Satisfaction	Mean	Interpretation
1. I am satisfied with the progress I have achieved in my career.	4.00	SA
2. I am satisfied with the progress I have made toward meeting my overall career goals.	3.78	SA
3. I am satisfied with the progress I have made toward meeting my goals for income	3.70	SA
4. I am satisfied with the progress I have made toward meeting my goals for advancement	3.71	SA
5. I am satisfied with the progress I have made toward meeting for the development of new skills	3.94	SA
Composite mean	3.79	SA

TABLE IV (B): MEAN RESPONSES OF CIVIL ENGINEERS BY JOB SATISFACTION

Job Satisfaction	Mean	Interpretation
1. I am satisfied being able to keep busy all the time	3.85	SA
2. I am satisfied to work alone on the job	3.98	SA
3. I am satisfied to do different things from time to time	3.77	SA
4. I am satisfied to be somebody in the community	3.85	SA
5. I am satisfied the way my boss handles his/her workers	3.85	SA
6. I am satisfied with the competence of my supervisor	3.81	SA
7. I am satisfied to do things that don't go against my conscience	3.77	SA
8. I am satisfied the way my job provides for steady employment	3.79	SA
9. I am satisfied to do things for other people	3.93	SA
10. I am satisfied to tell people what to do	3.86	SA
11. I am satisfied to do something that makes use of my abilities	3.89	SA
12. I am satisfied the way company policies are put practice	3.86	SA
13. I am satisfied with my pay and the amount of work I do	3.89	SA
14. I am satisfied with the advancement on this job	3.85	SA
15. I am satisfied with the freedom to use my own judgment	3.85	SA
16. I am satisfied to try my own methods of doing the job	3.95	SA
17. I Am satisfied with the working conditions	3.91	SA
18. I am satisfied with the way my co-workers get along each other	3.84	SA
19. I am satisfied with the praise I get for doing a good job	3.86	SA
20. I am satisfied with the feeling of accomplishment in my job	3.89	SA
Composite mean	3.89	SA

5) Life Satisfaction

As shown in Table V, respondents' perception that Civil engineers "Strongly Agree (SA)" that they are satisfied with their life with a mean composite response of 3.80. In general, the level of career success for Civil engineers in terms of life satisfaction was very satisfied.

TABLE V: MEAN RESPONSES OF CIVIL ENGINEERS BY LIFE SATISFACTION

Life Satisfaction	Mean	Interpretation
1. In most ways my life is close to my ideal	3.75	SA
2. The condition of my life is excellent.	3.79	SA
3. I am satisfied with my life	3.83	SA
4. I have gotten the important things I want in my life.	3.88	SA
5. If I could live my life over, I would change almost nothing.	3.75	SA
Composite mean	3.80	SA

VI. PREDICTORS OF CAREER SUCCESS

The multivariate regressions predicting fringe benefits, promotion, career satisfaction, job satisfaction and life satisfaction are provided in Table VI. As the table indicates, each set of hypothesized variables (mentor, network and professional linkage) explained a significant variance in career success.

Variables such as fringe benefits, promotion, career satisfaction, job satisfaction and life satisfaction and have obtained R^2 0.001, 0.114, 0.151, 0.169 and 0.145 to network and professional linkage and computed significant values of promotion, career satisfaction, job satisfaction and life satisfaction are below at 0.05 level, the Ho1 is rejected indicated significant variance to network and professional linkages.

TABLE VI: PREDICTORS OF CAREER SUCCESS

Social Capital	Career Success	Beta	R^2	Sig.
Mentor	Fringe benefits	0.005	0.000	0.962
	Promotion	-0.054	0	0.615
	Career Satisfaction	0.468	0.005	0.000
	Job Satisfaction	0.096	5	0.318
	Life Satisfaction	0.022	0.219	0.820
			0.009	
			0.003	
Networks and Professional linkage	Fringe Benefits	0.025	0.001	0.798
	Promotion	0.069	1	0.042
	Career Satisfaction	0.227	0.114	0.017
	Job Satisfaction	0.263	4	0.006
	Life Satisfaction	-0.213	0.151	0.026
			1	
			0.169	
			0.145	

Moreover, fringe benefits, promotion, career satisfaction, job satisfaction and life satisfaction have obtained R^2 0.962, 0.615, 0.000, 0.318 and 0.820 to mentor and computed significant value of career satisfaction is below at 0.05 level. The finding shows that career satisfaction is significant variance to mentor.

It could be inferred that mentor can best predict intrinsic success in terms of career satisfaction. On the other hand network and professional linkage can best predict extrinsic success in terms of promotion.

VII. Career Path for Civil Engineers

Most people who graduate with civil engineering degrees start with jobs that require a low level responsibility, and as the new engineers prove their competence, they are trusted with tasks that have larger consequences and require a higher level of responsibility. However, within each branch of civil engineering career path options vary. In some fields and firms, entry-level engineers are put to work primarily monitoring construction in the field, serving as the "eyes and ears" of senior design engineers; while in other areas, entry-level engineers perform the more routine tasks of analysis or design and interpretation. Experienced engineers generally do more complex analysis or design work, or management of more complex design projects, or management of other engineers, or into specialized consulting, including forensic investigation.

A. Industry

The researchers suggest a career path for Civil engineers who are in industry shown in Fig. 3. Civil engineers who work diverse settings including manufacturing, technology, pharmaceuticals, public facilities and services to the public. They manage large plants, oversee the design/construction facilities, and obtain critical environmental, construction, and operating permits facilities, and obtain critical environmental, construction, and operating permits

Fig. 3. Career path of Civil engineers in industry

Civil engineers are instrumental in new ventures requiring environmental site assessments and feasibility studies. They make significant contributions to decrease costs, increase profits, and produce smaller environmental footprints by developing more efficient processes, implementing waste minimization programs, and finding creative solutions to a wide range of issues.

B. Construction

As shown in Fig. 4, the researchers suggest a career path for civil engineers who are in construction companies. In construction, civil engineers may work for a contractor to create the built environment, transforming engineering and architectural design drawings from paper to reality.

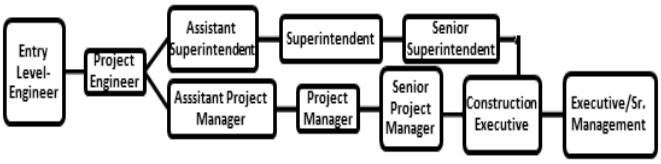

Fig. 4. Career path of Civil engineers in construction

VIII. Conclusion

The most objectively successful Civil engineer appears to be one who has technical and employability skills learned from mentor, network and professional linkages. From the perspective of an individual who aspires to be a successful civil engineer, it appears that high social capital pay off. However, given the comparability in results between the extrinsic career success, career satisfaction, job satisfaction and life satisfaction, the network and professional linkages also contribute to civil engineer promotion and intrinsic success. On the other hand, mentor can best predict intrinsic success in terms of career satisfaction

To help the academe in the recruitment of Civil engineer, the school administrator must partner with industry organizations, construction companies and volunteer organizations in recruiting youth into the construction industry. They should educate and partner with counselors in local school districts to bring the field of civil engineering as an option to high school and highlight the many different aspects of the construction industry as viable career paths.

To attract students in the field of civil engineering, the academe must develop mentoring program for students and help students build support networks before they graduate. They should introduce students to role models in industry and show them that Structural engineers are succeeding in construction industry. Further, the academe should provide students on job training program which serve as foundation for future career in structural engineering

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