Walden University

COLLEGE OF MANAGEMENT AND TECHNOLOGY

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Venkatarao Edara

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Abstract

Factors That Impact Software Project Success in Offshore Information Technology (IT) Companies

by

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MBA, Webster University, 2001

BS, Institution of Mechanical Engineers (India), 1995

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Applied Management and Decision Sciences

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Abstract

Information technology (IT) projects are unsuccessful at a rate of 65% to 75% per year, in spite of employing the latest technologies and training employees. Although many studies have been conducted on project successes in U.S. companies, there is a lack of research studying the impact of various factors on software project success in offshore IT companies. The purpose of this quantitative study was to better understand the impact of various factors on software project success in offshore IT companies. The various factors examined were host country, highest degree earned by software team members, duration of the project, the software development life cycle (SDLC) methodology used, team structure, and the compensation of the team members. The study drew on resource-based, resource dependence, and person-organization fit theories. The research questions for the study examined (a) the relationship between various factors and software project success, and (b) the degree of association between various factors and software project success in offshore IT companies. Data were collected through a web-based survey from 163 experienced IT professionals working for an offshore IT company in India. The quantitative study employed an independent sample t-test, paired sample t-tests, Pearson correlation coefficient analysis, and multiple regression analysis for data analysis. Results of this study revealed that there is statistically significant association between software project success and various factors except host country. This study contributes to positive social change by identifying the impact of various factors on software project success in offshore IT companies, thus helping the project managers, programmers, and human resource (HR) managers of IT companies, and by contributing to the possible increase in software projects success rate.

Dedication

This dissertation is dedicated to my spiritual Master Shri. Parthasarathi Rajagopalachari, President of Shri Rama Chandra Mission (SRCM). I would like to take this opportunity to thank my Revered Master for all his love and blessings.

I also want to thank my research committee chair and members for their guidance and continuous support.

I want to thank my grandma Punnamma and my parents Anjaneyulu and Singamma, who always made my education one of their top priorities and who taught me to never ever give up. I am especially grateful to my dear wife Bhargavi, who strongly motivated me to finish this dissertation and stood by me during long and difficult days. I want to thank my twin boys Raghav and Rajiv and my adorable daughter Vaishnavi for bearing with my late nights of work and researching on weekends. I want to thank my brothers Venkat Seshu and Sudhakar Rao for their extended support and encouragement.

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Chapter 1: Introduction to the Study

The concept and practice of outsourcing information technology (IT) is no longer unusual to industry leaders in various sectors. In general, outsourcing denotes “make-or-buy” decisions. The IT outsourcing toward offshore countries such as India and China has been registering growth rates of more than 30% for the last 4 years (Seddon, Cullen, & Willcocks, 2007). IT outsourcing has become essential for companies who want to stay competitive in the global market. Several Fortune 500 companies, for example, have outsourced projects worth billions of dollars to offshore IT companies located in countries such as China, India, and the Philippines.

One of these companies, J. P. Morgan Chase, announced a $5 billion IT outsourcing deal in 2002 with International Business Machines (IBM; Skillings, 2002). In 2006, Electronic Data Systems (EDS) secured a 3-year contract worth $3.1 billion for IT outsourcing and technology services rendered to the United States Navy and Marine Corps Intranet (Gibson, 2006). IBM won an IT outsourcing deal from the Australian Customs Services worth AUD$160 million (US$140 million) in 2007 (IBM signs 5 year deal, 2007). The Belgian government announced a 2008 contract worth approximately EUR 582 million (US$831 million) to EDS-Telindus, the largest outsourcing contract awarded to date from Belgium (Manufacturing Business Technology, 2008). Wipro Infotech, one of the major offshore IT outsourcing providers in India, recently secured a 9-year outsourcing contract from telecom services provider Aircel in one of Asia’s largest outsourcing deals (“Wipro Infotech Bags,” 2008). This data shows that outsourcing is happening across industries, and the importance of offshore IT companies in outsourcing.

A survey from Duke University's Offshoring Research Network and Pricewaterhouse Coopers, 514 IT outsourcing service providers in 50 countries found that the IT outsourcing industry is metamorphosing due to the growth of new entrants in the IT outsourcing arena; however, more than 68% of outsourcing deals in 2008 were renewed at the expiration of the first contract, down from 72% in 2007 (PricewaterhouseCoopers, 2010). Based on their 2005 survey, Global Insight, a private consulting firm, estimated that U.S. firms will spend about $38.2 billion in offshore IT services in 2010, in contrast to about $15.2 billion in 2005, because of the expected cost savings of hiring offshore companies. According to market researcher DataMonitor (2009), the size of the global IT industry in 2008 was US$303.8 billion, an increase of 6.5% compared to 2007.

DataMonitor (2009) has estimated that the global software market will grow to about US$457 billion by the year 2013, an increase of 50.5% since 2008. The global software industry and the IT-enabled services (ITES) market around the world are estimated to be worth US$1,300 billion, and 90% of the world's exports in software are from the United States and Europe (The global software industry, 2005). One common problem, identified among many IT projects, occurs whenever new technologies and software development methodologies are introduced as the project is underway (Havenstein, 2007). McKeen and Smith (2003) categorized IT project risks into various categories, such as financial risk, technology risk, security risk, information risk, people risk, business process risk, management risk, and external risk. According to Schwalbe (2007), technological changes combined with changes in business processes are causing an irregular shift in cost, the cost-benefit relationship, and the feasibility of doing specific things in particular ways.

IT projects face a number of challenges such as constantly changing work environments, work overload, and political motives. These challenges can create conditions that lead to IT projects fail to meet all the end users' specifications (Haas, 2006). Hoecht and Trott (2006) named various levels of risks in the outsourcing of IT projects and related operations. Project risks include the compromising of technologies for the sake of costs, lack of skilled resources in IT, scope risks related to requirements clarity, poor definition and documentation of requirements, account management risks, and poor mitigation plans for the risks—all of which contribute to IT projects that fail to meet all the end users' expectations (Tesch, Kloppenborg, & Frolick, 2007). Although the IT outsourcing industry is large and has a presence all over the world, no significant research has been done to examine the influence of various factors such as host country, highest degree earned by software team members, duration of the project, software development life cycle (SDLC) methodology used, team structure, and the compensation of the team members on the success of offshore IT projects.

Research conducted by the Standish Group (1995) has shown that an astonishing 31.1% of projects will be cancelled before they ever get completed. Further results indicate that 52.7% of projects will cost 189% of their initial cost estimates. IT projects are complex and flexible, which causes difficulties in managing them. To a great extent, the performance of the projects depends on this complexity and flexibility (G. Lee, 2003). The findings of this study will be useful to all IT outsourcing businesses across the globe, as they can use the findings of this study to understand how various factors, such as host country, highest degree earned by software team members, duration of the project, SDLC methodology used, team structure, and the compensation of the team members, impact software project success in offshore IT companies.

Background of the Problem

In today's globalized economy, many organizations are focusing on IT to improve profit margins, remain competitive, and increase shareholder value. To cut down on the costs, many organizations are outsourcing their IT work to offshore IT companies in countries such as India, China, the Philippines, and Ireland. Competing in today's globalized market has become very important in the current quality- and standards-driven IT market (Leung, 2003). These companies also recognize the need to understand the cultural differences that exist between different offshore countries, which enables them to increase their overall business functioning (Roberts, Kossek, & Ozeki, 1998). The fastest growing industry in offshore countries such as India, China, and the Philippines is IT (Hartman & Ashrafi, 2002). According to Brewer (2005), every year the number of IT projects increases, producing a demand for more IT professionals in different areas such as software analysis, design, development, testing, and implementation.

Moving IT work to offshore countries such as India and China not only offers cost savings but also has become essential for companies to maintain their competitive edge over other companies in the current business environment, which is progressively dependent on IT projects (Vijayan & Hoffman, 2002). IT projects that fail to meet all the required specifications impact many stakeholders such as the project sponsoring organizations, the project development organizations, business users, society at large, and the individual project team members. Organizations in the United States spent about $100 billion on IT projects that were not successful (Dalcher, 2003). Many projects that implement new technologies are envisioned to go beyond planned or estimated costs (Davis, 2005).

Statement of the Problem

Many IT projects are not finished on time, within budget, or within scope, leading to cost overruns, schedule slippages, and missed business opportunities (Standish Group, 2004). The Standish Group (as cited in Frese & Sauter, 2003) categorized IT projects as (a) successful projects—projects completed on time and within budget, with all features as specified; (b) challenged projects—projects completed, but over budget, behind schedule, and/or lacking all of the features that were originally specified; or (c) failed or impaired projects—projects that are abandoned or cancelled at some point and became total losses. Schneider (2009) stated that projects in the IT industry are more likely to fail than other types of projects, such as building construction projects. Schneider explained that some of the causes for IT projects that failed to meet all user specifications were application of speedily changing technologies, their longer project durations, and the volatility of business requirements. Because IT projects generally include all or some of these characteristics, they are likely to be seriously challenged and, in many cases, not successful. The problem addressed in this research was the impact of various factors on software project success in offshore IT companies.

The leadership style of IT project managers plays an important role in the success of a software project (LeBlanc, 2008). Many companies have recognized that to succeed in a globalized economy they need to understand and leverage the ethnic differences that exist between different countries and states in a way that helps them to increase their profits (Roberts et al., 1998). These companies have also realized that cultural differences play a pivotal role in the performance of offshore IT project team members (Robbins, 2003). The success of an IT project depends on the ability of team members to clearly understand user requirements and translate them into a product that meets all the documented and agreed upon requirements and is on schedule and within budget (Walsh, 2005). According to the 2004 Standish Group CHAOS report (Hartmann, 2006), globally only 29% of the IT projects succeeded and 71% of the projects are not successful in meeting the project variables like quality, time, and scope (Hartmann, 2006; Tesch et al., 2007).

According to a study released in 2002 and commissioned by the Department of Commerce's National Institute of Standards and Technology (NIST), buggy software costs users and vendors nearly $60B annually (Thibodeau, 2002). Although many studies have focused on finding out the causes of project success and failure (Shenhar, Tishler, Dvir, Lipovetsky, & Lechler, 2002, p. 111), "there has been little attempt in the past to define the criteria for success" (Wateridge, 1998, p. 59). Some of the studies showed that emotional intelligence (EI) played an important role in productivity and job satisfaction (Jordan, Ashkenazi, Hurtle, & Hooper, 2002; Mallinger & Banks, 2003). IT outsourcing offers many benefits to an organization. Some of the benefits are cost reduction, access to new skills or technologies, guaranteed service levels, and 24-hour continuity of IT development (King, 2005; Mathew, 2006).

Although the benefits of outsourcing cannot be denied, it has its own risks and challenges. Some of the risks associated with IT outsourcing are project data security, staff dissatisfaction, loss of control on the project deadlines and project resources, hidden costs, poor quality, rework, and loss of productivity (N. Brooks, 2006; Kakumanu & Portanova, 2006; Mathew, 2006). Some other risks associated with IT outsourcing are: dependence on the supplier, hidden costs of software development, loss of competencies, inefficiencies of the vendor in risks mitigation and meeting project deadlines, social risks, and poor communications management.

According to Overby (2007), there is also the risk of an outsourced partner being acquired or merging with competitors, resulting in disruption of the outsourced IT projects or services. According to International Data Corporation (2007), IT outsourcing emerged as the largest IT services segment in 2007. My study is important because leaders in organizations are increasingly looking toward IT outsourcing as a means for improving their company's competitiveness and profit margins and increasing shareholder value (King, 2005; Mathew, 2006). However, no significant research has been undertaken to assess the influence of various factors on software project success in offshore IT companies.

Nature of the Study

The nature of this quantitative study involved determining the association between various factors, such as those mentioned above, and software project success in offshore IT companies. The survey was hosted on the SurveyMonkey.com website and a link to the survey was sent to all the respondents. These IT professionals have various levels of IT skills and experience, and they work on a variety of IT projects such as software development, testing, maintenance, migration, web applications, operating systems, web pages, and network tools and utilities. Past research has utilized both qualitative and quantitative methods for assessing the impact of factors such as project managers' leadership style and managers' depth of technical IT knowledge on software project success.

Quantitative research studies are inferential, concentrated, and results oriented (Creswell, 2005). A quantitative approach was undertaken in this study because the intention was to study the impact of various factors on software project success in offshore IT projects. Research survey questions were used for measuring the impact of various factors on software project success in offshore IT projects. Survey participants were selected from an offshore IT company located in India that has more than 2,000 employees who offer IT services to clients across the globe and execute projects using a variety of technologies in different domains. Customers of the projects that survey participants were working in were not involved in the survey. Survey participants used only company resources and not customer resources to respond to the survey. The company has been in the IT services and consulting business for more than 12 years and is distinguished as one of the top companies in the IT industry. It is a for-profit offshore IT company employing IT professionals.

Research Questions

A series of research questions that focused on the impact of various factors on software project success in offshore IT companies guided this study. Through this research project, I aimed to determine whether, to what extent, and in what manner, software project success depends on the following factors: host country, highest degree earned by software team members, duration of the project, SDLC methodology used, team structure, and the compensation of the team members in offshore IT companies. The overarching research questions (RQ) devised for this study were as follows:

1. What is the relationship, if any, between various factors and software project success in offshore IT companies?
2. To what degree is there an influence between various factors and software project success in offshore IT companies?

Recognizing the relation between various factors and software project success in offshore IT companies may furnish a reading of how various factors stand in terms of value and grandness. Insight into the importance of various factors that affect software project success provides senior management with the information they need to improve factors that affirm project success.

Hypotheses

The following hypotheses were used to test the impact of various factors on software project success in offshore IT companies. The null hypotheses for the quantitative analysis of research questions in this study were as follows:

Hypothesis 1: The software project success is independent of the host country where the IT project is developed.

Hypothesis 2: The software project success is independent of the highest degree earned by team members involved in the projects developed at the offshore IT companies.

Hypothesis 3: The software project success is independent of the duration of the project that is developed in offshore IT companies.

Hypothesis 4: The software project success is independent of the SDLC methodology used in developing projects in offshore IT companies.

Hypothesis 5: The software project success is independent of the team structure that is used in developing projects in offshore IT companies.

Hypothesis 6: The software project success is independent of the compensation of team members involved in developing projects in offshore IT companies.

Variables of the Study

There are six independent variables and one dependent variable in this study.

Independent Variables

The independent variables in this study are:

Host country, highest degree earned by software team members, duration of the project, SDLC methodology used, team structure, and the compensation of team members.

Dependent Variable

The dependent variable of this study is software project success, defined as on-time delivery, project completion within budget and within scope. Figure 1 shows a conceptual framework of possible values for dependent and independent variables.

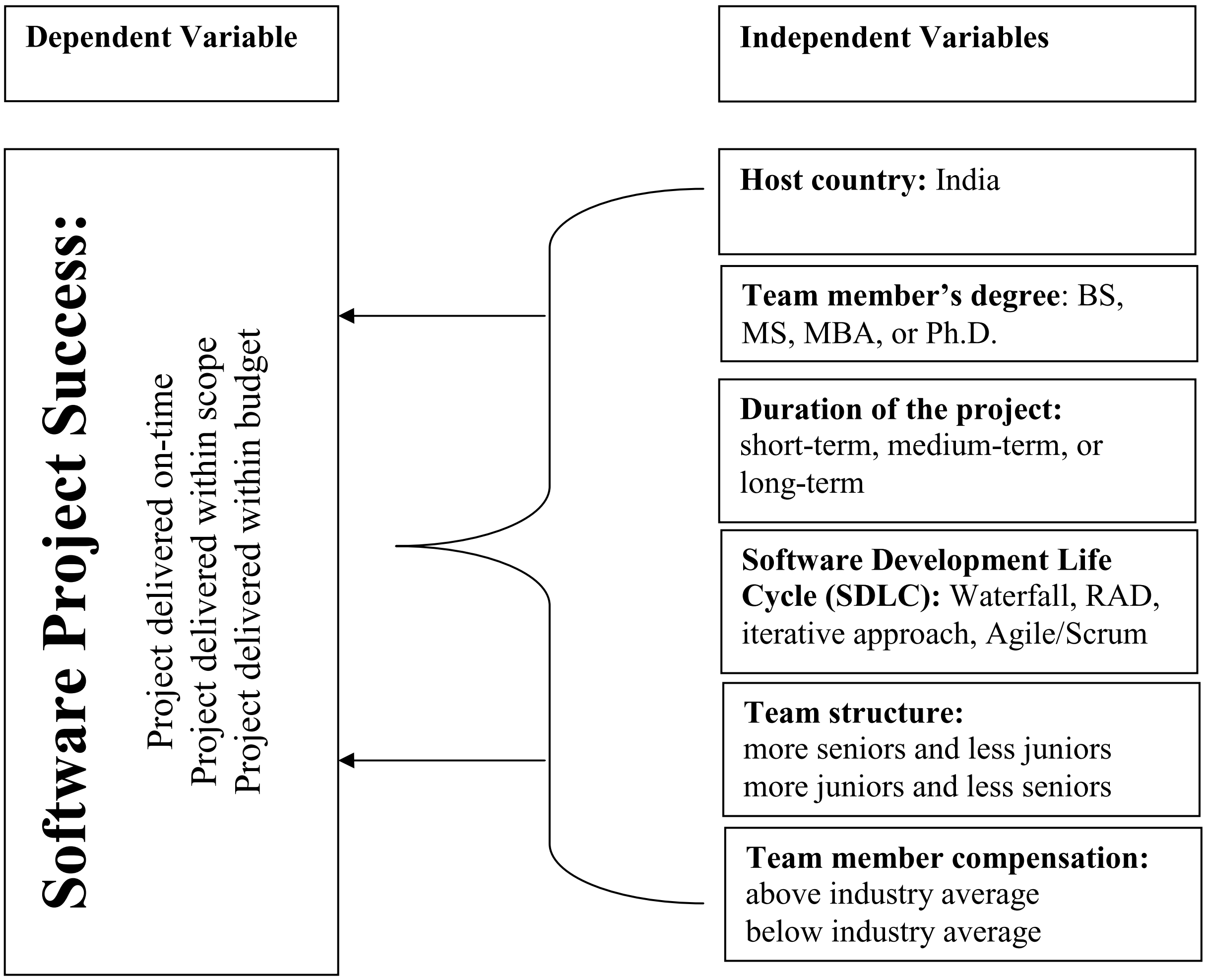

Figure 1. A conceptual framework of possible values for dependent and independent variables.

Purpose of the Study

The purpose of this study was to ascertain the role of various factors in the success of IT projects in offshore IT companies. Project success may be assessed by different stockholders such as project sponsors, business development managers, customers, employees, project manager, and team members. Therefore, criteria for measuring project success must reflect the views of different stakeholders (Stuckenbruck, 1986). According to Clegg et al. (1997), only 10% to 20% of IT investments (including both IT projects and other investments such as business process operations) met their required goals—that is, IT investments failed to deliver in 80% to 90% of the cases.

The primary reasons organizations offshore IT work are cost savings due to decreased labor costs and continuity of software development due to time differences between home and offshore locations (Corbett, 2005; Ellram, Tate, & Billington, 2008; Farrell, 2004). However, according to several studies, many of the organizations that have outsourced IT projects and services and business processes have failed to generate the expected financial benefits (Aron & Singh, 2005). Hourly billing rates for IT workers in China, India, and other offshore locations are reportedly 35% to 65% lower than they are in the United States (Pfannenstein & Tsai, 2004). According to McKinsey & Company, about 50% of IT outsourcing deals fail to achieve their expected value (Craig & Willmott, 2005).

Further, an industry report by Gartner Group in 2005 established that approximately 80% of all IT outsourcing contracts require renegotiation due to various factors such as technological changes and fluctuating currency values. Baccarini (1999) identified two distinct components of project success: project management success—focuses on the successful accomplishment of cost, time, and quality objectives and also counts the way in which the project management process was conducted— and product success—deals with the project's final product. This study contributes to a better quantitative understanding of how various factors impact software project success in offshore IT companies.

Theoretical Framework and Conceptual Foundation

Theoretical support for this study was drawn from resource-based, resource dependence, and person-organization fit theories. A theoretical framework furnishes a synopsis for coordinating findings and outcomes in a consistent way while using deductive and inductive analyses. Research promotes an understanding of a particular domain in any given field of study (Neuman, 2003). In the current globalized economy, IT companies are under a great deal of pressure to do things more cheaply and better than their competitors (Thamhain, 2004). Project managers are selected and deputed to a project and are entrusted with the responsibility of delivering the project on time and within budget (Sense, 2007). According to Baccarini (1999), project success is defined as: Project success = project management success + project product success.

The resource-based theory has been an important step in management. According to the resource-based theory, a firm's success is due to its resources and capabilities. The resource-based theory is pertinent to understand software project success (Doh, 2005). Two important assumptions that form the base for resource-based theory are (a) resources and capabilities are heterogeneous among firms, and (b) resources and capabilities are often unique to a firm (Ang & Inkpen, 2008).

Person-organization fit theory proposes that shared values between individuals and companies lead to employee job satisfaction. Factors such as the degree and timing of participation provide a competitive advantage and achieve project success (Lin & Tseng, 2006).

Resource dependence (RD) theory is based on the notion that organizations are dependent on talented and scarce resources for success. RD theory also believed that a firm's strategic success was determined by the environment. The resource dependence theory explains that although organizations face intense pressure to find scarce resources, their successes are dependent upon having reliable, efficient, skilled, dedicated, and committed resources.

The current research contributes to earlier research in the fields of project management, IT outsourcing to offshore locations, and software project success. Understanding the impact of various factors on software project success in offshore IT projects provides project managers and senior managers of client organizations and offshore companies the information they need to select and focus on factors that improve the software project success rate.

Significance of the Study

According to the Standish Group CHAOS report (Hartmann, 2006), published in 2004, about 29% of IT projects succeed and 71% are not successful in meeting project goals with respect to functionality, cost, and schedule (Hartmann, 2006; Tesch et al., 2007). The majority of the projects that failed to meet all the required specifications fall into categories of either cost or schedule overruns. It has been suggested that most IT project disasters are avoidable (Heekens, 2002). Many times, warning signs are obvious long before an IT project begins to fail to meet all the required specifications, but proper action is not taken to prevent the project from failing to meet all the end users' specifications. Previous research on the impacts of offshore developers' skill set on software development project success focused only on adherence to requirements and on-time delivery aspects (Elkhoury, 2007). My study is among the first to concentrate on the impacts of various factors on software project success in offshore IT companies.

Previous studies by LeBlanc (2008), Elkhoury (2007), Ozbay (2009), and Kendrick (2009) focused on the relationships between project success and other variables like project manager personality type, software developer skill sets, and distributed development. Thus far, there is a gap in the literature on the impacts of various factors on software project success in offshore IT companies. This study contributes to the body of knowledge on software project success in offshore IT companies by quantitatively evaluating various factors for how they impact software project success in offshore IT companies. The research findings were based on the answers to the research questions. The significance of this study lies in the fact that its results help offshore IT outsourcing companies and senior management understand the relative importance of various factors for how they impact software project success.

Some offshore IT companies follow a team structure of having more juniors and fewer seniors involved in the IT projects to increase profitability, but in the end, project success was impacted because of the imbalance in the team's experience level. By understanding the importance of various factors, senior management can plan new organizational policies such as standardizing team structures, using particular SDLCs, and adhering to certain compensations policies that increase software project success rates at the organizational level. A higher project success rate results in more customer satisfaction and increased revenues and profitability for the organization. This study adds to the current research on the impacts of factors that influence project management and software project success. By understanding the relative importance of the factors that impact software project success, project managers, team members, and other stakeholders of IT projects can spend more time and resources implementing the important factors. In today's IT world, project managers have many SDLCs at their disposal.

This study helps the project management community know which SDLC and what type of project duration helps improve project success rates. The findings of this study could have a significant effect on decisions that project managers and senior management make with respect to Information Systems Management (ISM)-related projects and other initiatives. In turn, an improved project success rate in ISM would most likely lead to greater customer satisfaction, a higher return on investments for IT initiatives, increased compensations to employees, and job satisfaction. Increased investment in IT-related projects and a higher project success rate contributes to the betterment of society and bring about positive social change. An increase in project success rates result in the outsourcing of more IT projects to offshore locations, which will contribute to improving the economies of developing countries.

Definitions of Terms

The following definitions are operationally employed in this study.

Information technology (IT): includes all aspects of managing and processing information via a computer (Information Technology, n.d.).

Information technology (IT) or software projects: projects involving computer software, hardware, database management, telecommunications, and networks and information processing technologies (Schwalbe, 2004).

IT professionals: individuals in a studied information technology occupation (IT Professionals, 1992).

IT projects: modules of work that apply information technologies inside the given cost and time restraints and provide business benefits (Bennington & Baccarini, 2004).

IT project success: a set of user requirements, both functional and non-functional, that are finished on schedule, within the cost and within scope constraints and is used by its purported users; success helps improve organizational goals and enhance efficiency or effectiveness (Karlsen, Andersen, Birkely, & Odegard, 2005; Nelson, 2006).

Not successful IT projects: projects that did not meet customer requirements, quality requirements, or have cost or schedule overruns (Oz & Sosik, 2000; Standish Group, 2004).

Offshore company: the vendor company that executes software projects for clients and is located in a country other than the client location.

On-time: refers to the length of time it takes for the project to be completed (Project Management Institute [PMI], 2004; Schwalbe, 2004).

Outsourcing: the turning over of IT functions to a service provider for a specified period of time, generally at least a few years. Outsourcing can occur between two U.S. companies or between a U.S. company and a company in another country (Pfannenstein & Tsai, 2004).

Programmer: an individual who writes programs or code (i.e., a list of instructions executed by a computer) (Programmer, n.d.).

Project team member or team member: "the person who reports directly or indirectly to the project manager, and who performs assigned tasks or works as a part of his or her assigned duties" (PMI, 2004, p. 371).

Software project success: is defined as the measurement of the overall project objectives or goals (Cookie-Davies, 2002), which include functional and non-functional requirements, cost, schedule, and quality (Calabrese, 2006).

Stakeholders: the end-users or clients, the people from whom requirements will be drawn, the people who will influence the design, and, ultimately, the people who will reap the benefits of your completed project.

Assumptions

This research study was guided by the following assumptions:

1. The study assumes that all respondents to the eSurvey answered all questions candidly. The responses provided to the survey questions properly reflect participants' views.
2. Respondents to the survey might have been motivated to present their company in a positive way and might not have been as candid in their

responses with regards to various factors that influence software project success.

3. Confidentiality helped survey respondents to answer questions without fear of reprisal.

4. This study is time-bound. For the sake of this research study, I assumed that the types of projects studied were similar in all other offshore companies. The cross section of skill sets, education level of team members, and project types presented by the study participants were the foundation for accepting and generalizing the findings of this research study.

Limitations and Delimitations

The following limitations and delimitations were applicable to this study.

Limitations

The limitations of the current research study are implicit in the chosen research methodology, research design, theoretical framework, and perspectives of the researcher.

1. This study was limited to one of the offshore IT companies located in India, and the population examined will be comparatively small relative to all employees of offshore IT companies.
2. The limitation on sample size restricted the scope of statistical analysis.
3. Another limitation of the study was that not all factors affecting software project success, other than the specific factors included in the study, were considered.

4. The software project success data used for data analysis were based on projects that were being developed for U.S. clients, so the results may not be directly applicable to international clients such as those in Japan and Europe.
5. A research study focused on a project that followed a SDLC methodology from the beginning until the end would have been beneficial but constraints on time and cost did not let us perform such a study.

Delimitations

1. The first delimitation of the current research was that surveying IT professionals from one of the offshore IT companies in India.
2. The data collected in India were not a representative of all IT projects for all offshore locations.
3. The offshore IT company identified as a sample in the survey was not a precise representation of all offshore IT companies located in countries such as China, India, and the Philippines.
4. This study did not attempt to highlight the impact of various factors on software project success in on-shore locations.
5. Finally, this study focused on the specified factors that may influence the success of offshore IT projects. It did not focus on other factors that may affect software project success.

Social Change Implications

The social change implications of this study are linked to my ability to explicate the relationship between various factors and the success of offshore IT software projects. Understanding the link between various factors and software project success can help senior management or decision makers of organizations to determine what factors they need to focus on to improve the software project success rate. The study also has significance to the project management community, client organizations, and offshore IT companies. Information about what factors impact software project success help companies to minimize the software projects that fail to meet all the required specifications.

Understanding the association between various factors and software project success could help offshore IT companies polish their policies and make better decisions regarding software projects. Ultimately, this study forms a basis for additional research that incorporates the factors that could improve software project success in offshore locations such as China, India, Philippines, and the Singapore. This study also provides a framework for analyzing other factors such as the international exposure of project managers and team members and client cooperation and involvement in the project.

Chapter Summary and Organization of the Study

This chapter has highlighted the importance of understanding the impacts of various factors on software project success in offshore IT companies. The need for this understanding is more critical during this time of economic recession because client organizations are tightening their IT budgets and they want to see software project success rates improve. This chapter has also provided the conceptual framework that was used to analyze the impacts of various factors on software project success in offshore IT companies. The organization of this dissertation follows the background and problem statements highlighted in this chapter. The study proceeds as follows. In chapter 2, I review the relevant literature on software project success and SDLC, IT project management, IT outsourcing to offshore locations, and IT project successes and projects failed to meet all the required specifications.

In addition, I discussed previous studies on project management styles and software programmers' skill sets and their impact on software project success. Chapter 3 addresses the research method that was used in this study, which includes the research design and data set that were employed to analyze the impact of various factors on software project success in offshore IT projects. In chapter 4, the data and empirical analysis are presented, with the aim of answering the research questions posed in chapter 1. Chapter 4 also includes statistical data that I used to determine the acceptance or rejection of the null hypotheses put forth in this study. Finally, Chapter 5 summarizes the entire study and its findings. In addition, I discuss the study's limitations as well as its implications for positive social change. Chapter 5 also provides recommendations for the practical application of the findings as well as suggestions for future research.

Chapter 2: Literature Review

Literature reviews supply significant information for the process of research validation and act as a basis for the research (Creswell, 2005). Dissertations, articles, journals, and books were used for this literature review. In this chapter, the literature on software development life cycles (SDLCs), project management, project life cycle, software project success, IT project successes, and IT projects that failed to meet all the required specifications are described and examined. To provide a basis for this discussion, I begin with an examination of SDLCs, IT project management, IT outsourcing to offshore locations, success factors for IT projects, IT project success conditions, IT project successes, and IT projects that failed to meet all the required specifications. The key words explored were *software project success, IT outsourcing, software development life cycles, offshoring, success factors for IT projects, and project manager technical knowledge.*

In today's globalized economy, information technology has become a critical component of the infrastructure of many organizations (Huang & Ho, 2007). Governments and organizations across the globe have become progressively more dependent on IT and outsourcing to remain competitive; as a result, organizations across all industries are making investments in IT (Bennington & Baccarini, 2004). The IT industry is gaining a negative reputation for its project management because of the complexities in managing IT projects within the given constraints, such as scope, cost, schedule, and quality (Calisir & Gumussoy, 2005; Sauer, Liu, & Johnston, 2001).

The purpose of this quantitative study was to ascertain the impacts of various factors on the software project success of offshore IT projects. One of the key elements of project success lies in selecting able team members and a project manager (Crawford, 2005). According to recent studies, IT projects fail at a high rate because of improper project planning and the misalignment of project goals with organizational goals (Kagerman, 2005). Books, articles, theses, and dissertations published between 2004 and 2009 played a pivotal role in the current study by providing a basis for understanding prior research on IT outsourcing to offshore locations, project management, software development, and software project success.

My review of the literature uncovered an important gap in the literature pertaining to the impacts of various factors on software project success in offshore IT companies. Turner and Müller's (2006) research found that there was an association between project success and type of project executed but they did not examine the relationship between the various factors I am testing and software project success in offshore IT companies. Software has become a crucial instrument in the daily business operations of organizations. As organizations grow, the need increases for more and more software applications to automate business processes and operations, to reduce the products or services costs, and to increase the profits and shareholder value (Schneider, Von Hunnius, & Basili, 2002).

In performing this literature review, the following sources and databases were utilized: peer-reviewed articles, dissertations, and theses from the online sources of the Walden University, namely, EBSCO Databases, Gale Databases, ProQuest Databases, and ProQuest Digital Dissertations; and articles, dissertations, and theses from Google Scholar. A PMI membership allowed access to articles related to project management and project success. The peer-reviewed articles about project success, outsourcing, offshore IT development, and project management are 5 or more years old. Present-day studies (less than 6 years old) were also examined to understand the most recent thoughts and analysis on project success. The bulk of research studies used are from 2004 to 2009.

Review of Project Success Research

Scores of research projects and articles focused on software project success and its connection with various tools and techniques of project management exist in the literature (Hyväri, 2006; Jugdev & Müller, 2005; Turner & Müller, 2006). What is evident from this literature is that project team members and managers are trained in using the diverse tools and technologies necessary for IT projects and still IT projects are failing to meet all the required specifications 55% to 75% of the time (PMI, 2004). IT projects have continued to fail even after researchers publishing documentation about technologies, project management tools, leadership styles, SDLC methodologies, and quality standards applicable to the IT industry (Mahaney & Lederer, 2006). Elkhoury (2007) confirmed that project success was dependent on offshore software developer skill sets that included English proficiency.

Literature Review of Various Factors and Project Success

The literature review of this study is focused on Software Development Life Cycle (SDLC) methodology, IT outsourcing to offshore locations, project management, project life cycle, IT project management, software project success, success factors for IT projects, IT project successes and projects that failed to meet all the required specifications, and review of literature gaps and research methods.

Software Development Life Cycle (SDLC)

Researchers who examined the phases that an IT project needs to follow and sorted them into models created what is called the SDLC. An SDLC involves the operation of developing and maintaining a software application through a step-by-step process. The process starts with the user requirements analysis and goes through design, development, testing, implementation, and maintenance (Lederer & Prasad, 2000). According to Grubb and Takang (2003), there are many SDLC methodologies available, and the commonly used ones are the waterfall model, rapid application development (RAD), and the iterative model.

Different IT projects use different SDLC methodologies based on the client and user requirements. How diligently an SDLC methodology is implemented plays an important role in the success of a software project (Palshikar, 2001). The popularity of the waterfall model is due to the fact that the planning phase comes at the beginning of SDLC (Royce, 1970). The waterfall model is also well suited for a project in which the user requirements are well known and do not change (Kotonya & Somerville, 1998). Royce (1970) has stated that the waterfall model consists of the following stages:

1. System requirements stage: defines hardware requirements, database, and networks.

2. Software requirements stage: defines functional and nonfunctional requirements of the software application to be developed.

3. Architectural design stage: specifies a framework for the software application.

4. Detailed design stage: architectural design is divided into sub-designs, which covers all components of the application.

5. Coding stage: software code is written for all the modules based on the detailed design documents and unit testing is completed by the end of this stage.

6. Testing stage: application is tested for defects. Various types of testing are performed, such as system testing, integration testing, and performance testing.

7. Maintenance stage: post-release defects are addressed and enhancements are made at this stage.

The RAD methodology was developed as a response to the waterfall model. RAD employs an incremental approach to developing a software application quickly (McConnell, 1996). The RAD model is made up of the following four phases:

1. Requirements planning: identifies business scenarios and workflows.
2. User design: defines all the business activities, user input screens, reports, and the software development approach.
3. Rapid construction: defines detailed designs, unit, system testing, and data migration. System is validated against user requirements.
4. Transition: involves software project implementation, end user training, and user acceptance testing.

IT companies make an effort to employ people with the best talent at the minimum cost. IT projects require team work and require all the team members who may be located at different locations to work in collaboration. Common roles involved in a typical IT project are architect, business analyst or subject matter expert, project manager, technical manager, project lead, developer, and tester. Subject matter experts assist in resolving business domain related queries (Tomayko & Hazzan, 2004). According to Watkins (2001), IT projects that follow iterative software development life cycles put great emphasis on interaction among all team members or roles.

IT Outsourcing to Offshore Locations

The offshore model is when business organizations outsource their IT projects to a different country or location (Anandasivam, 2000). For IT companies, personnel cost is the highest among all other fixed costs and in order to reduce this cost, they outsource IT work to offshore locations such as India and China where highly educated, English-speaking workers are available at low wages. However, outsourcing requires constant communication between clients and offshore IT companies in terms of the business processes followed, the team members employed in the project, a variety of issues and risks, and risk mitigation plans, business continuity plans, data backups, updates on project scope, cost, and schedule. According to Lever (1997), research shows that some of the reasons companies elect to outsource IT work to offshore companies are easy availability of skilled resources at a decreased cost, and improved productivity.

IT outsourcing allows organizations to concentrate on their principal business strengths and helps create employment opportunities in the developing world. In the IT arena, outsourcing has also become necessary because of a lack of required skilled resources. Organizations can get substantial benefits by outsourcing their IT projects to offshore locations (Rossi & Schuller, 2006). All organizations aim to increase their profitability and shareholders' value, and this can be achieved with reduced employee wages and by improving employee productivity by offshoring IT work.

To a large extent, employee performance is dependent on employee motivation. Robbins (2003) specified motivation as a process that explains an individual's strength and tenacity of effort for accomplishing their goals. In the offshore model, great stress is laid on designing jobs that motivate offshore teams. Work and life balance also play an important role in job satisfaction. Team members and project managers of IT projects are largely impacted by the mental and behavioral indications of stress. Stress may come because of long work hours, tight project schedules, fear of losing the job, and project issues and risks. Stress has a great impact on decision-making processes, productivity, and work efficiency. Good time management practices could help reduce stress through properly planning the work and executing or implementing the work.

Project Management

Engineering and construction industries have been using project management for a long time. Since 1960, those industries have made project management a discipline centered on project planning, scheduling, resource and cost estimating, and budgeting (Crawford, 2006; Leybourne, 2007). The establishment of the Project Management Institute (PMI) in 1969 distinguished project management as a profession (Shenhar & Dvir, 2007). The PMI is an international organization that works toward furthering project management as a profession (Henrie & Sousa-Poza, 2005). PMI started extending Project Management Professional certification beginning in 1984 (Calabrese, 2006; PMI, 2004). The Project Management Body of Knowledge is known as the *PMBOK Guide* (PMI, 2004). The *PMBOK Guide* consists of nine knowledge areas and 44 processes.

Projects are unique and temporary, while operations are ongoing and repetitive. Over time, project management helped organizations to focus on customer satisfaction by adding new project tools and techniques. As a profession, project management has been growing and many new industries have started realizing the benefits of implementing project management (Crawford, Pollack, & England, 2006). Project management slowly began diversifying into other fields such as Information Technology (IT), education and business management, and operations research (Cicmil & Hodgson, 2006). Later, project management flourished in other areas such as project leadership and team work (Leybourne, 2007).

As the project management literature proceeded to develop, an academic direction started to emerge with respect to project management (Leybourne, 2007). The Project Management Institute (PMI) recognized the need for greater research on factors impacting software project success (Scott-Young & Samson, 2008). During the 1960s, only a minute part of the literature pertained to project management, and after 10 years project management areas such as Work Breakdown Structure (WBS) and project management tools and techniques gained popularity in various industries and became about 8% of the literature related to project management. During the 1990s, the focus on project management increased and the percentage of published articles on project management increased to 62%.

As per the literature, following are some of the reasons for project management: it helps in new product launches and decreases the time to market, and, as Nicholas (1990) has explained, present day projects involve the latest technologies and require a diverse skill set from multiple professions. Each IT project is unparalleled and so is the approach for managing it. According to Balachandra and Friar (1997), classes of success factors for a project management framework are technology and the market; however, the priority of success factors changes depending on the type of innovation, market, and technology.

Crawford et al. (2006) conducted a study that focused on understanding project management trends between 1995 and 2003. The review of project management in this study is relevant to current issues in project management. In this study, the researchers discovered that during the 1990s, project management journals covered quality management, issue and risk management, and time management more than other topics. During the 2000s, more emphasis was put upon relationships and resource management. Project management is a utile tool for carrying out organizational strategies and it eases the transfer of knowledge from one project to another at the organizational level (Byosiere & Luethge, 2007).

Kolltveit, Karlsen, and Grønhaug (2007) performed a content analysis study on the project management literature from 1985 to 2004. They discovered that during the 1980s the project management literature centered on tasks, and during the early 2000s, it focused on leadership. Turner and Müller (2005, 2006) have shown that much of the published literature pertaining to project management concentrated on processes associated with project management more than the people involved in the projects.

During the early 2000s, it was found that on-time delivery of agreed-upon functional requirements within budget were the main project success factors. Turner and Müller (2006) found in their quantitative and qualitative study that there was an association between software project success and type of project and the PM's leadership style. The PMI (2004) has developed project management measures, enhanced Project Management Professional (PMP) training programs, and introduced new certification programs related to program and project management at different levels.

Crawford (2005) determined in his quantitative study that the competence of project managers was not dependent on increased project management knowledge, and there was no significant association between workplace performance standards and the functioning of the project manager. Project managers handle professionals such as engineers and they report to senior management. They are responsible for the delivery of the product of the project on time and within budget. Project managers need to have a variety of skills such as technical, negotiation, communication, and managerial. Their hiring decisions are based on this skill set (Petter & Vaishnavi, 2008; Turner & Müller, 2006). Project managers and other team members need to have good communication skills, as communication plays an important role in software project success (Parker & Skitmore, 2005). Behavioral skills are also important for project managers and training may need to be obtained on that front (Kendra & Taplin, 2004).

One of the important assets of an offshore company is people (Bell, 2006). The skills of project managers contribute toward a project's success (Hauschildt, 2000). Cheng and Dainty (2005) found in their quantitative study that the behavioral competencies of project managers and team members, such as taking initiative in the project or organizational activities, meeting client needs, and being adaptable at work, contribute a lot toward project success. Gorla and Lam (2004) discovered that team members with intuitive skills performed better than their peers. Da Cunha and Greathead (2007) also determined that team members who were more intuitive performed well in code and peer reviews.

Project Life Cycle

Organizations apportion projects into phases for better management and control. Project life cycle is defined as the phases that projects go through from inception to completion. The project life cycle is significant because it helps in identifying and coordinating project work (Levine, 2002). In order to plan and manage IT projects effectively, project managers need to comprehend project life cycles and their associated activities (Taylor, 2004). Lerouge and Davis (1999) categorized the project phases as initiation, planning, execution, monitoring, and closing. Cleland and Kocaoglu (1981) mentioned that planning is a very important phase for project life cycle success. The next priority is change management and conflict management, both of which play an important role in managing projects.

At the end of each project phase, deliverables or work products are reviewed and key decisions are made regarding whether to continue the project through more phases (American Management Association [AMA], 2006; Kerzner, 2000; PMI, 2000; Taylor, 2004). According to the *PMBOK Guide*, Fourth Edition, all project management activities and processes are categorized into nine knowledge areas, namely: project integration management, scope management, time management, cost management, quality management, human resources management, communications management, risk management, and procurement management. In the literature about project management, it has been mentioned that there is a relationship between project success and maturity of the project management processes. Labuschagne, Brent, and Claasen (2005) instituted a project life cycle with these phases: feasibility, development, testing, implementation, and post-implementation review. Byosiere and Luethege (2007) suggested a model with conceptualization, planning, execution, and termination phases. Peterson (2007) employed a life cycle with initiation, planning, execution, control, closing, and follow-up phases.

Information Technology Project Management

In today's globalized economy, most of the projects initiated by many organizations involve IT systems that consist of discrete types of projects (Karlsen et al., 2005). IT involves software, hardware, and networks, as well as the consolidation of these subsystems into a whole, operational, and usable system that provides business value to customers (Taylor, 2004). Taylor (2004) reasoned that the essential project management tools are the same irrespective of the industry where project management is employed. IT projects utilize many technologies and employ people with different skill sets, which necessitates project managers having technical and management expertise (Johnstone, Huff, & Hope, 2006).

Most of this literature focused on software aspects of IT and overlooked IT as a single system. Lee-Kelley and Leong (2003) have said that project management has developed from its engineering management beginnings into a cross-disciplinary professional method. They also mentioned that project managers need to have a blend of hard and soft skills in order to effectively manage IT projects.

Organizational project management maturity model (OPM3). The OPM3 comprises three components: knowledge, assessment, and improvement. OPM3 is a database of critical success factors (CSFs). The knowledge component concentrates on project management at the organizational level. The assessment factor focuses on the power to execute an assessment of project management maturity at the organizational level. The improvement component helps organizations improve project management activities. The main objective of OPM3 is to improve project management maturity.

Project management tools. Project management tools enable us to better implement project management processes. Pinto and Slevin (1989) have said that project management tools help in supplying project tracking and monitoring information, which in turn are handy for taking corrective actions. According to Meredith and Mantel (2000), the Work Breakdown Structure (WBS) is a project management tool that splits a project into hierarchical units of tasks and packages. The Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are tools that are helpful for project scheduling and estimating project durations.

Project metrics. Katzenbach (2003) posited that organizations use metrics for different purposes, one of which is to motivate employees. Project managers use metrics to track and monitor purpose and to see if the project is on track with respect to the project plan. Key metrics that assist in project tracking are earned value (EV), schedule variance (SV), cost variance (CV), schedule performance index (SPI), and cost performance index (CPI). Metrics help in evaluating project progress.

Software projects. F. P. Brooks (1987) posited that software projects are more complex to manage than hardware development projects because of the underlying complications involved in developing and managing software projects. Some of the complexities inherent in software projects are: ever-changing requirements, new technologies, compatibility with other interfacing applications and technologies, uniqueness of projects, and incomplete requirements. Hoch, Roeding, Purkert, and Lindner (1999) have stated that results of software projects are intangible. Maidantchik and Rocha (2002) found that a well established and well-handled software development process helps in improving quality. The primary benefit of software development process standardization is greater visibility of the project; thereby, managing the project will become easier. Ambler and Constantine (2000) reasoned that instituting a software process helps an organization in the following ways:

1. Helps project managers make the right decisions with regard to tools and techniques in a way that aligns with organizational goals.
2. Organizations can channel the successful strategies and processes of one project to other projects with little effort.

3. Organizations can standardize software processes such as code walkthroughs, peer reviews, and change and configuration management for all projects across the organization.

Software Project Success

Scholars have been struggling to agree on a definition of project success (Karlsen et al., 2005; Mahaney & Lederer, 2006). Project success and project management success are two discrete facets of success. Collins and Baccarini (2004) remarked that project success constitutes project management success. Project management success and product success together form project success (Andersen, 2006). Collins and Baccarini (2004) found in their quantitative and qualitative study that project success covers more than just schedule, cost, and quality factors. O'Connor and Yang (2004) learned in their study that there was a firm association between project success and the technology factor and little relationship between project success and the cost factor. Howard (2001) reasoned that productivity was enhanced by choosing the right project team members which in turn helped in improving the success rate of IT projects. Sometimes project success was measured on the basis of the technical merit of the project with little to no concern for the business processes knowledge, its customers, or end users (Kerzner, 2000).

The other problem is that stakeholder' views of project success areas are different from project managers. Hyväri (2006) discovered in a qualitative and descriptive study that frequent client involvement in the project and user acceptance of the project are the crucial factors in determining the project's success. Agarwal and Rathod (2006) determined in their exploratory research that scope, cost, and quality were the important factors for deciding project success. A different management style is required for different projects and team members should be adaptable to all kinds of management styles in order to improve the success rate of IT project (Cheng & Dainty, 2005).

Blahetka (2004) has argued that software project success is evaluated by three major elements: on time delivery of the project, fulfillment of all functional requirements, and quality of the end product. Korrapti and Rapaka (2009) mentioned in their quantitative study that referral sampling would be very useful for reaching out to a variety of users to gather opinions on software project success in offshore IT companies. They also posited that management and the leadership styles of managers play an important role in software project success. For stakeholders such as clients and project and senior managers, the definition of project success is an important factor and plays a pivotal role for IT projects (Mahaney & Lederer, 2006).

Metrics for project success. Project success metrics are described as standards against which projects are measured for judging project success or failure in meeting all the end users' expectations. Sometimes it is difficult to determine project success because of contradictory stakeholder anticipations, the immanent nature of success, and the multifarious nature of success. Baccarini (1999) has argued that success criteria set by dissimilar stakeholders should be prioritized and more attention should be allocated to significant stakeholders. Baccarini (1999) also posited that the project success criteria should be mentioned at the outset of the project itself. This is crucial for keeping all the team members and the project manger focused on the project objectives. Product success is evaluated based on the accomplishment of project goals such as user satisfaction, and project management success is based on the accomplishment of scope, cost, and quality objectives.

Success Factors for IT Projects

Researchers have been trying to determine the success factors for software projects for a very long time. What is meant by success factors for IT projects are the variables or features that when handled properly can have a huge impact on the success of an IT project (Cooke-Davies, 2007). Cooper and Kleinschmidt (1987) have contested that being knowledge of the success factors for IT projects can help in providing recommendations and acumen on managing projects. Most of the project management literature focused on intricacies with respect to scope and cost and time constraints, but very little attention was given to issues related to stakeholder management in IT projects (McNish, 2002; Winklhofer, 2001).

One of the important success factors was having a project champion (Nah and Delgado, 2006). According to Somers and Nelson (2001, p. 2), the top success factor was getting senior management support and involvement. Nah and Delgado (2006) classified the success factors of IT projects into various categories, some of which are: business vision, communications, project team skills, senior management support, and project management. These researchers also found that communication played a pivotal role throughout the project and also between the project team and stakeholders. Pinto and Slevin (1989) also reasoned that the significance and priority of success factors change throughout the lifecycle of an IT project.

Some of the success factors for IT projects are rational estimates of cost and time factors, proper requirement definitions, and user involvement. Senior management dedication, a good communication plan, stakeholder involvement and approvals, team working, risk planning and management, effective project planning, monitoring and tracking, and employing efficient project manager and team members play a key role toward project success. In order for IT projects to be financially successful, the project's return on investment (ROI) must surpass all costs involved in developing the product of the project (Dalcher & Genus, 2003). Marchand and Hykes (2006) conjectured that the common causes for IT projects failed to meet all the end users' expectations, such as ambiguous requirements, complex architecture, and lack of senior management support, may not be the obligating causes.

Key Performance Indicators (KPIs). Bennington and Baccarini (2004) have argued that organizations do not receive the expected benefits of implementing IT projects because there are not required business processes for implementing and handling IT projects. KPIs are "calculable measures that manifest an organization's critical success factors" (N. Brooks, 2006, p. 46). KPIs can be used to evaluate an organization's development toward achieving its goals (Kumaran et al., 2007). N. Brooks (2006) opined that in order to develop substantive KPIs, it is crucial for senior management to understand the organizational long-term and short-term business goals. Epstein and Buhovac (2006) formulated an IT contribution model for securing the antecedents and results of IT success. The researchers reasoned that the IT success of an organization is dependent on inputs such as senior management support. The main benefit of the IT contribution model is formulating metrics.

IT Project Successes and Failures

Interest in understanding the factors that affect software project successes and projects that fail to meet all the end users' specifications is quite understandable given the resources assigned to offshore IT companies. The U.S. spent $85 billion on IT projects that were not successful before the project closing phase because of troubles associated with scope, budget, schedule, and quality (Sauer et al., 2001). Staw and Ross (2005) stated that project managers over-commit on project budgets and schedules, which is one of the causes for projects not successful in meeting all the user requirements.

IT project successes and projects failed to meet all the end users' expectations were thoroughly discussed in the literature (Schmid & Adams, 2008; Mahaney &

Lederer, 2006). Senior managers and project managers need to have more knowledge of project management tools and technologies (Henderson, 2008). Many researchers identified several risk factors that caused IT projects fail to meet all the required specifications (Faraj & Sambamurthy, 2006; Ross, 2004; Roy, Bernier, & Leveille, 2006). Some of those risk factors are: poor estimates, ambiguous requirements, scope creep, no senior management support, and low user involvement.

Another reason for projects that fail to meet all the required specifications is the incorrect assignment of a project manager and the team members to a project with respect to their technology skills (Bucero, 2006). Gorla and Lam (2004) noticed that the personality types of team members and project managers also contribute to projects failing to meet all the user requirements. Lack of control measures such as risk management and project tracking and control were other factors cited that caused projects fail to meet all the required specifications (Rozenes, Vitner, & Spraggett, 2006). The Royal Academy of Engineering (RAE) report observed that the main purpose of many IT projects was to bring about an organizational change. Many IT professionals do not realize the extent to which business is impacted by IT projects (Royal Academy of Engineering [RAE], 2004). A good communication plan helps project managers provide the required information to all stakeholders on time (Henderson, 2008). Gundry and Kickul (2007) proposed that in order to reduce the impact of politics on projects, project managers need to learn how to play the game as quickly as possible. Project manager needs to keep all communication channels open in the project (Verzuh, 2005).

Literature Gaps

Project management in the IT industry is a developing profession and the research done up until now is insufficient for dealing with all the problems the IT industry is facing with respect to project success. More and more IT projects are being outsourced to offshore locations such as India and China and so are the problems associated with managing IT projects. In the project management literature, it is reasoned that project success rates can be improved by using a project management framework (Aronson, 2001). Since each project is unique, the approach to project success will need to be accommodated accordingly. Managing IT projects at offshore locations presents an unparalleled set of conditions that have not yet been explored. Limited research has been conducted on the impacts of various factors on software project success in offshore IT companies.

Review of Research Methods

There are profound variations between quantitative and qualitative research methods. One of the differences is the type of data gathered. In the qualitative type of research method, such as case studies research, the research is based on non-numeric data, and in the quantitative type of research methods, such as experiments, the researcher deals with numeric data (Strauss & Corbin, 1998). The researcher makes generalizations about the population, depending on the data gathered from a sampling (Creswell, 2003). Statistical analysis is done from the data collected in the quantitative methods, and qualitative research methods help in collecting data in a brilliant form of descriptions. As reported by Creswell (1998) and Yin (2003), the choice of research method will depend upon the type of queries that the researcher wants to explain or answer.

The survey method is relevant for gathering data because of the exploratory nature of the software success (Xu, 2005). It was discovered that there was a positive relationship between Project Management Office (PMO) functions and IT project success (Stewart, 2010). According to J. Lee (2009), business owner participation in IT projects led to increased project success. Xu (2005) found out that project teamwork quality and commitment to achieving a project goal had a positive impact on IT project success. Table 1 has details of previous research related to project success in the last 5 years.

Table 1

Previous Research Related to Project Success in the Last 5 Years

Previous research	**Methodology used**	**Type of research**	**Dissertation/peer-reviewed articles**
Elkhoury (2007)		Survey	Dissertation
Harper (2008)	Mixed—Qualitative and quantitative	Correlational and regression analysis	Dissertation
Kaufman & Korrapati (2007)			Peer reviewed article
Kendrick (2009)	Quantitative	Nonexperimental correlational	Dissertation
LeBlanc (2008)	Quantitative	Descriptive, causal-comparative	Dissertation
J. Lee (2009)	Quantitative	Nonexperimental, survey	Dissertation
Ozbay (2009)	Qualitative	Case study	Dissertation
Stewart (2010)	Quantitative	Nonexperimental descriptive	Dissertation
Xu (2005)	Quantitative	Survey	Dissertation

Qualitative research methods are used for answering “why” questions. Yin (2003) indicated that qualitative research methods are useful if the researcher wants to answer how and why questions and if the research study does not need to manipulate variables. The researcher uses structured interviews and observations for data collection in the qualitative research methods. Creswell (1998, p. 16) advised that researchers, using qualitative methods, need to build friendships with and earn the trust of the study population. LeCompte and Schensul (1999, p. 83) indicated that for studying a population or problem whose outcomes are not known, either a case study or ethnography research methods could be used. Researchers continue to argue about which research methodology is better, quantitative or qualitative. A researcher will get an improved understanding of phenomenon in qualitative research. Singleton and Straits (2005) proposed that if the researcher wants to gather information about a large population, then survey research is the best fit. If the researcher wants to study the dependent variable by controlling an independent variable, then an experiment type of research method would be very useful. Leedy and Ormrod (2005) explained that quantitative research methods make use of regular tools and techniques in the process of data collection and analysis.

My research addressed the gap in the literature by studying the impacts of various factors on software project success in offshore IT companies. The literature reviewed has led me to determine that correlational research is the overriding research method I should use to measure the direction and extent to which various factors affect software project success. Using quantitative research methods, many researchers have utilized survey instruments in studies related to project success for investigating participants' responses regarding their education, the SDLC impact on project success, and their views on project success. The current study is a correlational quantitative study to study the impact of various factors on software project success in offshore IT projects.

Chapter Summary

Various studies discussed in this literature review focused on project success, outsourcing, project management, success factors for IT projects, software development life cycles, IT projects that fail to meet all the required specifications, and key performance indicators. This tremendous focus on project success substantiates the claim that there is a problem in the field of IT projects that are outsourced and project success in IT projects. In order to take on the project success at offshore locations, Elkhoury (2007) has recommended studying the impact of various factors on software project success in offshore IT companies. Chapter 2 included a literature review on software development life cycles, IT outsourcing to offshore locations, project management, success factors for IT projects, and IT project successes and projects failed to meet all end users' specifications.

Chapter 3: Methodology

The purpose of this quantitative research study was to examine, using a survey instrument, the impact of various factors on the software project success of offshore IT projects. This chapter presents the sampling design, research hypotheses, data collection, and data analysis applied in the study. Creswell (2005) described quantitative research as "an expression of the association among variables" (p. 45). Quantitative research corroborates the correlation between two or more variables (Leedy & Ormrod, 2005). The quantitative research approach was chosen to examine the association between various factors and software project success, as suggested by Elkhoury (2007).

Software developers are likely to develop a defective application if they do not understand requirements properly and need to spend more time in rework. Creswell (2005) stated that there are three principal research designs for a quantitative research method: experimental, correlational, and survey. Creswell specified *survey design* as research in which researchers "distribute a survey or questionnaire to a small group of people (called the sample) for verifying the trends in behaviors of a large group of people (called the population)" (p. 52). Variables are quantified by utilizing instruments in quantitative research studies (Creswell, 2005). IT projects are still not meeting schedules or budgets even with highly educated human resources and the latest technologies, tools, and techniques (Kutsch & Hall, 2005; Standing et al., 2006). Figure 2 depicts the conceptual model for the study, where the independent variables may affect one or both of the dependent variables.

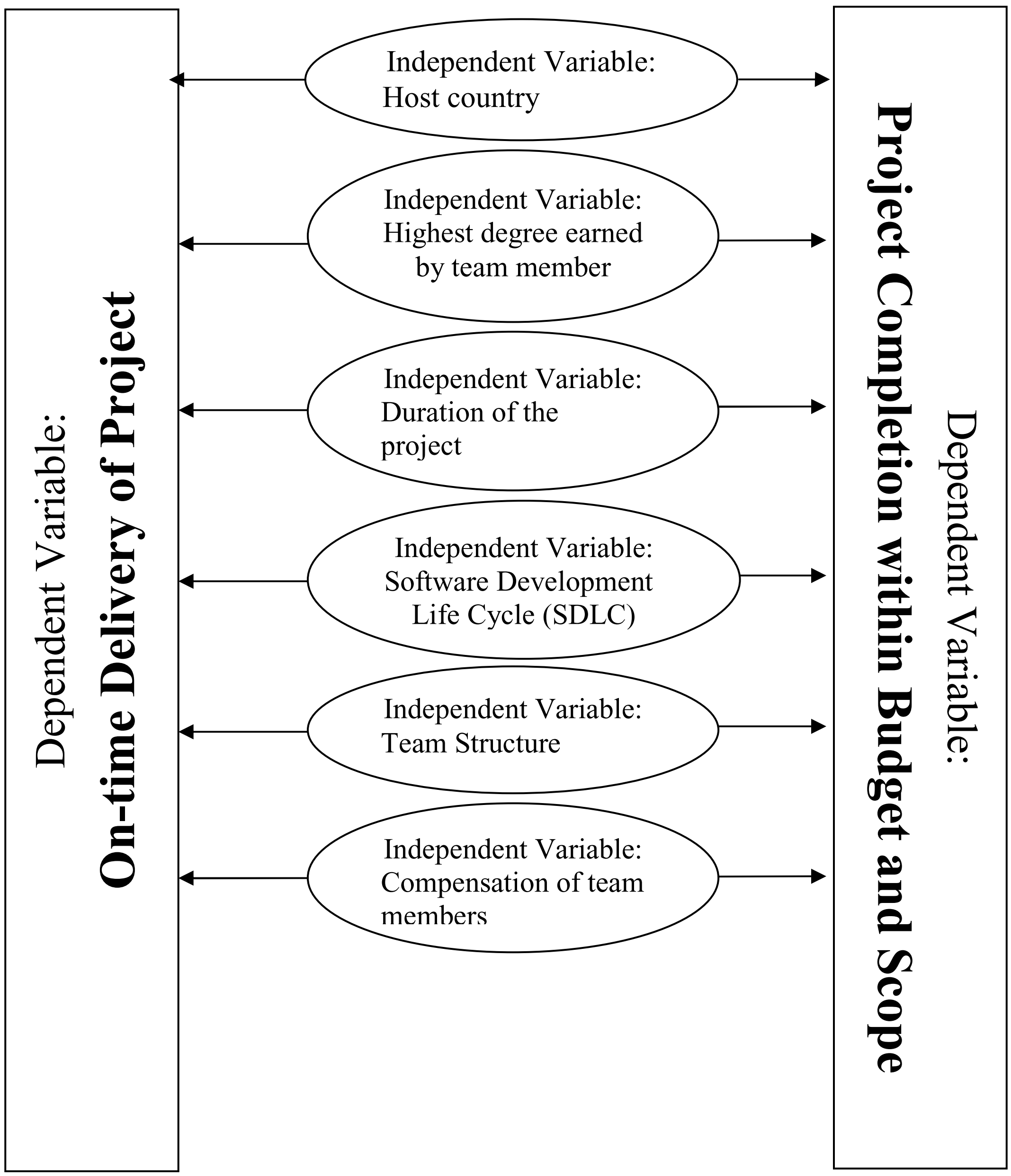

Figure 2. Conceptual model of dependent and independent variables.

Design Selection

For this study, the general population is understood to be the offshore IT companies from different locations such as China, India, the Philippines, and Singapore. The sample population was from an offshore IT company in India that develops different types of IT projects of different duration for clients from around the world. A quantitative approach using a survey instrument was used to find out the impact of various factors on software project success in offshore IT projects. Software project success was measured by interpreting the responses of the participants to the survey questionnaire.

IT projects with different durations, employing various software development life cycle models, and working in different team structures and under various management styles were included in the study in an attempt to minimize bias. This process helped in distinguishing between the external factors that are characteristic to particular SDLCs, team structures, management styles, host countries, and project durations, and furnished a precise correlation between the variables chosen for the study. IT professionals living in an offshore location were chosen because the purpose of this study was to determine the impacts of various factors on the software project success of offshore IT projects. The population must be a precise illustration to answer the research question (Salkind, 2003). As reported by Barber and Korbanka (2003), a normal distribution can be estimated with a sample size of 60.

Research Hypotheses

A variety of hypotheses were devised for testing the association between various factors and software project success in offshore IT companies. The following hypotheses addressed the research questions of this study:

$H1_0$: There is no significant association between software project success and host country, in other words, where information technology projects are developed, in offshore IT companies.

$H1_A$: There is an association between software project success and host country, in other words, where IT projects are developed, in offshore IT companies.

$H2_0$: There is no significant association between software project success and the highest degree earned by team members in offshore IT companies.

$H2_A$: There is an association between software project success and the highest degree earned by team members in offshore IT companies.

$H3_0$: There is no significant association between software project success and duration of the project in offshore IT companies.

$H3_A$: There is an association between software project success and duration of the project in offshore IT companies.

$H4_0$: There is no significant association between software project success and the SDLC methodology used in offshore IT companies.

$H4_A$: There is an association between software project success and the SDLC methodology used in offshore IT companies.

$H5_0$: There is no significant association between software project success and the team structure followed in offshore IT companies.

$H5_A$: There is an association between software project success and the team structure followed in offshore IT companies.

$H6_0$: There is no significant association between software project success and compensation of team members in offshore IT companies.

$H6_A$: There is an association between software project success and compensation of team members in offshore IT companies.

Researcher Role and Qualifications

The researcher's role is to gather evidence, carry on interviews, and develop decisions and recommendations from the findings. Yin (2003) argued that interviewer qualifications play a significant role in conducting interviews as well as in the data collection process. He reasoned that the researcher should be able to ask pertinent questions and construe the responses. The interviewer must be an adept listener, be adaptive to and respond to different circumstances, have a good understanding of the issues being examined, and be open-minded. It is crucial that the researcher have prior experience in the topic being examined in order to impart believability to the study conclusions and recommendations. Schein (2004) also stated that to comprehend a culture one must belong to and be a part of that culture.

I have 16 years of experience in the IT industry. I have been involved in various roles such as programmer analyst, systems analyst, development lead, project manager, program manager, and senior manager. During that time, I managed different kinds of IT projects such as software development, testing, and maintenance and employed different technologies such as .NET framework, J2EE, and various project management tools and techniques. I also managed big teams in both onsite and offshore locations. In addition, I managed software projects in different business domains such as insurance, telecom, banking, and pharmaceutical for Fortune 500 clients. For many years, I have been interested in finding out what the association is between software project success and various factors that influence software projects in offshore IT projects. Refer to the curriculum vitae at the end of this dissertation for detailed qualifications.

Confidentiality Assurance

All data collected for this study were exhibited in a manner that prevents others from finding its source. This includes all authenticated evidence and responses from the survey. Participants' identity and contact information was confidential and stored in a secured database. The research study's results were stored in a secure password-protected database and were not used again in any other study. All the data stored in the database, CDs, and hard copies will be destroyed after 3 years. An introduction to the survey was delivered to all participants of the study explaining the objective as well as the guarantee that their responses are confidential. They were also given a chance to refuse the survey or interview.

To prevent loss of intellectual property or the revelation of proprietary information, the final dissertation will be provided to the offshore IT company for review before it is made public. In addition, institutional review board (IRB), approval was received (IRB approval number was 06-28-10-0323593) prior to data collection to ascertain compliance with university requirements and laws regulating the use of data. All evidence will be preserved for a minimum of 3 years. Interview responses were organized by number, not name, in order to protect the identities of respondents.

Data Sources

After I received an approval of my proposal from IRB, I sent an e-mail to the IT professionals working in the offshore IT company asking them to take part in the research study. The distribution list of survey participants was provided by the human resource manager of the offshore IT company. As I commenced with the survey, the objective of the research study was explained to participants and survey questions were provided along with instructions. I made it clear to the respondents that it was their choice to participate in the study. Respondents were given one month to complete the survey. The chosen company has more than 2,000 employees. This company has been offering IT and consulting services for more than 12 years and is distinguished as one of the top companies in the IT industry. It is a for-profit offshore IT company that employs IT professionals who are engaged in developing and maintaining various types of IT projects. Survey results were transformed into numeric codes and the results were inserted into a spreadsheet. The Excel spreadsheet data were entered into a database, where statistical analysis was performed. Statistical analysis was conducted using the Statistical Analysis System (SAS) tool version 9.1. Descriptive statistics were calculated to summarize and analyze the data gathered.

Data Collection

In this study, an online survey was conducted to gather data from IT professionals working for an offshore IT company. An introduction to the research study was provided to all the participants before commencement of the eSurvey, and the following details were explained in detail: survey objective, explanation of how the data will be used, and assurance of confidentiality. The participants were provided with the choice to refuse participation. The data were reviewed for integrity and completeness after all participants completed the eSurvey questionnaire. The eSurvey instrument, shown in Appendix B, was designed, developed, and distributed through SurveyMonkey.com. The eSurvey link was sent by e-mail to IT professionals working at the offshore IT company.

In this quantitative research study, data was analyzed to find out whether relationships exist between the various factors and the software project success of offshore IT projects. eSurvey respondents' personal information such as name, address, and telephone numbers were not gathered. The SurveyMonkey.com website utilizes the Secure Sockets Layer (SSL) encryption mechanism, which helps protect the privacy of the survey respondents. Refer to Appendix A for the survey introduction, Appendix B for the eSurvey questions.

Validity and Reliability

This study employed a quantitative correlation approach. For this study, the quantitative method is pertinent because the study centers on an assessment of the extent to which variables depend on each other (Clough & Nutbrown, 2002). Leedy and Ormrod (2005) defined a research study's *internal validity* as "the degree to which research design and the data that it produces lets the researcher to describe precise conclusions about cause-and-effect and other relationships within the data" (p. 97). Leedy and Ormrod (2005), explained *external validity* as "the degree to which research study results apply to situations outside the study itself" (p. 99).

The suitability of the correlation approach is based on the shortcomings of the researcher to maneuver the variables being studied (Emory & Cooper, 1991). For this study, I have used questionnaires from project success studies, earlier findings from the literature, and peer reviews to ensure that questions in the survey are illustrative of the problem and that they precisely indicate the answers to the subject or topic being researched. I also checked with a number of peers who have worked on offshore IT projects to corroborate the survey questions based on their knowledge and experience.

Reliability pertains to the achievement of uniform results by applying the instrument on several occasions (Leedy & Ormrod, 2005). Reliability was quantified by the use of the Cronbach Alpha reliability estimate. This estimate can accept values between zero and one with a generally approved reliability value of 0.70 or higher. Key contributors to the study were asked to evaluate sources of data, as well as my interpretations, for soundness.

Study Scaling

The instrument used in this study is survey questionnaire. SurveyMonkey.com was used to design and publish the survey. The survey utilized dichotomous and interval scaling as well as open-ended questions. Examples of dichotomous scaling responses are agree/disagree, true/false, or yes/no. Interval scaling answers are 1 through 5 (Creswell, 1998). Scaling was not used to assign values to abstract or intangible evidence. Data was analyzed using SAS software to understand the hypothesized relationships.

Mapping of Survey Questions to Research Questions

The survey questions described in Appendix B are designed to address the research questions formulated for this study. Table 2 maps the survey questions to the research questions of this study.

Table 2

Matrix of Survey Questions and Research Questions

Study variables	Survey questions (SQ)	Research questions (RQ)
IV1: Host country	SQ6	RQ1, RQ2
IV2: Highest degree earned by team member	SQ8	RQ1, RQ2
IV3: Duration of the project	SQ3, SQ4, SQ5, SQ10	RQ1, RQ2
IV4: SDLC	SQ11	RQ1, RQ2
IV5: Team structure	SQ8	RQ1, RQ2
IV6: Compensation of team member	SQ15, SQ16	RQ1, RQ2
DV1: Software project success	SQ13, SQ14	RQ1, RQ2

Note. IV = Independent variable; DV = Dependent variable.

Sampling Process

One of the fundamental features of a survey is to choose a sample that is a representative of the population under study. Leedy and Ormrod (2005) reasoned that generalizations about the study population will be made based on the results received from studying the sample. Examining the impact of various factors on software project success in all of the offshore IT companies is not possible. In addition to that, most of the offshore IT companies employ thousands of IT professionals and surveying all of these IT professionals is not feasible. That is why a sample had to be selected that was a representative of the population. Samples were drawn from the sampling frame.

The samples furnished the evidence for the conclusions that were drawn from the study regarding the impact of various factors on software project success in offshore IT projects. This sampling let us choose respondents who were competent in providing believable information. The sample size for this study was 163. The sample respondents should be able to add to the understanding of the issue being studied (Creswell, 1998). The null hypotheses were tested by using regression analysis. The offshore IT company that was used as a sample has been identified through extensive research, personal contacts, and reliable business information, with a focus on their ranking in the offshore IT business. The researcher's experience in the IT industry was utilized in the process of formulating and conducting an eSurvey.

The sample selection rules were as follows:

1. Only an offshore IT company was studied.
2. The responsibilities of the IT professionals who were solicited for the survey included software development, testing, maintenance, or migration activities.

SurveyMonkey.com was used to conduct the eSurvey. eSurvey questions are included in Appendix B, and there are 16 questions in the eSurvey aimed at measuring the impact of various factors on software project success.

Data Analysis

Data analysis was performed utilizing a nonparametric test to test the research hypotheses The significance of ordinal and nominal data was tested by employing non-parametric tests, and the significance between the ratio and interval measures is examined by parametric tests (Cooper & Schindler, 2006). Data analysis was done using a statistical analysis tool called a BASE Statistical Analysis System (SAS). Correlation coefficients "provide a numerical summary of the direction and the strength of the linear relationship between two variables" (Pallant, 2007, p. 120). The hypotheses were examined employing *t*-test, regression analysis at a significance level of .05 to find out if the differences among participants in the sample to allow the researcher to generalize the findings to the general population.

The *project delivery within the budget* variable can take values of *yes*, marked by 1, if the project is delivered within +/- 10% of the approved budget and *no*, marked by 0, if the project requires more than 10% of the approved budget for the delivery of signed off requirements. The same method is employed to the *on-time delivery of the project* variable. The value *yes*, denoted by 1, denotes the scenario in which the project is completed on or before the approved timeframe or within +/- 10% of approved schedule, and *no*, marked by 0, represents the case where the project completion requires more time than 10% of approved schedule. The same method is applied to the *project delivery within the scope* variable. The value *yes* denoted by 1, denotes the scenario in which the project meets all signed off requirements, and *no* marked by 0, represents the case where the project does not meet all the signed off requirements. In order to ensure accuracy, all survey participants were provided with the same questionnaire.

Anticipated Challenges

There were some expected challenges such as an inability to express the concept of this study through survey. The hardship was in demonstrating the required perspective to gain insight into the effects the various factors have on software project success in offshore IT companies. Personal observations made over 16 years of working in the IT industry indicate that software project success is affected by various factors such as the host country where the IT project is developed, the team members and the project manager's education, and the SDLC method employed in the project. Consideration was given to my conceptualized notions to make sure that personal bias does not have an effect on interview responses or findings of the study.

It was challenging to encourage survey and interview respondents' to be frank in answering questions. That is why I focused on earning their confidence. Notwithstanding this effort, some respondents may not find it easy to freely verbalize their thoughts. The process of choosing the sample decreased this possibility. A greater challenge was in gathering documented evidence to determine the impact of various factors on software project success in offshore IT projects and their connection with findings from the interviews. A personal challenge was the focus and determination required to perform this essential project.

Chapter Summary

This chapter provided a description of the population, sampling design, research hypotheses, data sources, data collection method, validity and reliability, study scaling, sampling process, data analysis, and anticipated challenges.

Chapter 4 presents data analysis and findings of the study.

Chapter 4: Data Analysis and Findings

The purpose of this chapter is to present the findings of the study. In this chapter, I analyze the impact of various factors on software project success in offshore information technology (IT) companies. This chapter includes a discussion of the results of the data collection, associating them to the research questions and hypotheses. The goal of this study was to discover whether various factors such as host country, highest degree earned by software team members, duration of the project, the Software Development Life Cycle (SDLC) methodology used, team structure, and the compensation of the team members have any impact on software project success in offshore IT companies.

Data Collection

The researcher-designed survey instrument was a structured, Web-based questionnaire that was self-completed by respondents. Data collection was done through an online survey of IT professionals working for an offshore IT company, and the survey vehicle was SurveyMonkey.com, which served as the data collection service. Prior to posting the survey on the website, the survey instrument underwent a field test and a review by a group of experts. The survey respondent selection process did not necessitate access to personal information.

Descriptive Analysis

There were 163 participants in the survey, which was used to determine the success factors of IT projects in India, and there were no missing data. The male participants (n = 112) were 69% of the sample and female participants (n = 31) made up the difference. The respondents' were between 25 and 52 years of age and approximately 60% of the respondents were 37 years old or less. The average age of respondents was $M = 35.96$, $SD = 6.14$. The largest age group comprised people who were 38 years old ($n = 17$) and was 10% of the responses. The second largest group was comprised of people between 29 and 30 years of age ($n = 24$) and was approximately 15% of the sample. The median age was 36 years.

The average number of years of participants' IT experience was $M = 13$, $SD = 5.4$. The least amount of experience anyone had in IT was $n = 3.75$ years and the most was $n = 28.7$ years. Participants with 10 years of IT experience or less were 39% of the sample, indicating that almost 61% of the sample worked in the IT field for over 10 years. The range of approximately 25 years indicated strong IT experience within the sample. Most people had worked with their current employer $M = 5.06$, $SD = 2.5$ years with a range of approximately 14 years. However, 52% of the sample was employed with their employer for 2 or less years and 77% were employed for 3 years or less. The high range was a result of outliers—a few people worked for their employers for 12 or more years and were less than 1% of the sample.

Respondents said the average length of each project they worked on was $M = 2.4$, $SD = 1.2$ years. Some projects lasted as long as 12 years, while the shortest project was 1 year. The projects that lasted 3 years or more but less than 5.5 years were approximately 10.4% of all projects, while 81% of the projects lasted 3 years or less. There were approximately $n = 77$ reports of projects lasting between 2 and 3 years; these were 44%

of the responses. Most respondents found that if a project was based in a foreign country or offshore, it could be successful *n* = 134; these comprised 82% of the responses.

The participants in the sample were very well educated and most people reported 18 years of education (*M* = 17.56, *SD* = 2.2), which is equivalent to a master's degree (*n* = 74). Most respondents had a bachelor's degree or higher (*n* = 156) and were approximately 96% of the participants. There were people who held doctorate degrees (*n* = 17) and were 10% of the participants. Not many people who did not have at least a bachelor's degree worked in the IT field. A great majority of people received about four months of training to work in the IT field and on projects that were outside their formal education (*n* = 103) and were 63% of the sample. The most training reported was 1.8 years (*n* = 16) and was approximately 10% of the responses. Most people received less than 1 year of training (*n* = 130) and were approximately 80% of the sample. Most people reported that projects are too long if they exceed more than *M* = 3.8, *SD* = 1.7 years. The number of people who reported they would like to see projects last less than 3 years was *n* = 85 and were 52% of the population.

Participants found the software development life cycle (SDLC) affected the success of a project *n* = 136 and were 83% of the sample. These results indicated that one in every five people did not feel that the SDLC has an effect on the success of the project. In a similar vein to the SDLC, most people found the structure of the project team also affected the success of the project *n* = 114 and were 70% of the responses. This indicated that one in four people did not have any problems with the structure of their project teams and found it did not affect the successful outcome of the project.

Participants reported they have worked on several projects during the last 5 years, *M* = 4.25, *SD* = 1.09. Most people worked on three projects while employed in the IT field (*n* = 115) and were 92% of the sample. There were people who worked on seven projects (*n* = 47) that were 29% of the responses. There was one person who worked on as many as eighteen projects and was an anomaly in this dataset. The case was removed and the statistics were recomputed on the rest of the cases (*n* = 162) and found that the average person completed *M* = 4.16, *SD* = 1.8 projects over the last 5 years. Of all the projects completed, the average amount of projects considered successful was *M* = 2.4, *SD* = 1.97. For all the projects completed, those considered not successful were *M* = 1.82, *SD* = 1.09, indicating there was a difference between those that were successful and those that were not successful.

Most respondents reported that if they were paid a high salary (*n* = 120), it would help projects to be successful. Those of the opposing opinion were *n* = 57 and were 35% of the responses. Those who were very opposed to the question were *n* = 12 and were 7% of the group. Respondents indicated that they were very satisfied with their level of compensation (*n* = 120) and were 74% of the responses. This indicated that approximately one in four IT workers were not happy with their level of compensation.

There were *n* = 78 male participants, 68%, who completed three projects as compared to females *n* = 37, or 32%, who completed three projects over the last 5 years. Males who completed seven projects over the past 5 years were *n* = 33 compared to females *n* = 14 who completed seven projects. Males who were satisfied with their compensation were *n* = 82, or 69%, compared to females *n* = 43 who were satisfied with their compensation. More males felt that getting a higher salary would help project success *n* = 63, or 59%, compared to females *n* = 43, or 41%, who feel the same way. People who completed higher education had more projects completed than people with a lower level of education. Participants who reported having a master's degree completed *n* = 50, or 44%, projects as compared to people with a bachelor's degree *n* = 45, or 39%. Those who had a doctorate degree completed *n* = 16, or 14%, projects. Those who earned a master's degree reported that higher salaries would help project success *n* = 51, or 48%, which was close to what those who had a bachelor's degree reported *n* = 46, or 43%. Most of those who had a doctorate did not have the same conclusion *n* = 12, or 21% out of 25%—similar to those who had less than a bachelor's degree. Refer to Table 3 for descriptive statistics of survey participants and Table 4 for frequency tables.

Table 3

Descriptive Statistics

Descriptive statistics										
	N	Minimum	Maximum	Mean	Std. deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. error	Statistic	Std. error
Gender	163	0	1	.31	.465	.216	.815	.190	-1.353	.378
Age of respondent	163	25	52	35.96	6.135	37.634	.427	.190	-.311	.378
IT experience in yrs.	163	3.75	28.67	12.9422	5.39214	29.075	.563	.190	.061	.378
Current employment in yrs.	163	1.08	15.50	5.0557	2.49937	6.247	1.437	.190	2.881	.378
Average length of time worked on a project	163	1.00	12.00	2.3589	1.19295	1.423	3.708	.190	25.754	.378
Project successful offshore	163	0	1	.18	.384	.147	1.700	.190	.901	.378
Years of education	163	15.00	27.00	17.5644	2.16891	4.704	1.589	.190	2.863	.378
Highest degree completed	163	1	5	3.61	.765	.586	-.284	.190	.686	.378
IT training received in yrs.	163	.0	1.8	.629	.5086	.259	1.282	.190	.283	.378
Project is too long in yrs.	163	1.00	15.00	3.7853	1.66941	2.787	2.095	.190	11.180	.378
SDLC affect project success	163	0	1	.17	.373	.139	1.816	.190	1.312	.378
Team structure Affect project outcome	163	0	1	.30	.460	.212	.878	.190	-1.245	.378
Successful projects	163	1.50	16.50	2.4264	1.97064	3.883	2.999	.190	14.936	.378
Projects completed	163	3	18	4.25	2.114	4.470	2.223	.190	9.373	.378
Unsuccessful projects	163	1.50	5.50	1.8190	1.08699	1.182	3.131	.190	7.902	.378
High salary help project success	163	0	1	.35	.478	.229	.636	.190	-1.615	.378
Satisfied with compensation	163	0	1	.26	.442	.195	1.082	.190	-.840	.378
Valid *N* (list wise)	163									

Table 4

Frequency Tables

Gender

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Males	112	68.7	68.7	68.7
	Females	51	31.3	31.3	100.0
	Total	163	100.0	100.0	

Age of Respondent

	Frequency	Percent	Valid percent	Cumulative percent
25	1	.6	.6	.6
26	6	3.7	3.7	4.3
27	3	1.8	1.8	6.1
28	6	3.7	3.7	9.8
29	14	8.6	8.6	18.4
30	10	6.1	6.1	24.5
31	4	2.5	2.5	27.0
32	8	4.9	4.9	31.9
33	9	5.5	5.5	37.4
34	6	3.7	3.7	41.1
35	11	6.7	6.7	47.9
36	12	7.4	7.4	55.2
37	6	3.7	3.7	58.9
38	17	10.4	10.4	69.3
39	9	5.5	5.5	74.8
40	8	4.9	4.9	79.8
41	5	3.1	3.1	82.8
42	3	1.8	1.8	84.7

(continued)

43	3	1.8	1.8	86.5
44	7	4.3	4.3	90.8
45	5	3.1	3.1	93.9
47	1	.6	.6	94.5
48	1	.6	.6	95.1
49	4	2.5	2.5	97.5
50	1	.6	.6	98.2
51	2	1.2	1.2	99.4
52	1	.6	.6	100.0
Total	163	100.0	100.0	

Research Question and Hypotheses Analysis

What is the relationship, if any, between various factors and software project success in offshore IT companies?

To address this question, IT experience in years, age of respondents, and average length of time worked on a project variables were chosen, based on a significant correlation produced by a Pearson correlation matrix at a .05 alpha.

Hypothesis 1

$H1_0$: There is no significant association between software project success and host country, in other words, where IT projects are developed, in offshore IT companies.

$H1_A$: There is an association between software project success and host country, in other words, where IT projects are developed, in offshore IT companies.

T test. An independent sample t test was conducted between the gender variable and project success variable to determine if there was a difference in how people felt about a project's chances of success when based in a foreign country depending on the respondent's gender. The test was conducted at an alpha level of .05 for significance. The test variable in each of the two groups was normally distributed, the variances were equal, and the cases in the sample were independent of each other and were randomly chosen from the population.

The results were not significant, $t(161) = .913$, $p = .363$, $d = .17$, indicating no significant difference between men and women regarding whether projects can be successful if based in a foreign country. Another *t* test was done to determine if there was a significant difference between the ages of the respondents and their gender. The results were significant, $t(161) = 3.775$, $p = < .000$, $d = .17$, indicating that there was a difference between the ages of respondents based on their gender. Male participants $M = 37$, $SD = 6.4$ and were approximately 4 years older than their female counterparts $M = 33$, $SD = 4.7$. Table 5 shows details of independent samples test related to hypothesis 1.

Table 5

Independent Samples Test—Gender and Project Success

Group statistics

	Gender	*N*	Mean	Std. deviation	Std. error mean
Project successful offshore	Males	112	.20	.399	.038
	Females	51	.14	.348	.049

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Project successful offshore	Equal variances assumed	3.619	.059	.913	161	.363	.059	.065	-.069	.187
	Equal variances not assumed			.961	110.177	.339	.059	.062	-.063	.181

A further *t* test examined whether there was a significant difference in the amount of experience a respondent had based on their gender. The results were significant, $t(161) = 3.685$, $p < .001$, .17 = .006, indicating there was a significant difference in the level of experience based on gender. Male participants $M = 14$, $SD = 5.4$ had approximately three more years of experience than females $M = 11$, $SD = 4.5$. A final *t* test was conducted to determine if there was a significant difference in the average length of time respondents worked on projects based on their gender. The results were not significant, $t(161) =$

1.070, $p = .286$, $d = .17$, indicating that male participants $M = 2.4$, $SD = 1.29$ spent approximately the same amount of time as females $M = 2.21$, $SD = .912$ working on projects in number of years. The entire Cowen's *d* effect size reported a small effect between the test variable and each independent variable.

A paired sample *t* test was conducted to determine if relationships exist between the dependent variable project successful offshore and the age, IT experience, and length of time worked on projects. The results for each pair were significant for the first pair, project success offshore and respondents age, $t(162) = -73.613$, $p < .001$, $d = .006$. The mean score for project success offshore ($M = .18$, $SD = .384$) was significantly lower than means scores for age of respondents ($M = 35.96$, $SD = .481$), indicating that age is very relevant to offshore project success. This is a reasonable conclusion because as people get older, they acquire more experience in IT and may become more competent when performing their job functions. The confidence interval for the mean difference for the two variables was -36.739 to -73.613, indicating that the mean is reasonable since it is located within the 95% confidence. Table 6 shows details of paired sample t-Test related to hypothesis 1.

Table 6

Paired Sample t Test—Project Success and Age, IT Experience, and Length of Time Worked on IT Projects

Group statistics

	Project successful offshore	N	Mean	Std. deviation	Std. error mean
Age of respondent	0	134	36.40	6.277	.542
	1	29	33.93	5.042	.936
IT experience in years	0	134	13.3781	5.51467	.47640
	1	29	10.9282	4.31910	.80204
Average length of time worked on a project	0	134	2.4478	1.26677	.10943
	1	29	1.9483	.63168	.11730

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Age of respondent	Equal variances assumed	.784	.377	1.979	161	.050	2.464	1.245	.005	4.924
	Equal variances not assumed			2.278	48.776	.027	2.464	1.082	.290	4.639
IT experience in years	Equal variances assumed	1.658	.200	2.246	161	.026	2.44995	1.09081	.29581	4.60409
	Equal variances not assumed			2.626	49.934	.011	2.44995	.93285	.57620	4.32370
Average length of time worked on a project	Equal variances assumed	2.601	.109	2.065	161	.041	.49949	.24190	.02178	.97719
	Equal variances not assumed			3.114	84.478	.003	.49949	.16042	.18050	.81847

The second pair evaluated whether project success offshore correlated with the respondent's level of experience in the IT industry. The results were significant *t*(162) = -29.781, *p* = < .001, *d* = .006. The mean score for project success offshore (*M* = .18, SD .384) was far less than the mean score for experience in the IT industry (*M* = 12.94, *SD* = 5.39), indicating that there is a relationship between the two variables and that the level of experience contributed significantly to offshore project success. The confidence interval for the mean difference for the two variables was -13.6106 to -11.9174, indicating that the mean is reasonable since it is located within the 95% confidence.

The third pair examined the relationship between project success and the average length of time respondents spent on each project. The results were also significant, $t(162) = -21.248$, $p < .001$, $d = .006$. The mean score for project success offshore ($M = .18$ $SD = .384$) was significantly less than the mean score for the average time spent on the project ($M = 2.35$ $SD = 1.19$), indicating that the experience of spending more time on each project is beneficial to project success. This is reasonable because as respondents spend more time on projects, they gain the experience that is relevant to performing their functions proficiently. The 95% confidence interval ranges from -2.38367 to -1.97829, indicating that the mean is reasonable for the sample and falls within the level of confidence. The effect sizes reported by Cowen's *d* were small and indicated the differences between the means of the variables were not very large. Table 7 shows details of paired samples test statistics, and correlations related to hypothesis 1.

Table 7

Paired Sample Test—Project Success and Age, IT Experience, and Length of Time Worked on IT Projects

Paired samples statistics

		Mean	*N*	Std. deviation	Std. error mean
Pair 1	Project successful offshore	.18	163	.384	.030
	Age of respondent	35.96	163	6.135	.481
Pair 2	Project successful offshore	.18	163	.384	.030
	IT experience in years	12.9422	163	5.39214	.42234
Pair 3	Project successful offshore	.18	163	.384	.030
	Average length of time worked on a project	2.3589	163	1.19295	.09344

Paired samples correlations

		N	Correlation	Sig.
Pair 1	Project successful offshore & age of respondent	163	-.154	.050
Pair 2	Project successful offshore & IT experience in years	163	-.174	.026
Pair 3	Project successful offshore & average length of time worked on a project	163	-.161	.041

(continued)

Paired samples test

		Paired differences							
					95% confidence interval of the difference				
		Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Project successful offshore—age of respondent	-35.779	6.205	.486	-36.739	-34.819	-73.613	162	.000
Pair 2	Project successful offshore—IT experience in years	-12.76431	5.47205	.42860	-13.61069	-11.91794	-29.781	162	.000
Pair 3	Project successful offshore—average length of time worked on a project	-2.18098	1.31046	.10264	-2.38367	-1.97829	-21.248	162	.000

Regression. Before a linear bivariate multiple regression analysis was conducted, an examination between the variables using a scatter plot was performed to examine if a linear relationship existed between the dependent variable, project success, and the independent variables, respondent's age, amount of experience in IT by years, and the average length of time respondents spend on each project.

The first scatterplot examined project success for offshore projects and the respondent's age. The plot showed a negative linear relationship between the two variables. The linear association showed that as a respondent's age increased, the success of projects offshore decreased. This indicated that as respondents aged, they also increased their experience level working on offshore projects and found that when projects were based offshore, they were not likely to be successful. In turn, younger worker were more optimistic and found that projects can be successful, but perhaps this perspective comes out of a lack of experience. The relationship reported between the two variables *r* = .02 was not very strong and may not be a good indicator of project success offshore. Scatter plot between project success and respondent's age is shown in Figure 3.

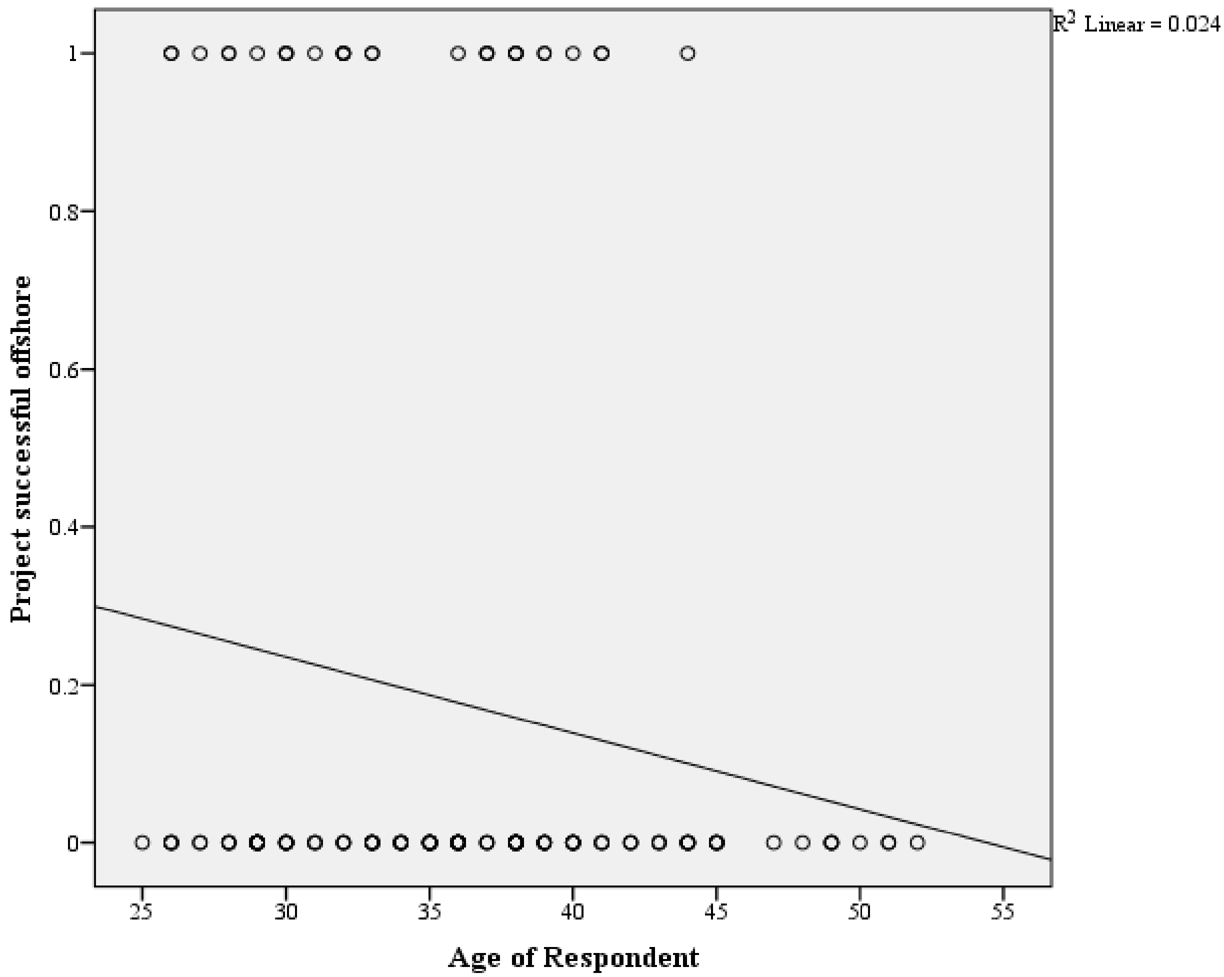

Figure 3. Scatter plot between project success and respondent's age.

The second scatterplot indicated that as experience in the IT industry increased, respondents believed that IT projects based offshore would not be successful and showed a negative linear relationship between the two variables. The scatter plot revealed that people who had 10 years or less of experience in the IT industry were far more positive than those who had greater than 10 years of experience in the IT industry. The relationship reported between the two variables *r* = .03 was not very strong and may not be a good indicator of project success offshore. Refer to Figure 4 for scatter plot between project success and respondent's IT experience in years.

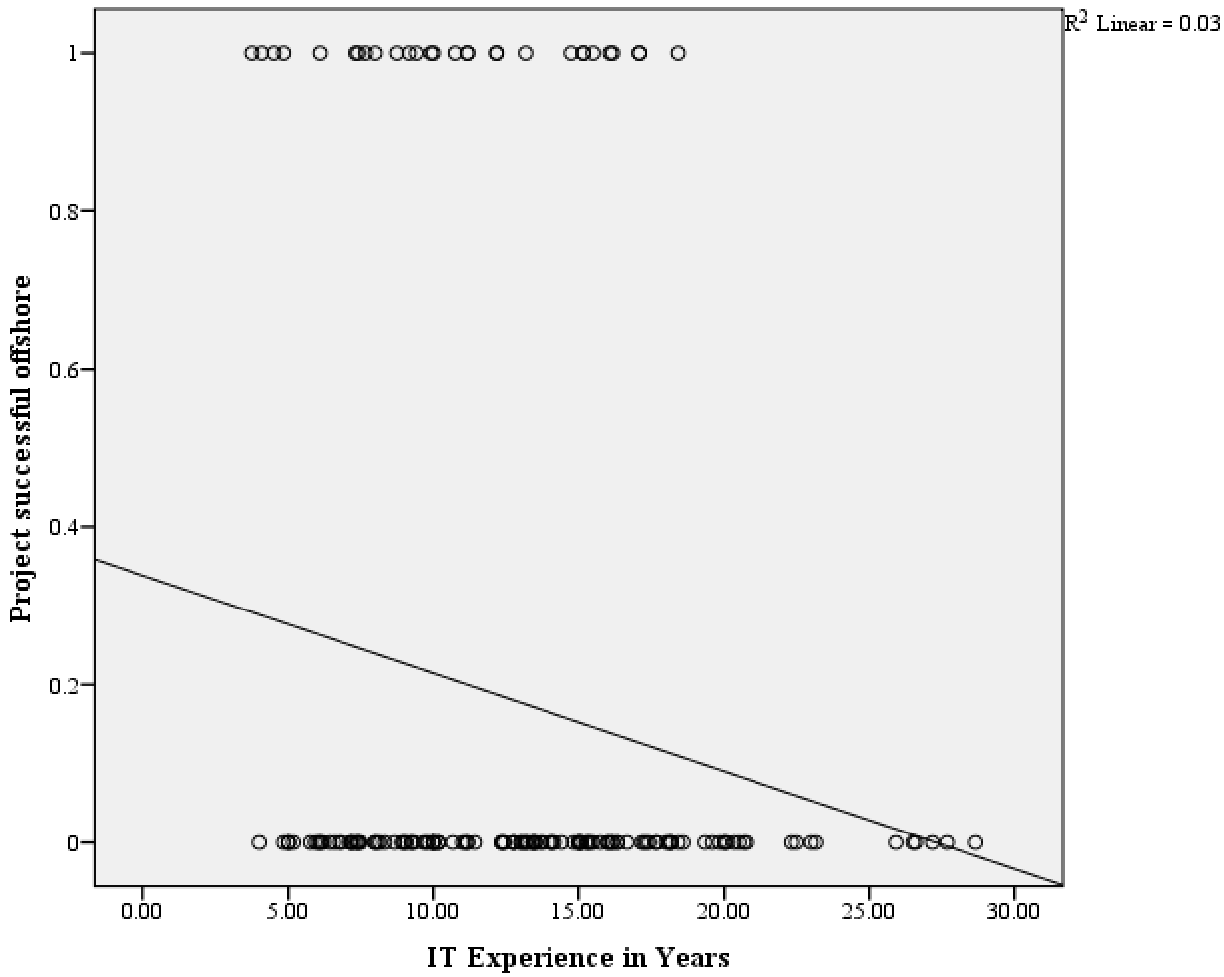

Figure 4. Scatter plot between project success and respondent's IT experience in years.

The third scatterplot between project success offshore and the average length of time worked on a project revealed a negative linear relationship. Respondents who worked less than 4 years on a project were more likely to find a project will be successful than those who work greater than 4 years on a project. This is an indication that longer projects were more inclined to fail than shorter projects. The relationship reported between the two variables, r = .03, was not very strong and may not be a good indicator of project success offshore. Figure 5 shows scatter plot between project success and respondent's average length of time worked on a project.

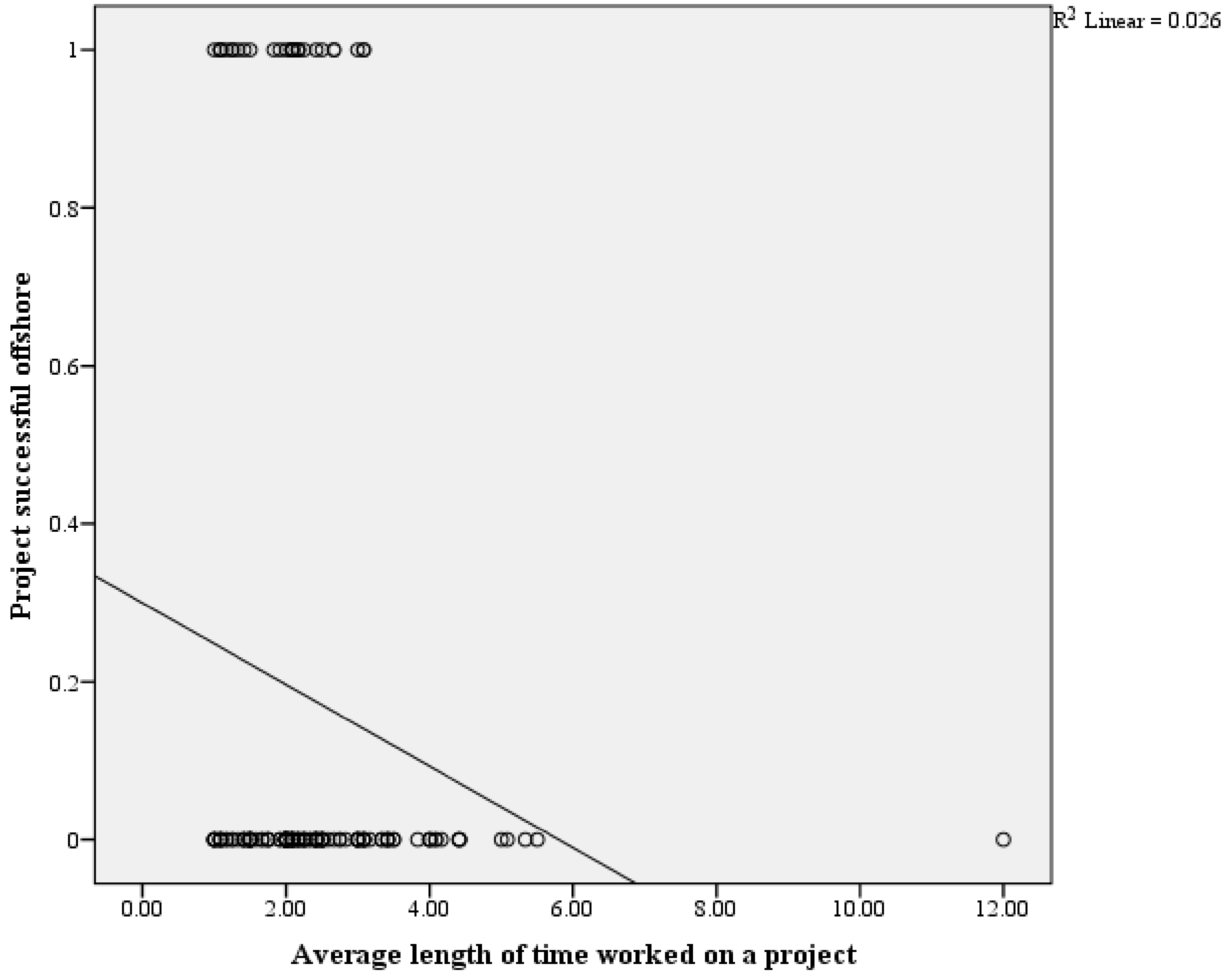

Figure 5. Scatter plot between project success and respondent's average length of time worked on a project.

A standard multiple regression analysis was performed between the dependent variable (project success offshore) and the dependent variables (average time worked on projects, IT experience in years, and age of respondents). The assumptions were tested by examining normal probability plots of residuals and scatterplot diagrams. No violations of normality, homoscedasticity, or linearity were found. No apparent outliers were found when boxplots were examined.

The regression analysis revealed that the model did not significantly predict if a project would be successful when based offshore, $F(3, 159) = 2.287$, $p = .081$. The $R2$ for the model was .04, and adjusted $R2$ was .02. Table 8 displays the unstandardized regression coefficients (*B*), intercepts, and standardized regression coefficients (β) for each variable. When individual relationships were examined between the dependent variable (project success offshore) and the independent variables—age of respondent (t = .336, p = .289), IT experience in years (t = -1.001, p = .318), and average length of time worked on a project (t = -1.342, p = .181)—they were all nonsignificant in predicting project success offshore. Together, the three variables contributed 20.3% in shared variability. The means and standard deviations are presented in Table 8.

Table 8

Multiple Regression Analysis Between Project Success and Respondent's Age, IT Experience in Years, and Average Time Worked on Projects

Descriptive statistics

	Mean	Std. deviation	N
Project successful offshore	.18	.384	163
Age of respondent	35.96	6.135	163
IT experience in years	12.9422	5.39214	163
Average length of time worked on a project	2.3589	1.19295	163

Correlations

		Project successful offshore	Age of respondent	IT experience in years	Average length of time worked on a project
Pearson correlation	Project successful offshore	1.000	-.154	-.174	-.161
	Age of respondent	-.154	1.000	.911	.403
	IT experience in years	-.174	.911	1.000	.384
	Average length of time worked on a project	-.161	.403	.384	1.000
Sig. (1-tailed)	Project successful offshore	.	.025	.013	.020
	Age of respondent	.025	.	.000	.000
	IT experience in years	.013	.000	.	.000
	Average length of time worked on a project	.020	.000	.000	.
N	Project successful offshore	163	163	163	163
	Age of respondent	163	163	163	163
	IT experience in years	163	163	163	163
	Average length of time worked on a project	163	163	163	163

(continued)

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F Change
1	.203[a]	.041	.023	.379	.041	2.287	3	159	.081

a. Predictors: (Constant), average length of time worked on a project, IT experience in years, age of respondent

ANOVA[b]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	.986	3	.329	2.287	.081[a]
	Residual	22.854	159	.144		
	Total	23.840	162			

a. Predictors: (Constant), average length of time worked on a project, IT experience in years, age of respondent.

b. Dependent variable: Project successful offshore.

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients			Correlations		
		B	Std. error	Beta	t	Sig.	Zero-order	Partial	Part
1	(Constant)	.295	.277		1.065	.289			
	Age of respondent	.004	.012	.064	.336	.737	-.154	.027	.026
	IT experience in yrs.	-.013	.013	-.189	-1.001	.318	-.174	-.079	-.078
	Average length of time worked on a project	-.037	.027	-.114	-1.342	.181	-.161	-.106	-.104

a. Dependent variable: Project successful offshore.

The null hypothesis was retained based on the results of the regression analysis; there is no significant association between software project success and host country, i.e., where IT projects are developed, in offshore IT companies. Although there were factors that may affect the project's success, the factors were weak and did not contribute significantly to the overall model for predicting offshore project success.

Hypothesis 2

$H2_0$: There is no significant association between software project success factors and the highest degree earned by team members in offshore IT companies.

$H2_A$: There is an association between software project success factors and the highest degree earned by team members in offshore IT companies.

A correlation matrix presented in Table 9 shows the eight variables that correlated significantly with the dependent variable degree earned. The success factors were the independent variables of participants such as gender, age, level of IT experience, length of employment, amount of IT training received, the length of the project, level of salary, and satisfaction with compensation.

T test. A series of independent sample t tests were performed to test differences between males and females. The first test investigated if males and females were equally educated in the sample. The average male earned a bachelor's degree, similar to the average female who also earned a bachelor's degree. The results were not significant $t(161) = 1.772$, $p = .08$, NS, indicating that males and females were equally suited educationally to perform IT functions. The 95% confidence interval ranged from -.026 to .481, indicating a zero is a plausible population value and that it is likely that the true difference between the two groups is zero. Refer to Table 9 for details of multiple regression analysis between degree earned, respondent's age, IT experience in years and IT training in years.

Table 9

Multiple Regression Analysis Between Degree Earned and Respondent's Age, IT Experience in Years, and IT Training in Years

Descriptive statistics

	Mean	Std. deviation	*N*
Degree earned	3.61	.765	163
Age of respondent	35.96	6.135	163
Level of IT experience (yrs)	12.9422	5.39214	163
IT training (yrs)	.629	.5086	163

Correlations

		Degree earned	Age of respondent	Level of IT Experience (yrs)	IT training (yrs)
Pearson correlation	Degree earned	1.000	.453	.273	.334
	Age of respondent	.453	1.000	.911	.420
	Level of IT experience (yrs)	.273	.911	1.000	.373
	IT training (yrs)	.334	.420	.373	1.000
Sig. (1-tailed)	Degree earned	.	.000	.000	.000
	Age of respondent	.000	.	.000	.000
	Level of IT experience (yrs)	.000	.000	.	.000
	IT training (yrs)	.000	.000	.000	.
N	Degree earned	163	163	163	163
	Age of respondent	163	163	163	163
	Level of IT experience (yrs)	163	163	163	163
	IT training (yrs)	163	163	163	163

(continued)

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics: R square change	F change	$df1$	$df2$	Sig. F change
1	.585[a]	.342	.330	.626	.342	27.573	3	159	.000

a. Predictors: (Constant), IT training (yrs), level of IT experience (yrs), age of respondent.

b. Dependent variable: Degree earned.

ANOVA[b]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	32.466	3	10.822	27.573	.000[a]
	Residual	62.406	159	.392		
	Total	94.871	162			

a. Predictors: (Constant), IT training (yrs), level of IT experience (yrs), age of respondent.

b. Dependent variable: Degree earned.

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients			95.0% confidence interval for B		Correlations			Collinearity statistics	
		B	Std. error	Beta	t	Sig.	Lower bound	Upper bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.094	.463		-.204	.839	-1.009	.820					
	Age of respondent	.140	.020	1.123	7.037	.000	.101	.179	.453	.487	.453	.163	6.152
	Level of IT experience (yrs)	-.115	.022	-.812	-5.203	.000	-.159	-.072	.273	-.381	-.335	.170	5.890
	IT training (yrs)	.251	.107	.167	2.350	.020	.040	.461	.334	.183	.151	.823	1.214

a. Dependent variable: Degree earned.

Another *t* test investigated whether a difference existed between the level of IT experience and gender. The results were significant $t(161) = 3.685$, $p < .001$, $d = .006$, indicating there was a significant difference in the amount of IT experience between males and females. Males had $M = 14$, $SD = 5.44$ years of experience compared to females, who had $M = 11$, $SD = 4.59$ years of experience. The 95% confidence interval ranged from 1.50048 to 4.96608, indicating that zero is not present or a likely difference in the population. The true difference between the levels of IT experience between two groups is not equal to zero.

The following *t* test was used to examine if there was a difference between the length of employment for males and females. The results were significant, $t(161) = 3.414$, $p < .01$, $d = .006$. Males ($M = 5.49$, $SD = 2.62$) were employed significantly longer than females ($M = 4.09$, $SD = 1.88$) and this would account for the difference in experience. If males are working longer than females, they would gain higher levels of experience than females. The 95% confidence interval ranged from .58850 to 2.20381 and did not contain a zero. It is unlikely that the true difference between the length of employment between the two groups in the population is equal to zero.

A further *t* test was used to determine if there was a difference in the length of time participants worked on past projects based on their gender. The results were not significant $t(161) = 1.070$, $p = .286$, *NS*. This indicated that the duration of projects was not based on gender and both males and females had an equal chance of the success or failure in meeting all the requirements of projects. Males ($M = 2.4$, SD 1.29) took the same amount of time to complete projects as females ($M = 2.2$, $SD = .912$). The 95%

confidence interval ranged from -.18223 to .61334 and included a zero. This indicated that zero is a plausible population value and that the true difference in the length of time between males and females can be equal to zero.

The next *t* test investigated whether a difference existed in the ages of IT workers based on their gender. The results were significant $t(161) = 3.775$, $p < .01$, $d = .006$, indicating that the difference in age between the two variables was significant. Males ($M = 37.13$, $SD = 6.355$) were 3.76 years older than their female ($M = 33.37$, $SD = 4.728$) counterparts. The 95% confidence interval ranged from 1.794 to 5.729 and did not include a zero. This indicated that the true difference in the population is not likely to be zero. The true difference is expected to be greater than 1.794 years but less than 5.729 years. This is reasonable and would support the finding that males have more experience and work longer for their employers than females do. Men are older and typically enter the workforce before their female coworkers do.

A *t* test was also used to investigate whether higher salaries would influence project success based on gender. The results were significant $t(161) = 3.599$, $p < .01$, $d = .006$. This indicated that more males ($n = 63$), or 59%, found that higher salary levels would lead to the success of a project than females ($n = 43$), or 41%. The 95% confidence interval ranged from .127 to .435 and did not include a zero. This indicated that zero is an unlikely possibility in the population for this response. The results suggested that although males and females had equal levels of education, because males had more IT experience than females, they believed they should be paid well for their work. Females were not influenced as heavily as males were by high levels of compensation based on their level of education.

The *t* test was used to determine whether there was a difference in the levels of satisfaction with compensation based on gender. The results were not significant $t(161) = -.208$, $p = .835$, *NS*, indicating there was no difference in the level of satisfaction with compensation between males and females. Males ($n = 83$), or 69%, said they were satisfied with their level of compensation and $n = 29$, or 67%, said they were not satisfied compared to females ($n = 37$), or 31%, who said they were satisfied and $n = 14$, or 33%, who said they were not satisfied. This demonstrated that an equal percentage of males were satisfied and unsatisfied with their compensation and an equal percentage of females were satisfied and unsatisfied with their levels of compensation. The effect size of .006, calculated using Cowen's *d*, indicated the relationship between the dependent and independent variables was small.

Regression. Before a linear bivariate multiple regression analysis was conducted, an examination between the variables using a scatterplot was performed to examine if a linear relationship existed between the dependent variable (highest degree earned) and the independent variables. The independent variables were the respondent's gender, age, level of IT experience, length of current employment, IT training (yrs), project duration (yrs), salary level, and satisfaction with compensation. The independent variables were chosen as the predictor variables because they had a significant correlation of .05 or less level of probability with the dependent variable in the correlation matrix.

A scatterplot was examined to determine if a linear relationship existed between the dependent variable (degree earned) and each success factor predictor variable. There were seven success factor predictor variables examined and three were found to have a linear relationship with the dependent variable. They were: the age of the respondents, the amount of IT training received, and their level of IT experience. The rest of the variables were not linearly related to the dependent variable and were not used as success factor predictor variables in the multiple regression model to determine if project success had an association with degree earned.

A standard multiple regression was performed between the dependent variable (degree earned) and the independent variables (age, level of experience, and level of IT training). The assumptions were tested by examining normal probability plots of residuals and scatterplot diagrams. No violations of normality, homoscedasticity, or linearity were found. No apparent outliers were found when boxplots and scatterplots were examined. Figure 6 shows scatter plot between degree earned and gender of respondent. Refer to Figure 7 for details of scatter plot between degree earned and respondent's age. Details of scatter plot between degree earned and level of IT experience in years are shown in Figure 8. Refer to Figure 9 for details of scatter plot between degree earned and length of current employment in years. Figure 10 shows scatter plot between degree earned and IT training in years.

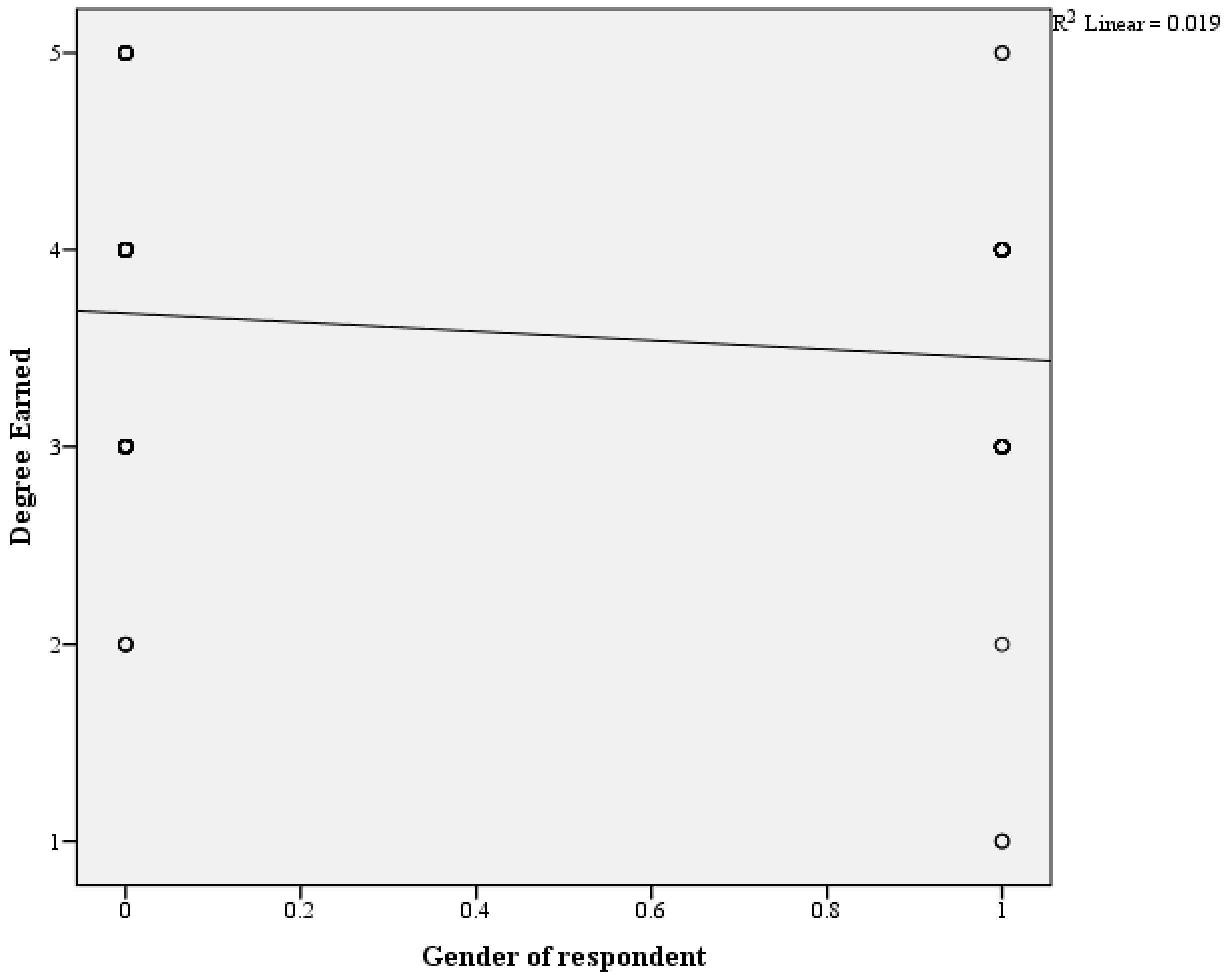

Figure 6. Scatter plot between degree earned and gender of respondent.

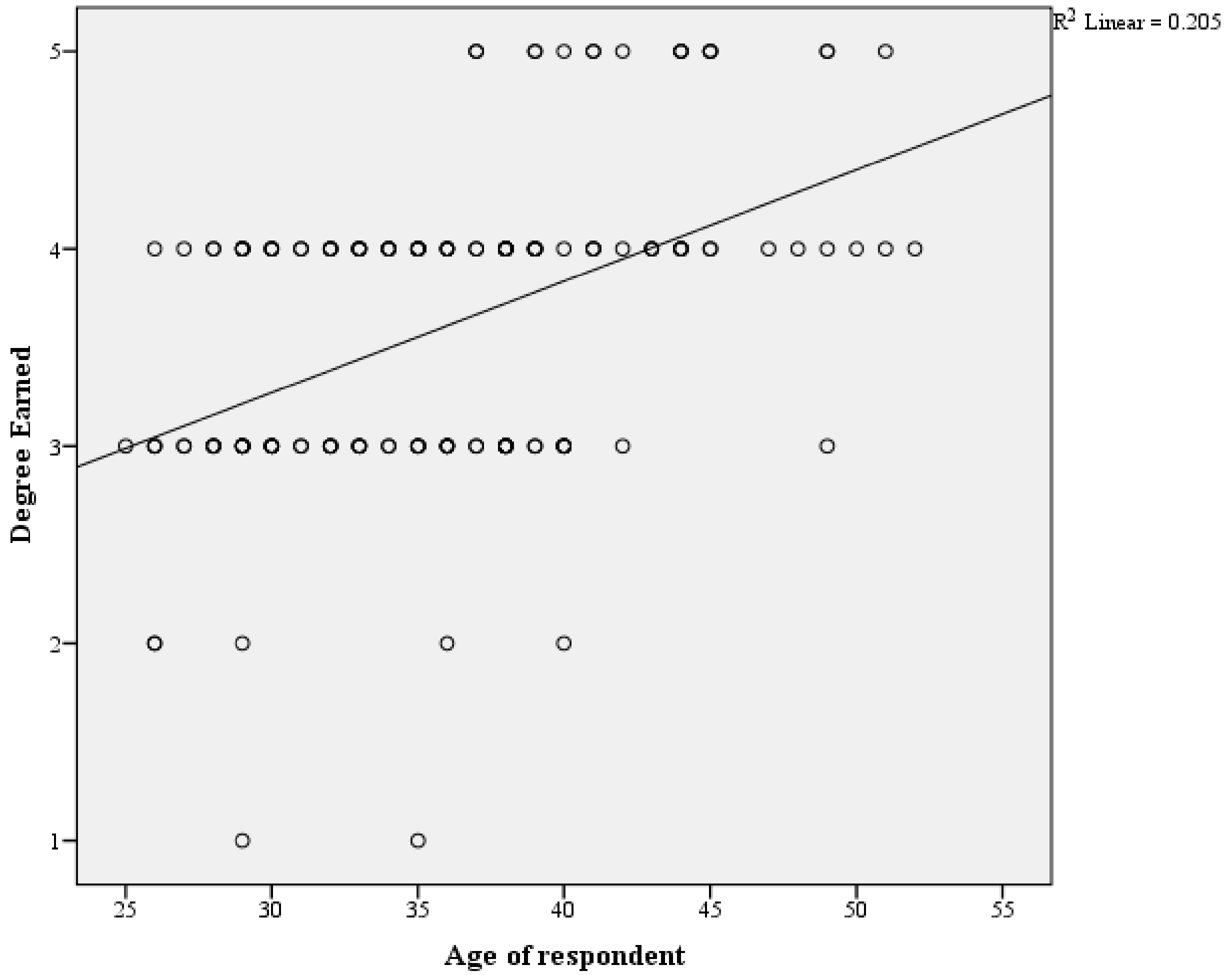

Figure 7. Scatter plot between degree earned and age of respondent.

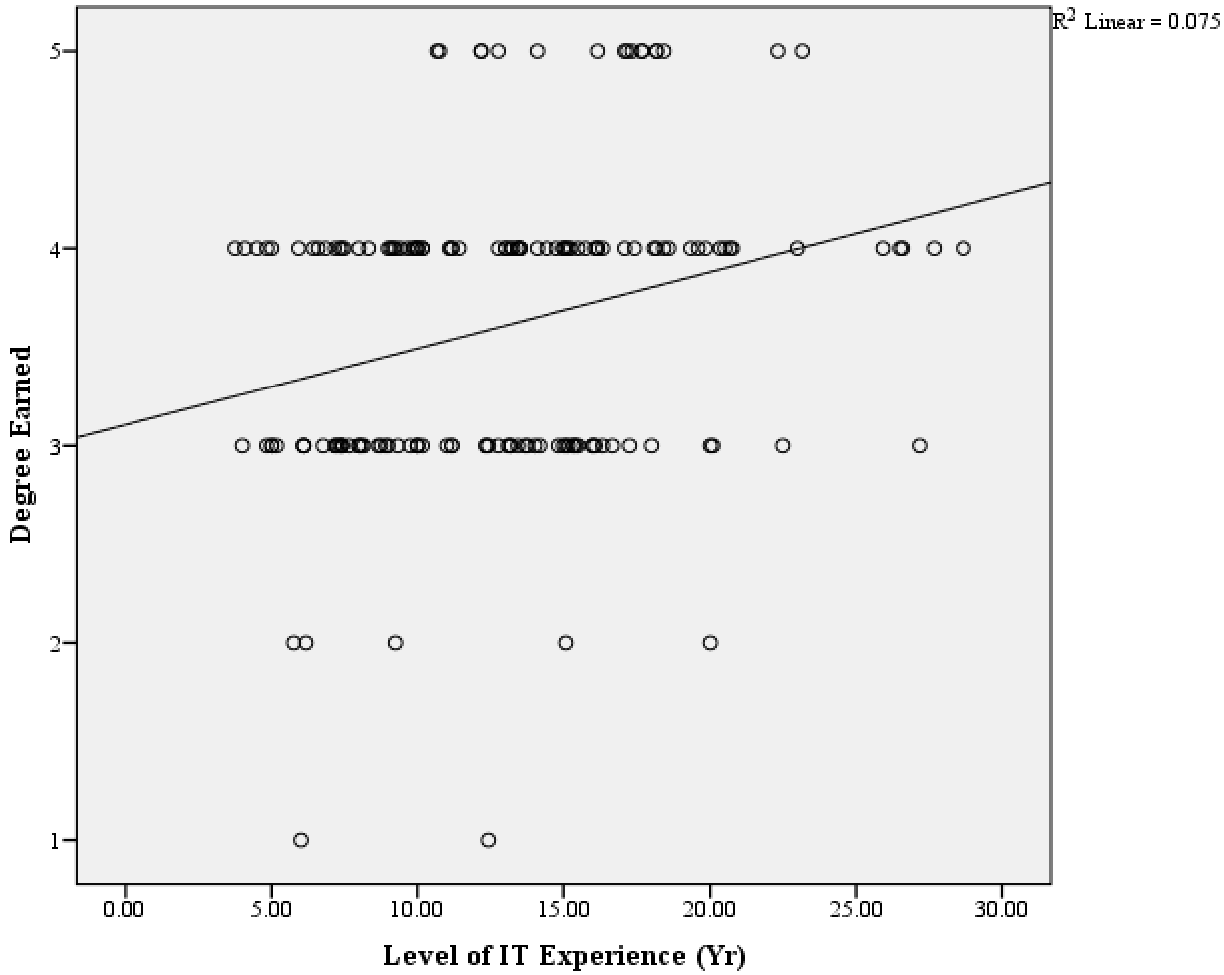

Figure 8. Scatter plot between degree earned and level of IT experience in years.

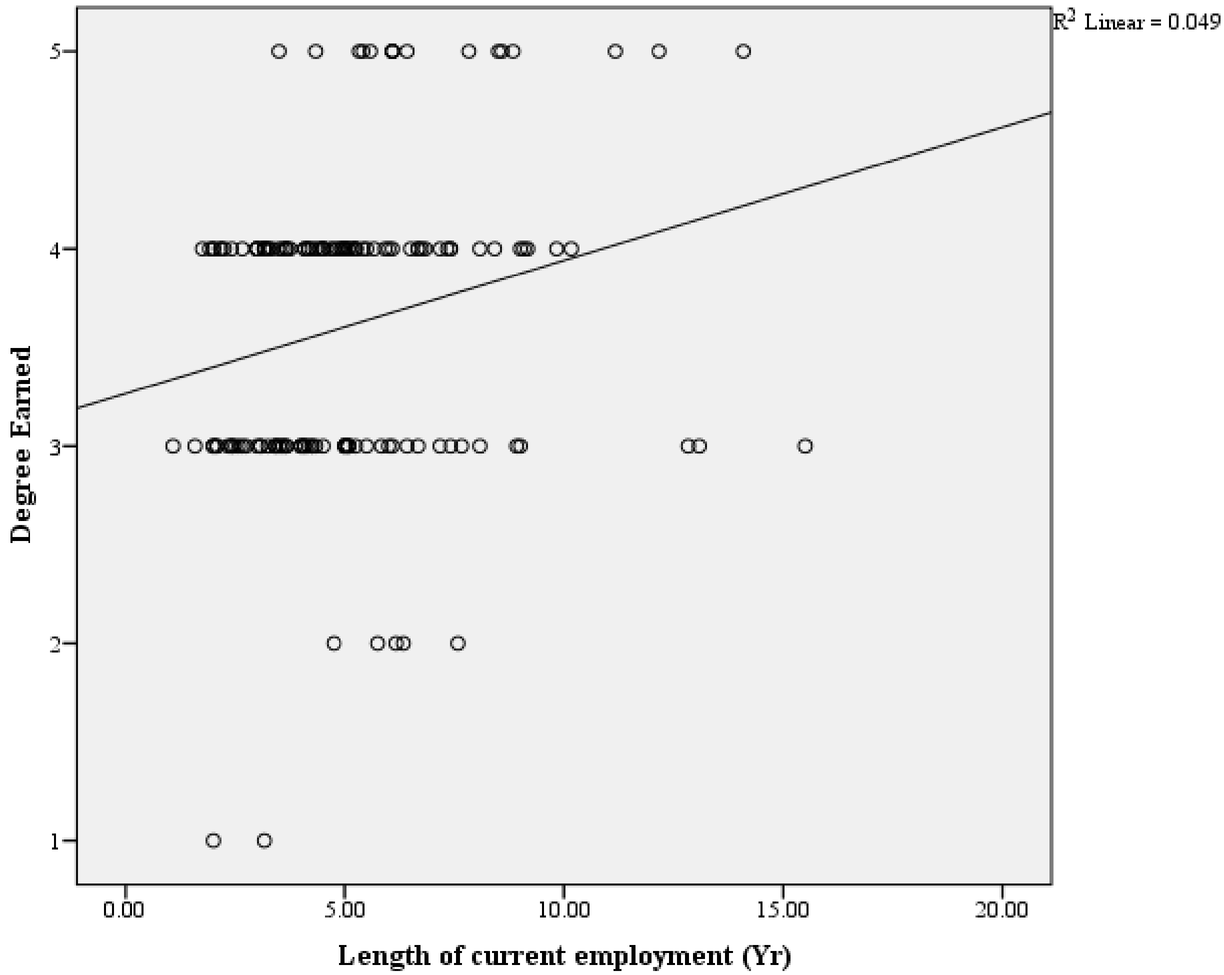

Figure 9. Scatter plot between degree earned and length of current employment in years.

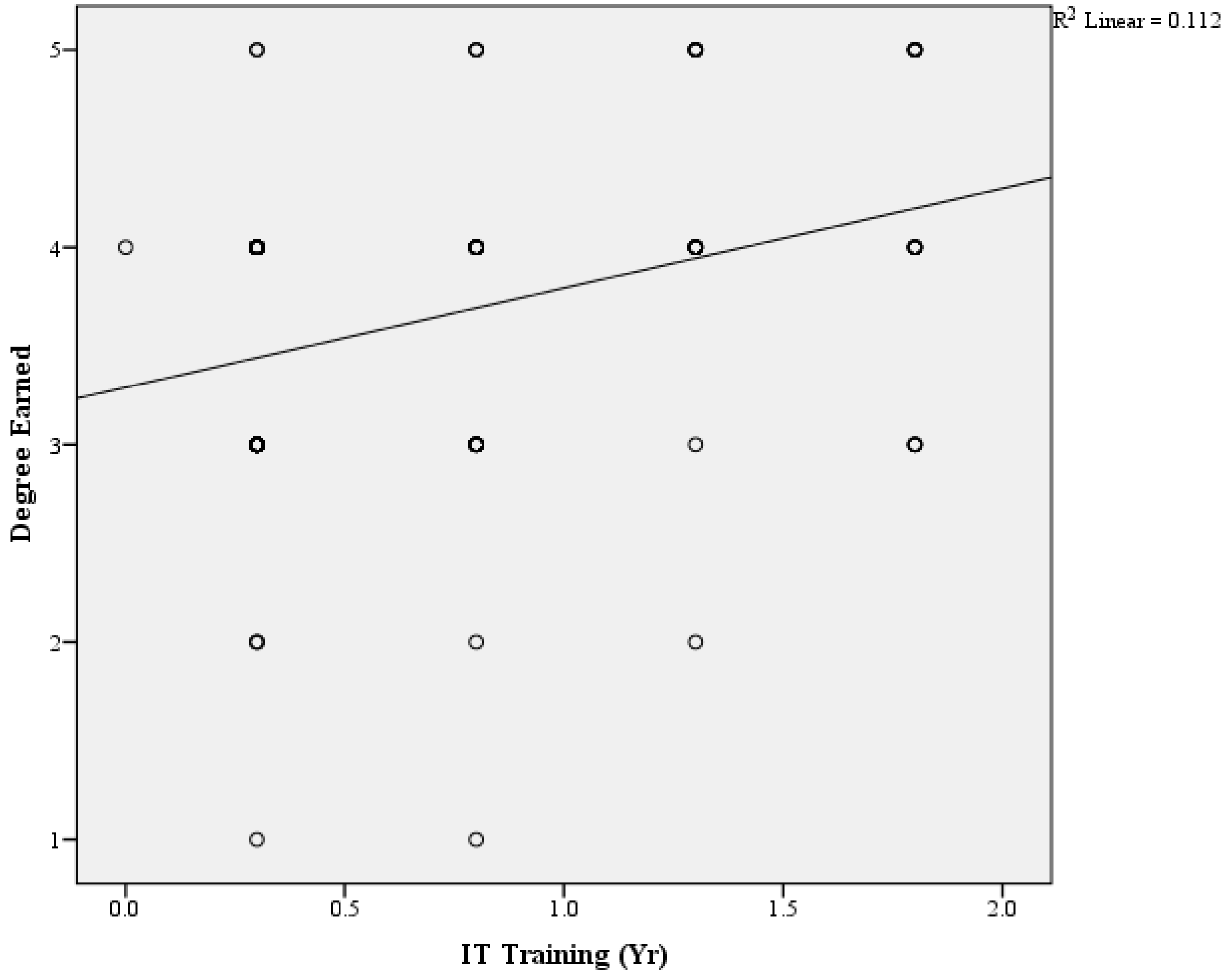

Figure 10. Scatter plot between degree earned and IT training in years.

The results of the regression analysis revealed that the model significantly predicted a relationship with degree earned and the predictor variables, $F(3, 159) = 27.573$, $p < .001$, *R2* for the model was .342 and the adjusted *R2* was .330. The results are listed in Table 9, which shows unstandardized coefficients (*B*) and the standardized coefficients (β) for each variable. When individual relationships were examined between the age of the respondent ($t = 7.037$, $p < .001$), level of IT experience ($t = -5.203$, $p = .001$), and level of IT training ($t = 2.350$, $p < .05$) and degree earned, they were all significant. When the three variables were combined, they contributed 58.5% in shared variability. The 95% confidence interval for each predictor variable did not have a zero and indicated that zero is an unlikely possibility in the population for this association. The partial correlation between degree earned and the age of the respondent was .453, for level of experience it was .273, and for level of IT training it was .334. This indicated that each variable had a small effect on degree earned.

The multicollinearity tolerance diagnostic was used to measure the strength of the linear relationship among the independent variables. A perfect tolerance that explains the proportion of variability not explained by its linear relationship with the other independent variables in the model is one. The age of respondents = .163, level of IT experience = .170, and IT training = .823. There was evidence of multicollinearity since all tolerances were greater than .10. IT training had the greatest level of independence with the dependent variable.

When all the variables are at zero, the constant indicates that people working on IT projects would have less than a high school diploma. For each measure of education earned, the age of respondents will increase by .140 years. For each level of education not earned, we can add -.115 years of experience and for each level of education we can add .251 years of IT training to these workers. This indicated that as a worker's age increases, they are likely to also increase in their level of education and the amount of training they receive. As education increases, the level of IT experience also increases. The model shows that when the level of education was negative, the level of IT experience was also negative; therefore, when education is positive, the level of experience is also positive. The null is rejected in that there is no significant association between software project success factors and the highest degree earned by team members in offshore IT companies. The success factors that are associated with level of education are the age of the respondents, the level of IT experience, and the level of IT training.

Hypothesis 3

$H3_0$: There is no significant association between software project success factors and duration of the project in offshore IT companies.

$H3_A$: There is an association between software project success factors and duration of the project in offshore IT companies.

T test. A paired sample t test was done to determine if the mean difference between project length and length of employment of employment, project length and IT training, project length and team structure, and project length and salary level was significantly different from zero. These variables were chosen because they were significantly related on the correlation matrix at a .05 alpha level. The differences in scores are normally distributed in the population, the sample size is large (n = 163), and the cases represent a random sample from the population with each score independent of each other. Table 10 shows details of paired samples test statistics, and correlations related to hypothesis 3.

Table 10

Paired Samples Correlation and Paired Samples Test Between Project Duration (Length) and Length of Current Employment, IT Training, Team Structure, and Salary Level

Paired samples statistics

		Mean	*N*	Std. deviation	Std. error mean
Pair 1	Project length	3.7853	163	1.66941	.13076
	Length of current employment (yrs)	5.0557	163	2.49937	.19577
Pair 2	Project length	3.7853	163	1.66941	.13076
	IT training (yrs)	.629	163	.5086	.0398
Pair 3	Project length	3.7853	163	1.66941	.13076
	Team structure affect Project outcome	.30	163	.460	.036
Pair 4	Project length	3.7853	163	1.66941	.13076
	Salary level	.35	163	.478	.037

Paired samples correlations

		N	Correlation	Sig.
Pair 1	Project length & length of current employment (yrs)	163	.613	.000
Pair 2	Project length & IT training (yrs)	163	.631	.000
Pair 3	Project length & team structure affect project outcome	163	.438	.000
Pair 4	Project length & salary level	163	.512	.000

(continued)

Paired samples test

		Paired differences							
					95% confidence interval of the difference				
		Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Project length—Length of current employment (yrs)	-1.27045	1.97969	.15506	-1.57665	-.96425	-8.193	162	.000
Pair 2	Project length— IT training (yrs)	3.15583	1.40485	.11004	2.93854	3.37312	28.680	162	.000
Pair 3	Project length—Team structure affect project outcome	3.48466	1.52492	.11944	3.24880	3.72052	29.175	162	.000
Pair 4	Project length—Salary level	3.43558	1.48256	.11612	3.20627	3.66489	29.586	162	.000

The results of the paired sample t test were significant for pair one, $t(162) = -8.193$, $p < .001$, η2= .29; for the second pair $t(162) = 28.680$, $p < .001$, η2 = .79; the third pair $t(162) = 29.175$, $p < .001$, η2 = .81; and for the fourth pair $t(162) = 29.586$, $p < .001$, η2 = .81. The effect size reported by eta squared were all large except for pair one that had a small effect size. The mean for project length ($M = 3.7853$, $SD = 1.6694$) was significantly less than the mean for length of current employment ($M = 5.0557$, $SD = 2.4993$). The 95% confidence interval was -1.57665 to -9.6425 and did not include a zero, indicating that the mean difference of -1.27045 is reasonable for the sample and falls within the level of confidence. The mean differences fell between the 95% confidence interval for each paired sample. The means and standard deviations are presented in Table 10 with the 95% confidence intervals.

Regression. Before a standard bivariate multiple regression analysis was conducted, an examination between the variables using a scatterplot was performed to examine if a linear relationship existed between the dependent variable (project length) and the independent variables, length of current employment, level of IT training, team structure, and salary level. These independent variables were chosen for the model because they all had a significant correlation with the dependent variable. The examination of the scatterplots revealed that a linear relationship was present between the dependent variable and the independent variables. Figure 11 shows scatter plot between project length and IT training in years. Refer to Figure 12 for details of scatter plot between project length of team structure. Details of scatter plot between project length and salary level are shown in Figure 13.

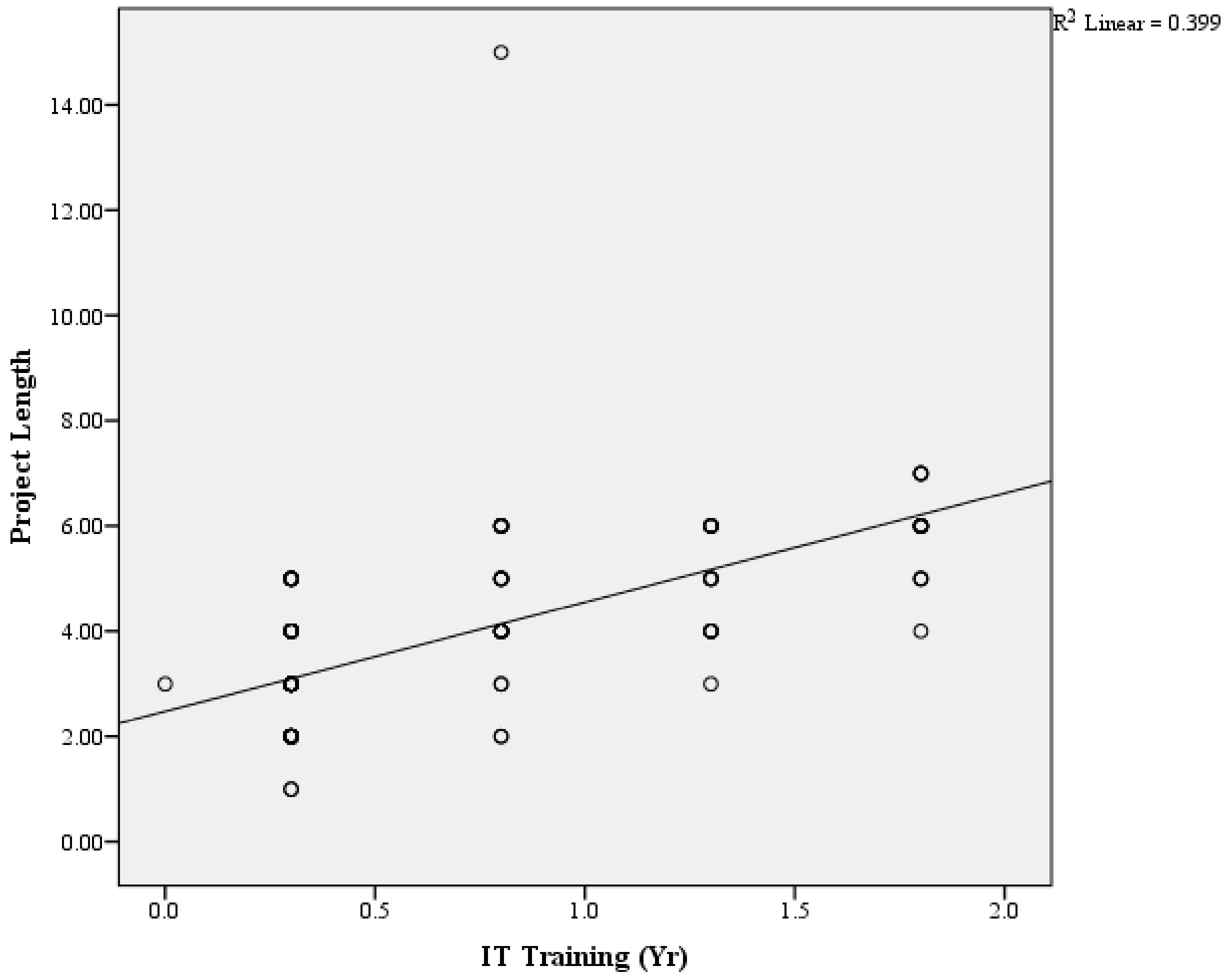

Figure 11. Scatter plot between project length and IT training in years.

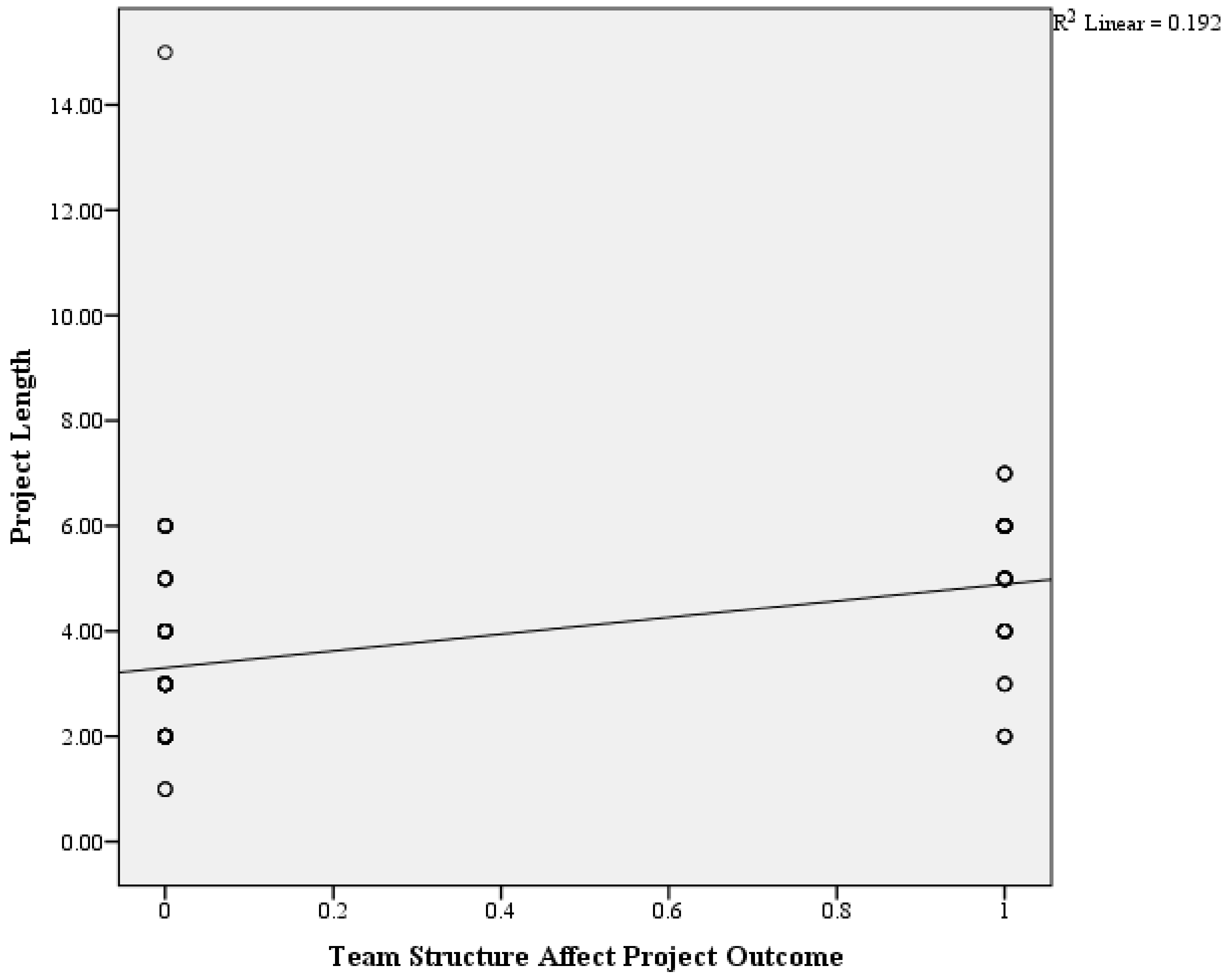

Figure 12. Scatter plot between project length and team structure.

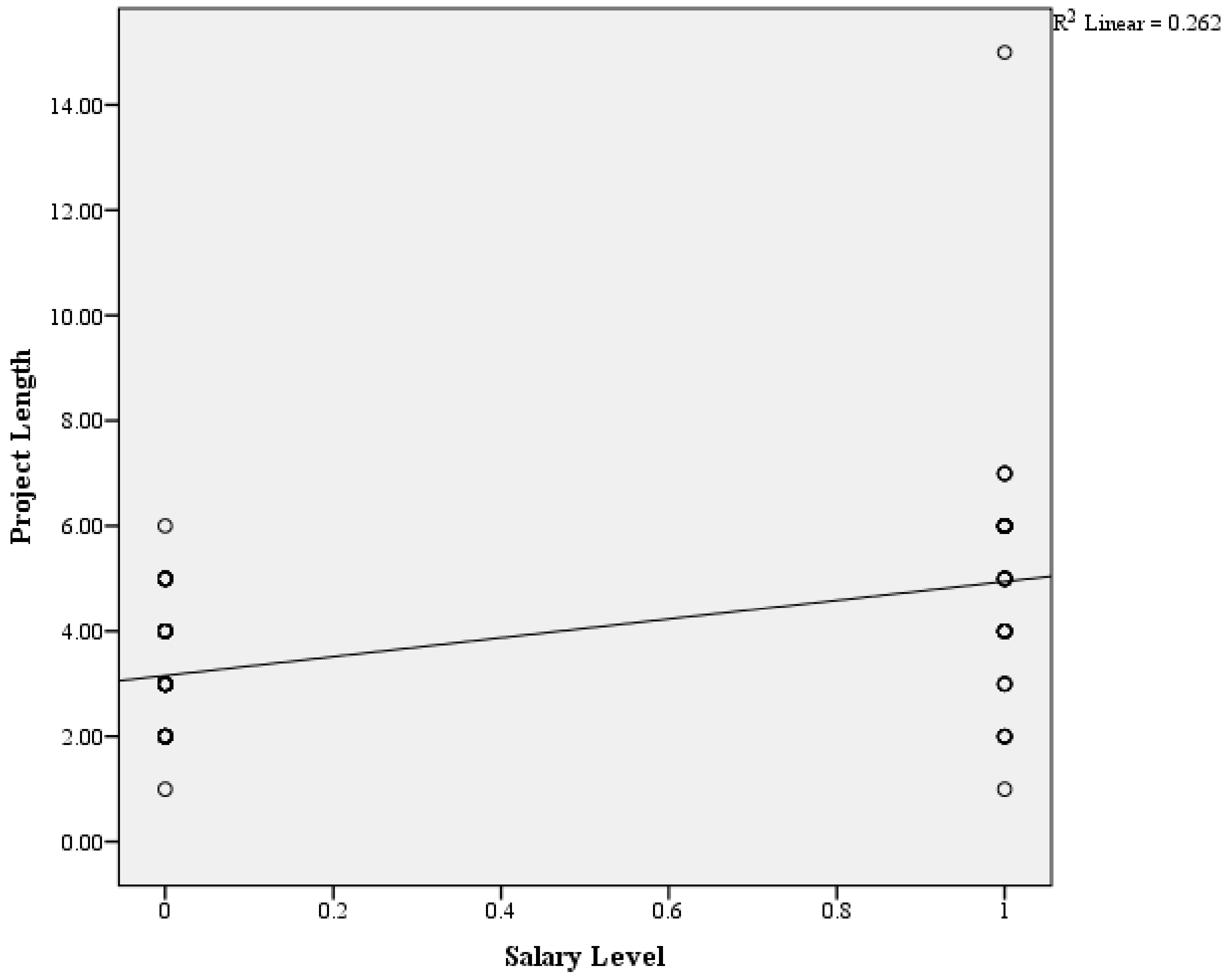

Figure 13. Scatter plot between project length and salary level.

Refer to Table 11 for details of regression analysis related to hypothesis 3. Collinearity diagnostics details related to hypothesis 3 are shown in Table 12.

Table 11

Regression Analysis Between Project Duration (Length) and Length of Current Employment, IT Training, Team Structure, and Salary Level

Descriptive statistics

	Mean	Std. deviation	*N*
Project length	3.7853	1.66941	163
Length of current employment (yrs)	5.0557	2.49937	163
IT training (yrs)	.629	.5086	163
Salary level	.35	.478	163

Correlations

		Project length	Length of current employment (yrs)	IT training (yrs)	Salary level
Pearson correlation	Project length	1.000	.613	.631	.512
	Length of current employment (yrs)	.613	1.000	.467	.415
	IT training (yrs)	.631	.467	1.000	.450
	Salary level	.512	.415	.450	1.000
Sig. (1-tailed)	Project length	.	.000	.000	.000
	Length of current employment (yrs)	.000	.	.000	.000
	IT training (yrs)	.000	.000	.	.000
	Salary level	.000	.000	.000	.
N	Project length	163	163	163	163
	Length of current employment (yrs)	163	163	163	163
	IT training (yrs)	163	163	163	163
	Salary level	163	163	163	163

(continued)

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	$df1$	$df2$	Sig. F change
1	.746[a]	.556	.548	1.12258	.556	66.423	3	159	.000

a. Predictors: (Constant), salary level, length of current employment (yrs), IT training (yrs).

ANOVA[b]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	251.115	3	83.705	66.423	.000[a]
	Residual	200.370	159	1.260		
	Total	451.485	162			

a. Predictors: (Constant), salary level, length of current employment (yrs), IT training (yrs).
b. Dependent variable: Project length.

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients			95.0% confidence interval for B		Correlations			Collinearity statistics	
		B	Std. error	Beta	t	Sig.	Lower bound	Upper bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.566	.202		7.745	.000	1.166	1.965					
	Length of current employment (yrs)	.238	.041	.356	5.753	.000	.156	.319	.613	.415	.304	.729	1.371
	IT training (yrs)	1.240	.207	.378	5.997	.000	.832	1.649	.631	.429	.317	.703	1.422
	Salary level	.678	.214	.194	3.173	.002	.256	1.101	.512	.244	.168	.744	1.344

a. Dependent variable: Project length.

Table 12

Collinearity Diagnostics for Project Duration (Length) and Length of Current Employment, IT Training, and Salary Level

Collinearity diagnostics[a]

Model	Dimension	Eigenvalue	Condition index	Variance proportions (Constant)	Length of current employment (yrs)	IT training (yrs)	Salary level
1	1	3.240	1.000	.02	.01	.02	.03
	2	.453	2.675	.09	.02	.00	.77
	3	.214	3.892	.14	.03	.94	.14
	4	.093	5.913	.75	.93	.04	.05

a. Dependent variable: Project length.

The assumptions were tested by examining normal probability plots of residuals and scatterplot diagrams. No violations of normality, homoscedasticity, or linearity were found. No apparent outliers were found when boxplots and scatterplots were examined. The regression analysis revealed the model significantly predicted an association between software project success and duration of the project in offshore IT companies, $F(3, 159) = 66.423$, $p < .001$, $R2$ was .56, and the adjusted $R2$ was .55. The model used to predict the association was $\hat{Y} = 1.566 + .678$ salary level + 1.240 IT training + .238 length of employment. When individual relationships were examined between the independent variables and project length, salary level $(t = 3.173, p = .002)$ with a confidence interval (CI) ranged from .256 to 1.101. The collinearity tolerance was strong, .774, and the partial correlation was .244. This indicated a significant relationship between the two variables. For IT training $(t = 5.997, p < .001)$, the CI ranged from .832 to 1.649. The collinearity tolerance was strong, .703, and the partial correlation was .429. For the length of employment, (t = 5.753, p < .001), CI ranged from .156 to .319 and the partial correlation was .415. All CIs indicated that zero was not included in the ranges, proving the population scores are likely to be found in the confidence intervals.

The multicollinearity tolerance diagnostic was used to measure the strength of the linear relationship among the independent variables. A perfect tolerance that explains the proportion of variability not explained by its linear relationship with the other independent variables in the model is one. Salary level had the greatest multicollinear level within the model.

This model was a great fit for predicting the relationship and revealed that 55.6% of the observed variability in project success was explained by the three independent variables. The null hypothesis was rejected in that there is no significant association between software project success factors and duration of the project in offshore IT companies. Software project successes are increased a value of one when there is a change of .678 in high salaries. Project length will be improved by a value of one when there is an increase in training of 1.24 years of workers. Project length is improved by a value of one for each .238 of a year workers are employed with their firm. The means and standard deviations are presented in Table 10.

Hypothesis 4

$H4_0$: There is no significant association between software project success and the SDLC methodology used in offshore IT companies.

*H*4A: There is an association between software project success and the SDLC methodology used in offshore IT companies.

T test. A paired sample t test was done to determine if the mean difference between SDLC and age of respondents, SDLC and level of IT experience, SDLC and salary level, and SDLC and satisfied with compensation was significantly different from zero. These variables were chosen because they were significantly related in the correlation matrix at a .05 alpha level. The differences in scores are normally distributed in the population, the sample size is large (n = 163), and the cases represent a random sample from the population with each score independent of each other.

The results of the first pair SDLC and age of respondents was significant, $t(162) = -73.681$, $p < .000$, η2 .97, CI ranged from -36.751 to -34.832, which did not include a zero, with a mean difference of -35.791. This indicated there was a significant difference between the means of both groups, and the confidence interval suggested it is unlikely that a value of zero is present within the population. For the second group, SDLC and level of IT experience, the results were significant, $t(162) = -29.829$, $p < .001$, η2 = .86. The CI ranged from -13.62241 to -11.93076 and did not include a zero, with a mean difference of -12.77658. This indicated it is unlikely a zero is present within the population. Refer to Table 13 for details of paired samples test related to hypothesis 4.

Table 13

Paired Samples Test Between SDLC Impact on Project Success and Age of Respondent, Level of IT Experience, Salary Level, and Satisfaction With Compensation

Paired samples statistics

		Mean	*N*	Std. deviation	Std. error mean
Pair 1	SDLC affect project success	.17	163	.373	.029
	Age of respondent	35.96	163	6.135	.481
Pair 2	SDLC affect project success	.17	163	.373	.029
	Level of IT experience (yrs)	12.9422	163	5.39214	.42234
Pair 3	SDLC affect project success	.17	163	.373	.029
	Salary level	.35	163	.478	.037
Pair 4	SDLC affect project success	.17	163	.373	.029
	Satisfied with compensation	.26	163	.442	.035

Paired samples correlations

		N	Correlation	Sig.
Pair 1	SDLC affect project success & age of respondent	163	-.151	.055
Pair 2	SDLC affect project success & level of IT experience (yrs)	163	-.172	.028
Pair 3	SDLC affect project success & salary level	163	.296	.000
Pair 4	SDLC affect project success & satisfied with compensation	163	.145	.064

(continued)

Paired samples test

		Paired differences							
					95% confidence interval of the difference				
		Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	SDLC affect project success—Age of respondent	-35.791	6.202	.486	-36.751	-34.832	-73.681	162	.000
Pair 2	SDLC affect project success—Level of IT experience (yrs)	-12.77658	5.46853	.42833	-13.62241	-11.93076	-29.829	162	.000
Pair 3	SDLC affect project success—Salary level	-.184	.512	.040	-.263	-.105	-4.589	162	.000
Pair 4	SDLC Affect Project Success—Satisfied with compensation	-.098	.535	.042	-.181	-.015	-2.341	162	.020

For the third group, SDLC and salary level, the results were significant $t(162) = -4.589$, $p < .001$, η2 = .20. The CI ranged from -.263 to -.105, which did not include a zero, with a mean difference of -.184. This indicated that it is unlikely a zero is present within the population. For the fourth group, SDLC and satisfied with compensation, the results were also significant $t(162) = -2.341$, $p < .05$, η2 = .10. The CI ranged from -.181 to -.015, and did not include a zero, with a mean difference of -.098. This indicated that it is unlikely a zero is present within the population. The effect size for the calculation using eta squared was large for the first two pairs and small for the second two pairs. The correlations between each variable and SDLC showed no significant correlation between

SDLC and the age of respondents. There was a significant correlation between SDLC and level of IT experience and a correlation between SDLC and salary levels, but no correlation between SDLC and satisfied with compensation. This indicated SDLC only had an association between IT experience and salary level.

Regression. Before a standard bivariate multiple regression analysis was conducted, an examination between the independent and dependent variables using a scatter plot was performed to examine if a linear relationship existed between the dependent variable and the independent variables. There was a linear relationship between each independent variable and the dependent variable SDLC. Figure 14 shows scatter plot between SDLC impact on project success and age of respondent. Details of scatter plot between SDLC impact on project success and level of IT experience in years are shown in Figure 15. Refer to Figure 16 for details of scatter plot between SDLC impact on project success and salary level.

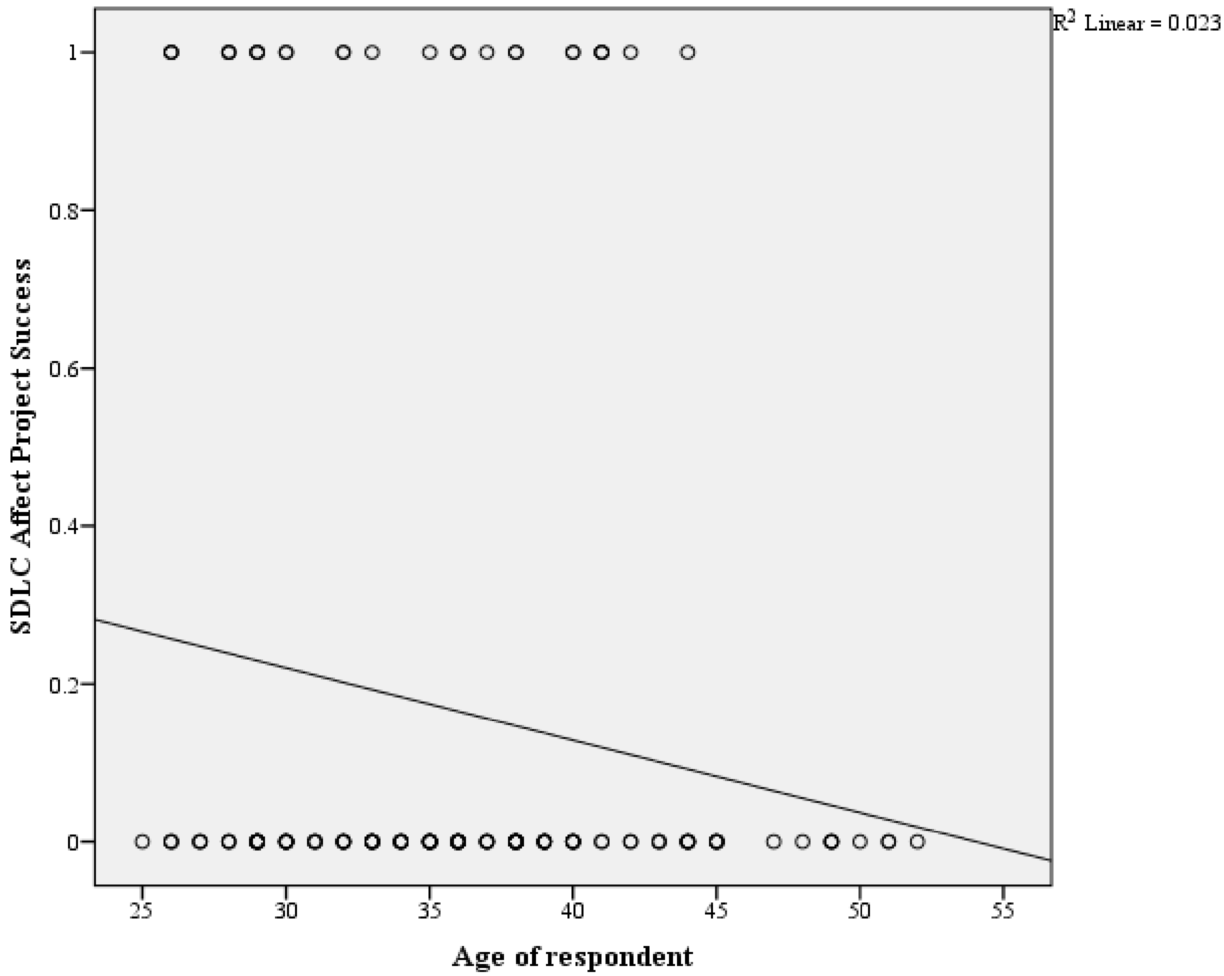

Figure 14. Scatter plot between SDLC impact on project success and age of respondent.

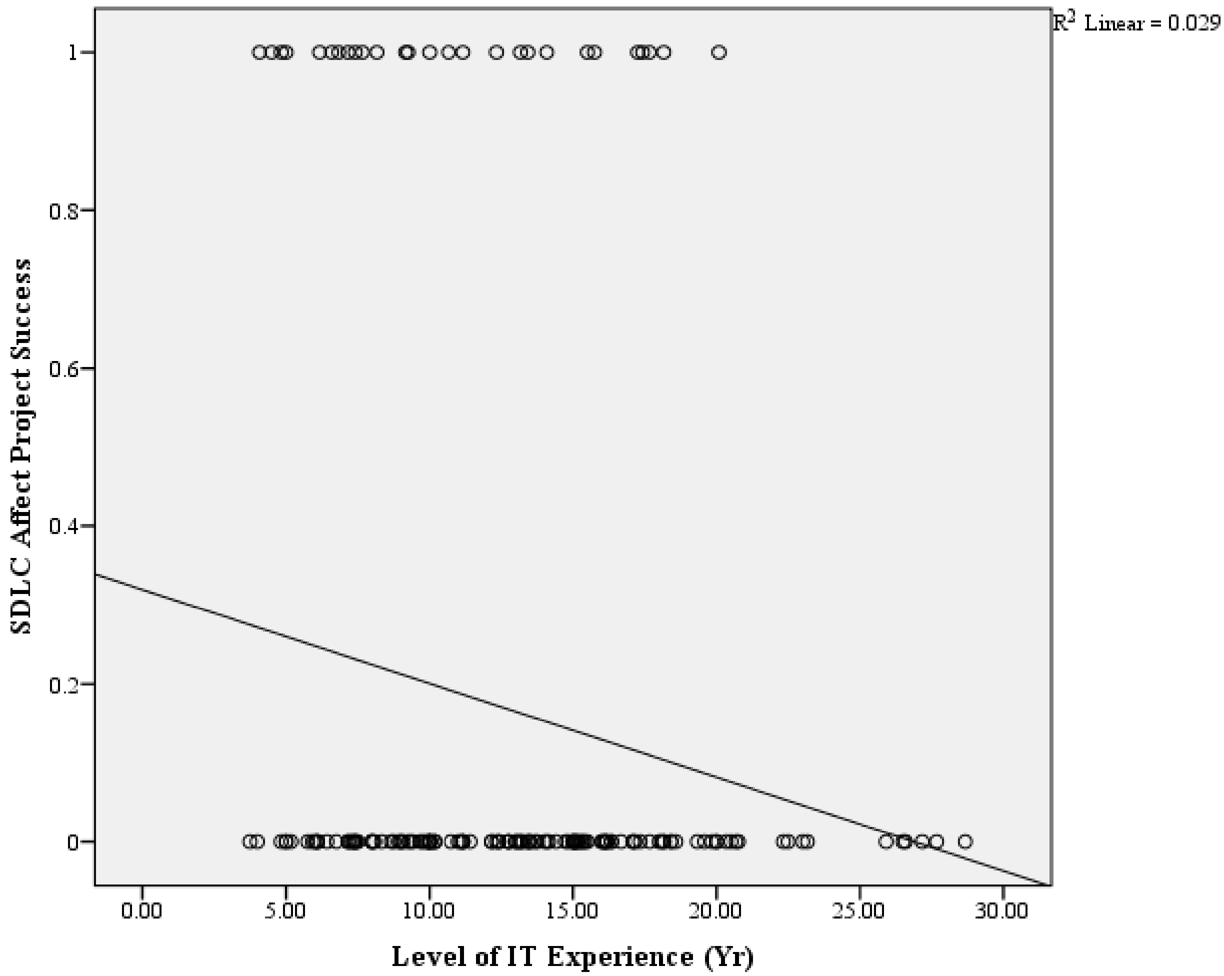

Figure 15. Scatter plot between SDLC impact on project success and level of IT experience (yrs).

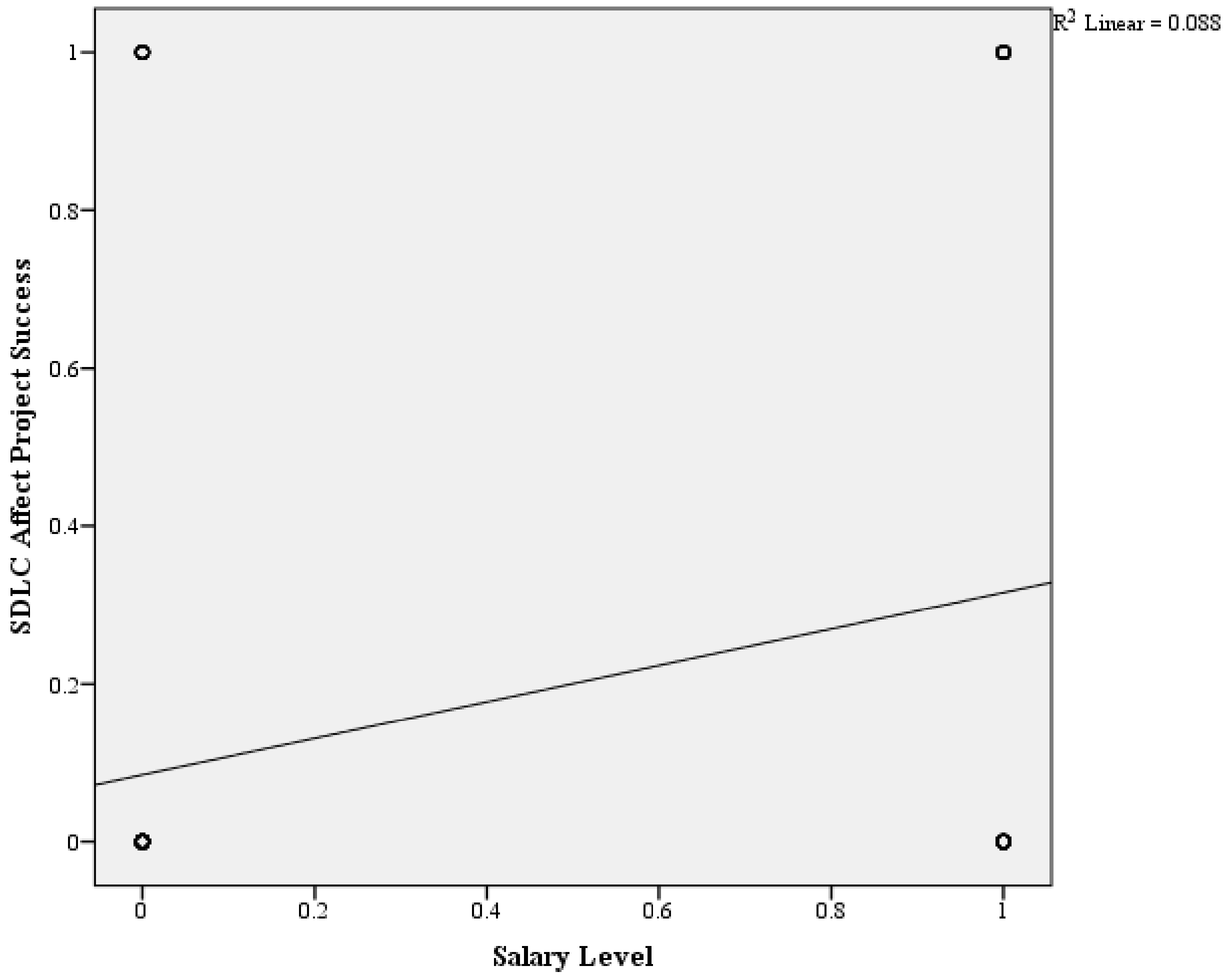

Figure 16. Scatter plot between SDLC impact on project success and salary level.

The results of the regression analysis revealed that the model significantly predicted a relationship among the dependent variable SDLC and the predictor variables, $F(4, 158) = 5.095$, $p < .001$, $R2$ for the model was .114 and the adjusted $R2$ was .092. The results are listed in Table 13, which shows unstandardized coefficients (B) and the standardized coefficients (β) for each variable. When individual relationships were examined between the age of the respondent ($t = -.290$, $p > .05$), level of IT experience ($t = -.567$, $p > .05$), salary level ($t = 3.507$, $p = .05$) and satisfied with compensation ($t = .510$, $p > .05$), they were all non significant except for salary level, which was significant at a $p < .05$ level. When the four variables were combined, they contributed 11.4% in shared variability, indicating a weak model. The 95% confidence interval for salary level as a predictor variable did not have a zero and indicated that zero is an unlikely possibility in the population for this association. The partial correlation between age of respondent and SDLC was -.151, for level of experience it was -.172, salary level was .296, and for satisfied with compensation it was .145. This indicated that each variable had a small effect on SDLC.

The model used to predict the association was $\hat{Y} = .291 + .034$ satisfaction with compensation + .217 salary level - .007 level of IT experience - .003 age of respondents. The multicollinearity tolerance diagnostic was used to measure the strength of the linear relationship among the independent variables. A perfect tolerance that explains the proportion of variability not explained by its linear relationship with the other independent variables in the model is one. Salary level had the greatest multicollinear level within the model. The tolerance level for salary level was .892 and satisfied with compensation was .879. The tolerance levels for the other two variables were .16. Refer to Table 14 for details of paired samples test statistics, correlations, and model summary related to hypothesis 4. Collinearity diagnostics related to hypothesis 4 are shown in Table 15.

Table 14

Paired Samples Test Between SDLC Impact on Project Success and Age of Respondent, Level of IT Experience, Salary Level, and Satisfaction With Compensation

Descriptive statistics

	Mean	Std. deviation	*N*
SDLC affect project success	.17	.373	163
Age of respondent	35.96	6.135	163
Level of IT experience (yrs)	12.9422	5.39214	163
Salary level	.35	.478	163
Satisfied with compensation	.26	.442	163

Correlations

		SDLC affect project success	Age of respondent	Level of IT experience (yrs)	Salary level	Satisfied with compensation
Pearson correlation	SDLC affect project success	1.000	-.151	-.172	.296	.145
	Age of respondent	-.151	1.000	.911	.001	-.057
	Level of IT experience (yrs)	-.172	.911	1.000	-.049	-.119
	Salary level	.296	.001	-.049	1.000	.320
	Satisfied with compensation	.145	-.057	-.119	.320	1.000
Sig. (1-tailed)	SDLC affect project success	.	.027	.014	.000	.032
	Age of respondent	.027	.	.000	.495	.234
	Level of IT experience (yrs)	.014	.000	.	.266	.066
	Salary level	.000	.495	.266	.	.000
	Satisfied with compensation	.032	.234	.066	.000	.
N	SDLC affect project success	163	163	163	163	163
	Age of respondent	163	163	163	163	163
	Level of IT experience (yrs)	163	163	163	163	163
	Salary level	163	163	163	163	163
	Satisfied with compensation	163	163	163	163	163

(continued)

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics: R square change	F change	df1	df2	Sig. F change
1	.338[a]	.114	.092	.355	.114	5.095	4	158	.001

a. Predictors: (Constant), satisfied with compensation, age of respondent, salary level, level of IT experience (yrs).

ANOVA[b]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	2.574	4	.643	5.095	.001[a]
	Residual	19.954	158	.126		
	Total	22.528	162			

a. Predictors: (Constant), satisfied with compensation, age of respondent, salary level, level of IT experience (yrs).
b. Dependent variable: SDLC affect project success.

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients			95.0% confidence interval for B		Correlations			Collinearity statistics	
		B	Std. error	Beta	t	Sig.	Lower bound	Upper bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.291	.259		1.121	.264	-.221	.803					
	Age of respondent	-.003	.011	-.053	-.290	.772	-.025	.019	-.151	-.023	-.022	.166	6.014
	Level of IT experience (yrs)	-.007	.013	-.105	-.567	.571	-.032	.018	-.172	-.045	-.042	.165	6.078
	Salary level	.217	.062	.278	3.507	.001	.095	.339	.296	.269	.263	.892	1.121
	Satisfied with compensation	.034	.067	.041	.510	.610	-.099	.167	.145	.041	.038	.879	1.137

a. Dependent variable: SDLC affect project success.

Table 15

Collinearity Diagnostics for SDLC Impact on Project Success and Age of Respondent, Level of IT Experience, Salary Level, and Satisfaction With Compensation

Collinearity diagnostics[a]

Model	Dimension		Eigenvalue	Condition index	Variance proportions				
					(Constant)	Age of respondent	Level of IT experience (yrs)	Salary level	Satisfied with compensation
1	dimension1	1	3.689	1.000	.00	.00	.00	.02	.02
		2	.773	2.184	.00	.00	.00	.17	.44
		3	.462	2.824	.00	.00	.00	.79	.50
		4	.072	7.138	.07	.00	.18	.02	.04
		5	.003	34.771	.93	1.00	.82	.00	.01

a. Dependent variable: SDLC affect project success.

When all the variables are at zero, the constant indicates that SDLC slightly affected project success. The age variable had a negative but nonsignificant effect on the dependent variable and as the SDLC affected project success, the age of IT workers was reduced by .003 years. This indicated that the younger the worker the less the SDLC affected the success of the project. The level of IT experience also had a nonsignificant relationship with the SDLC and the model revealed that when the model affected project success, the level of IT experience was less. This indicated that people with less IT experience allowed the SDLC to affect the project success.

When each unit of SDLC that affected the project success increased, the level of salaries was increased by .217 units. This indicated that as the SDLC methodology units increased, people who were paid higher salaries were needed because of the greater levels of skills they possessed. As the level of SDLC increased, the level of people who were satisfied with their salary were increased, indicating that people who were satisfied with their salaries had a positive effect on the SDLC and how it affected project success. The model is a good fit and the null is rejected in that there is no significant association between software project success and the SDLC methodology used in offshore IT companies. The success factor that is significantly associated with SDLC methodology was the level of salary people were paid. This indicated that when salaries were high, the SDLC methodology affects the project in a positive way.

Hypothesis 5

$H5_0$: There is no significant association between software project success and the team structure followed in offshore IT companies.

$H5_A$: There is an association between software project success and the team structure followed in offshore IT companies.

T test. A paired sample t test was done to determine if the mean difference between the dependent variable (team structure) and each independent variable (length of employment, project length, IT training, salary level, and satisfied with compensation) was significantly different from zero. These variables were chosen because they were significantly related on the correlation matrix at a .05 alpha level. The differences in scores are normally distributed in the population, the sample size is large (n = 163), and the cases represent a random sample from the population with each score independent of each other. Details of paired samples test statistics, and correlations are shown in Table 16.

Table 16

Paired Samples Test Between Team Structure Impact on Project Success and Length of Current Employment (Yrs), Project Length, Salary Level, Satisfaction With Compensation, and IT Training

Paired samples statistics

		Mean	*N*	Std. deviation	Std. error mean
Pair 1	Team structure affect project outcome	.30	163	.460	.036
	Length of current employment (yrs)	5.0557	163	2.49937	.19577
Pair 2	Team structure affect project outcome	.30	163	.460	.036
	Project length	3.7853	163	1.66941	.13076
Pair 3	Team structure affect project outcome	.30	163	.460	.036
	Salary level	.35	163	.478	.037
Pair 4	Team structure affect project outcome	.30	163	.460	.036
	Satisfied with compensation	.26	163	.442	.035
Pair 5	Team structure affect project outcome	.30	163	.460	.036
	IT training (yrs)	.629	163	.5086	.0398

Paired samples correlations

		N	Correlation	Sig.
Pair 1	Team structure affect project outcome & length of current employment (yrs)	163	.167	.033
Pair 2	Team structure affect project outcome & project length	163	.438	.000
Pair 3	Team structure affect project outcome & salary level	163	.333	.000
Pair 4	Team structure affect project outcome & satisfied with compensation	163	.184	.018
Pair 5	Team structure affect project outcome & IT training (yrs)	163	.379	.000

(continued)

Paired samples test

		Paired differences							
					95% confidence interval of the difference				
		Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Team structure affect project outcome—Length of current employment (yrs)	-4.75511	2.46463	.19304	-5.13632	-4.37390	-24.632	162	.000
Pair 2	Team structure affect project outcome—Project length	-3.48466	1.52492	.11944	-3.72052	-3.24880	-29.175	162	.000
Pair 3	Team structure affect project outcome—Salary level	-.049	.542	.042	-.133	.035	-1.156	162	.249
Pair 4	Team structure affect project outcome—Satisfied with compensation	.037	.576	.045	-.052	.126	.816	162	.416
Pair 5	Team structure affect project outcome— IT training (yrs)	-.3288	.5412	.0424	-.4125	-.2451	-7.757	162	.000

The results of the paired sample *t* test were significant for pair one, $t(162) = -24.632$, $p < .001$, $\eta 2 = .80$ and for the second pair $t(162) = -29.175$, $p < .001$, $\eta 2 = .81$. For the third pair $t(162) = -1.156$, $p > .05$, *NS*, and for the fourth pair $t(162) = .816$, $p > .05$, *NS*, and for the fifth pair $t(162) = -.7.757$, $p < .01$, $\eta 2 = .32$. The effect size reported by eta squared was large for the first two pairs and small for the fifth pair. The means and standard deviations are presented in Table 16. The 95% confidence interval for pair one was -5.13632 to -4.37390 and did not include a zero, indicating that the mean difference of -4.75511 is reasonable for the sample and falls within the level of confidence. The 95% confidence interval for pair two was -3.72052 to -3.72052 and did not include a zero, indicating that the mean difference of -3.48466 is reasonable for the sample and falls within the level of confidence, that sample came from the population. The 95% confidence interval for pair five was -.4125 to -.2451 and did not include a zero, indicating that the mean difference of -.3288 is reasonable for the sample and falls within the level of confidence.

Regression. Before a standard bivariate multiple regression analysis was conducted, an examination of the relationship between the variables using a scatterplot was performed to examine if a linear relationship existed between the dependent variable (team structure) and the independent variables (project length, level of IT training, and length of current employment). These variables were chosen for the model because they all had a significant correlation with the dependent variable and were significant when tested with a paired sample t test. The examination of the scatterplots revealed that a linear relationship was present between the dependent variable and the independent variables. Figure 17 shows scatter plot between team structure impact on project success and length of current employment in years. Refer to Figure 18 for scatter plot between team structure impact on project success and project length. Details of scatter plot between team structure impact on project success and salary level are shown in Figure 19. Refer to Figure 20 for scatter plot between team structure impact on project success and compensation satisfaction.

Figure 21 shows scatter plot between team structure impact on project success and IT training in years.

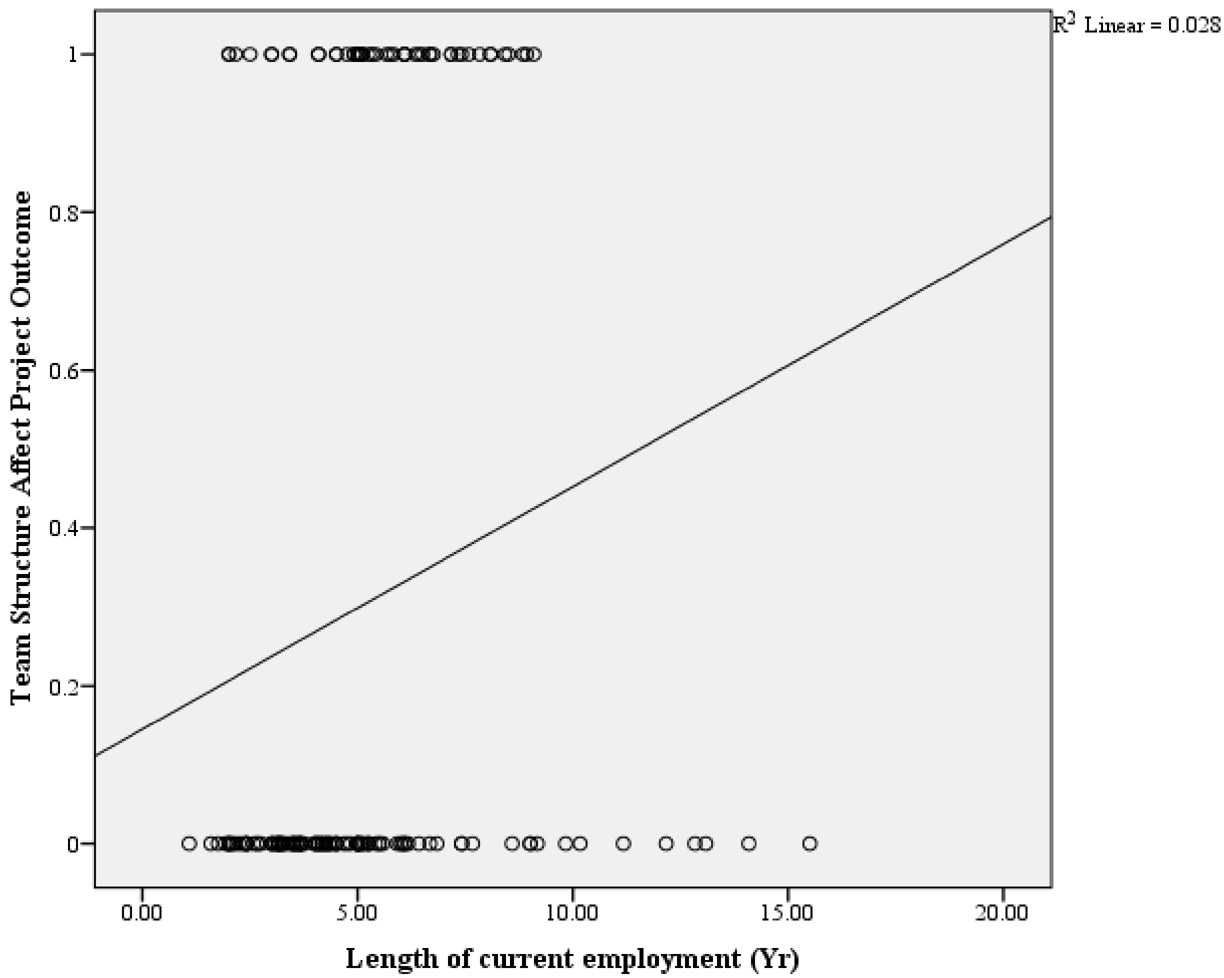

Figure 17. Scatter plot between team structure impact on project success and length of current employment (yrs).

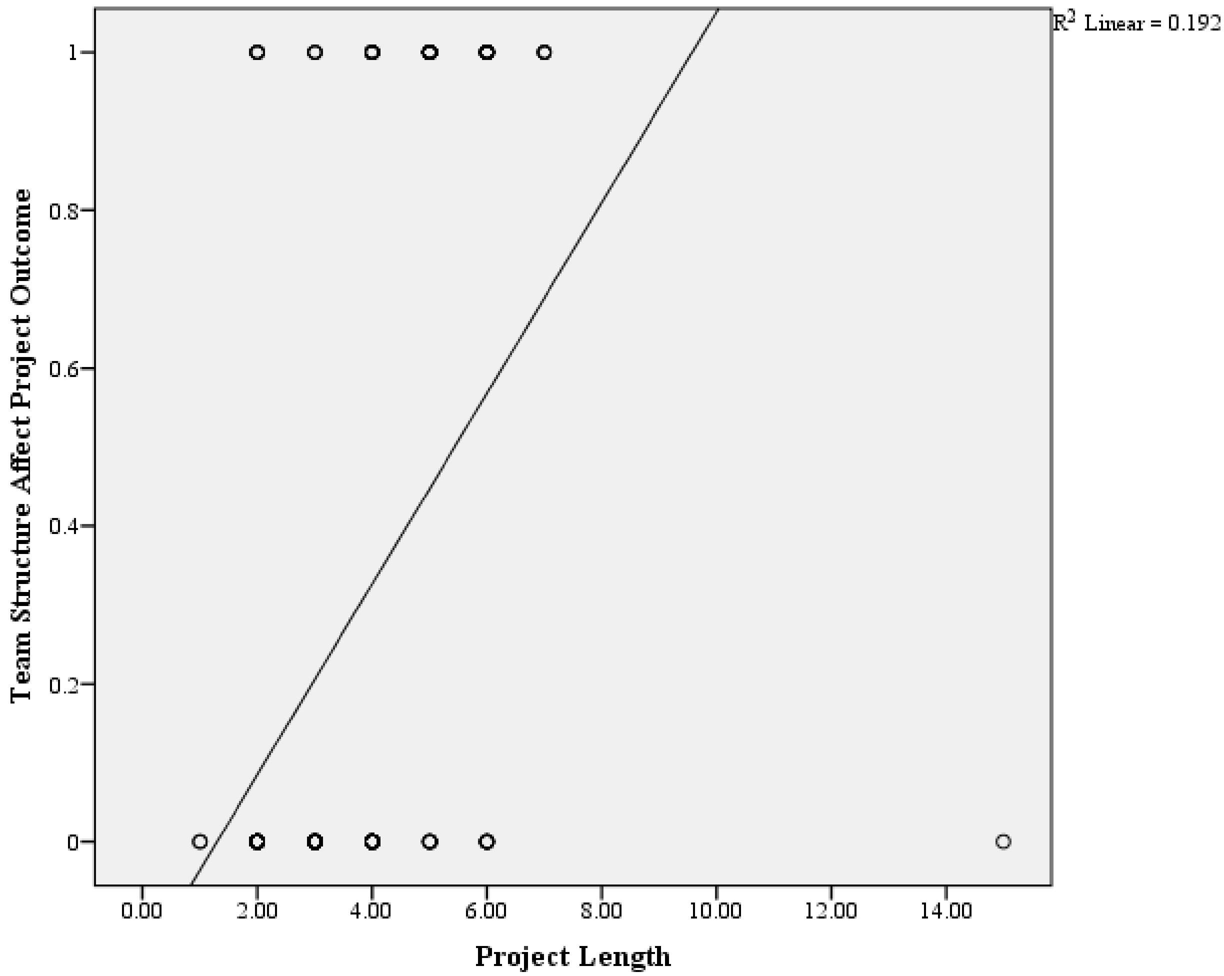

Figure 18. Scatter plot between team structure impact on project success and project length.

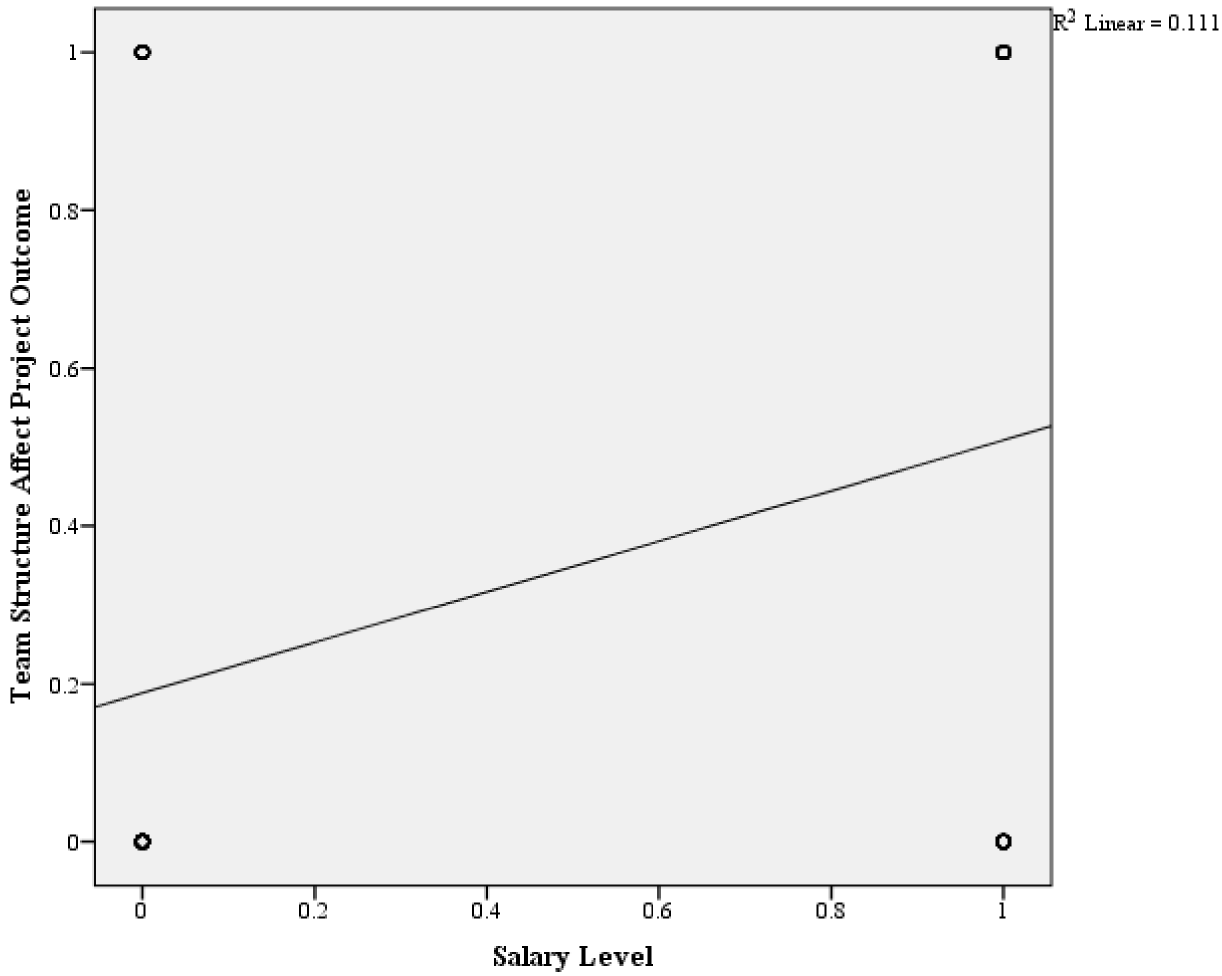

Figure 19. Scatter plot between team structure impact on project success and salary level.

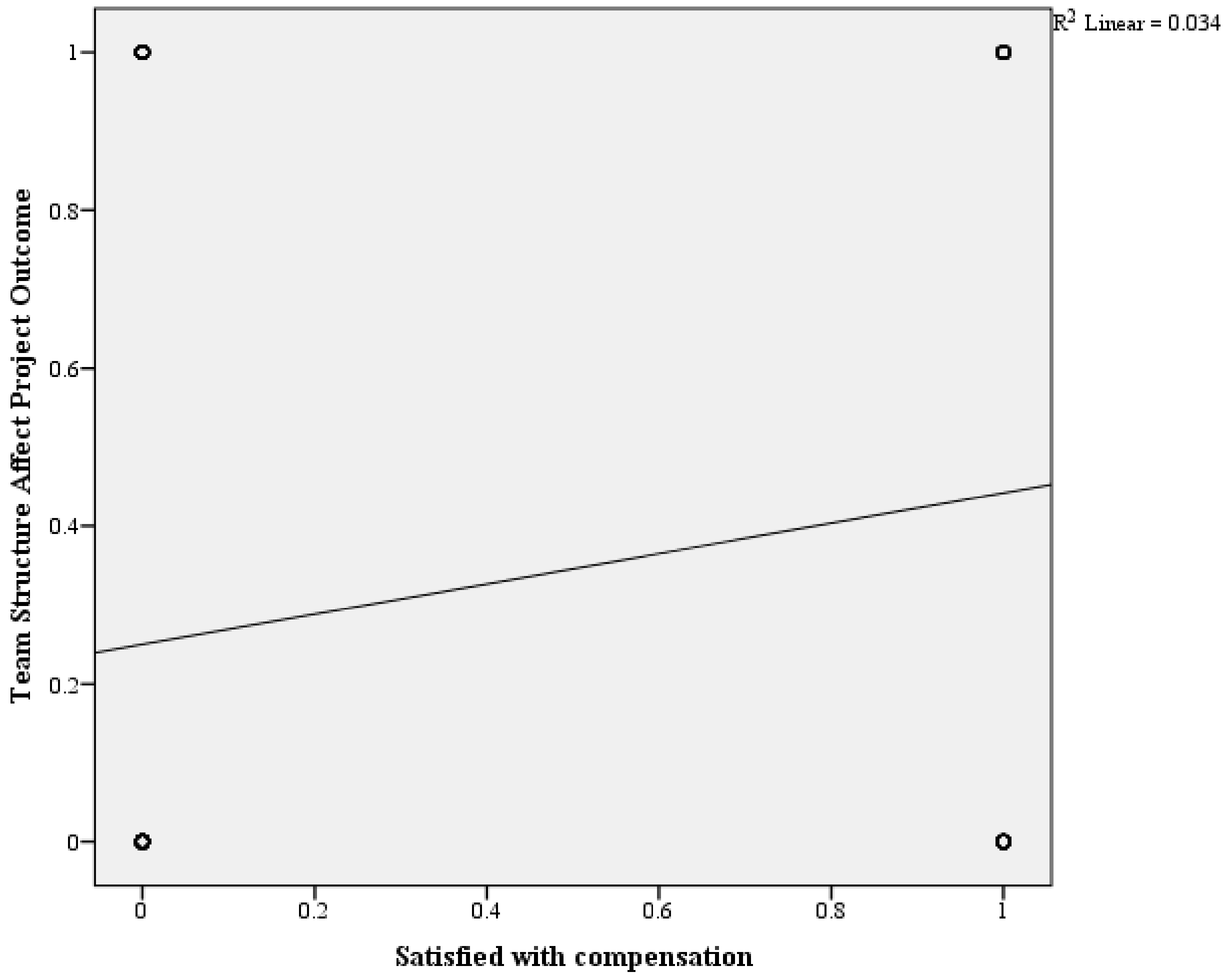

Figure 20. Scatter plot between team structure impact on project success and compensation satisfaction.

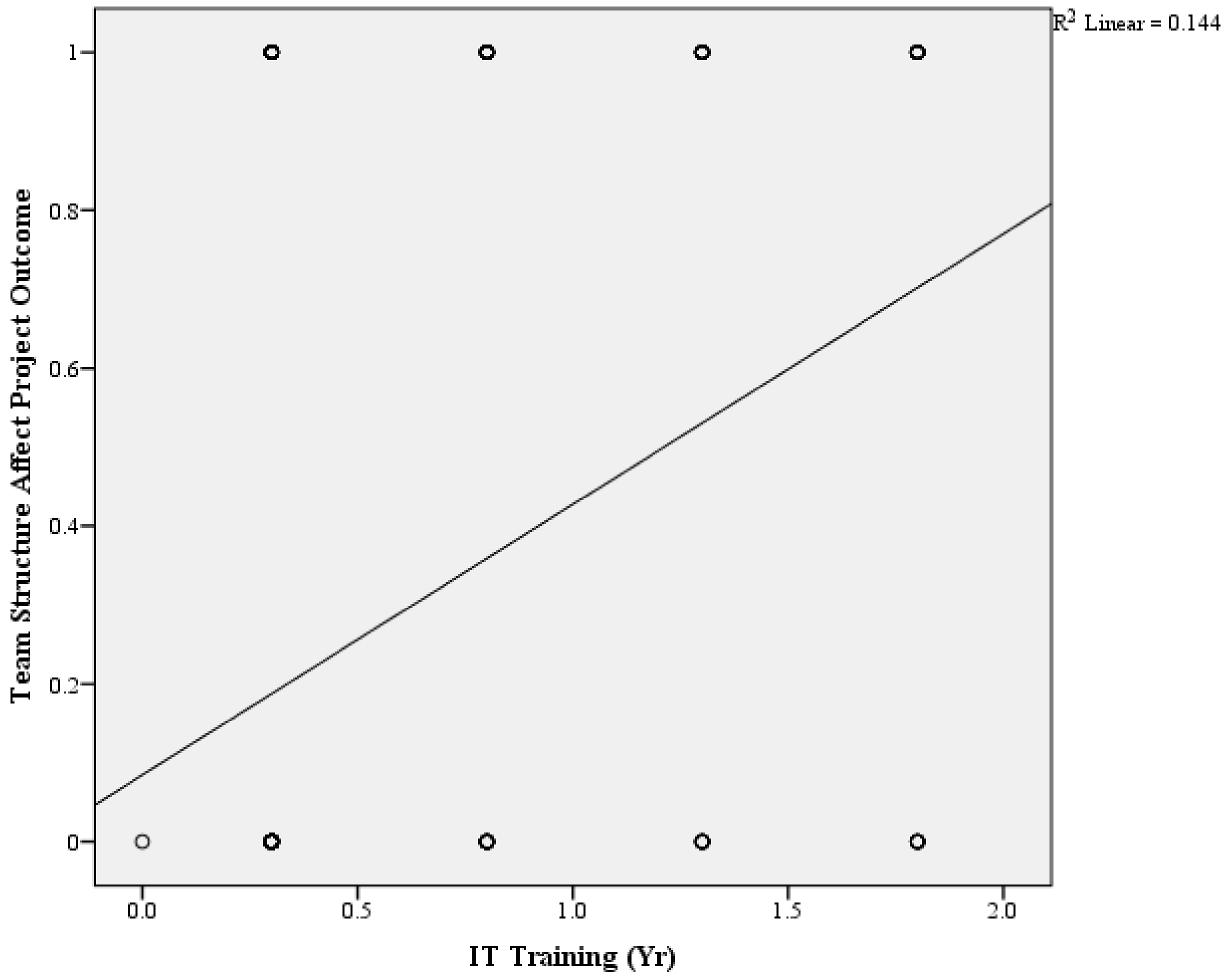

Figure 21. Scatter plot between team structure impact on project success and IT training (yrs).

The assumptions were tested by examining normal probability plots of residuals and scatterplot diagrams. No violations of normality, homoscedasticity, or linearity were found. No apparent outliers were found when boxplots and scatterplots were examined. The results of the regression analysis revealed that the model significantly predicted a relationship between the dependent variable (team structure) and the predictor variables (length of the project, length of current employment, and level of IT training), $F(3, 159) = 15.928$, $p < .001$, $R2$ for the model was .231 and the adjusted $R2$ was .217. The results are listed in Table 17, which shows unstandardized coefficients (*B*) and the standardized coefficients (β) for each variable. When individual relationships were examined between project length *(t* = 4.251, *p* <.01), level of IT training *(t* = -.567, *p* >.05), and satisfied with compensation *(t* = 2.153, *p* <.05) and team structure, they were significant. Refer to Table 17 for details of regression analysis related to hypothesis 5.

Table 17

Regression Analysis of Team Structure Impact on Project Success and Length of Current Employment (Yrs), Project Length, Salary Level, Satisfaction With Compensation, and IT Training

Descriptive statistics

	Mean	Std. deviation	*N*
Team structure affect project outcome	.30	.460	163
Length of current employment (yrs)	5.0557	2.49937	163
IT training (yrs)	.629	.5086	163
Project length	3.7853	1.66941	163

Correlations

		Team structure affect project outcome	Length of current employment (yrs)	IT training (yrs)	Project length
Pearson correlation	Team structure affect project outcome	1.000	.167	.379	.438
	Length of current employment (yrs)	.167	1.000	.467	.613
	IT training (yrs)	.379	.467	1.000	.631
	Project length	.438	.613	.631	1.000
Sig. (1-tailed)	Team structure affect project outcome	.	.017	.000	.000
	Length of current employment (yrs)	.017	.	.000	.000
	IT training (yrs)	.000	.000	.	.000
	Project length	.000	.000	.000	.
N	Team structure affect project outcome	163	163	163	163
	Length of current employment (yrs)	163	163	163	163
	IT training (yrs)	163	163	163	163
	Project length	163	163	163	163

(continued)

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	.481[a]	.231	.217	.407	.231	15.928	3	159	.000

a. Predictors: (Constant), project length, length of current employment (yrs), IT training (yrs).

ANOVA[b]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	7.919	3	2.640	15.928	.000[a]
	Residual	26.351	159	.166		
	Total	34.270	162			

a. Predictors: (Constant), project length, length of current employment (yrs), IT training (yrs).
b. Dependent variable: Team structure affect project outcome.

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients			95.0% confidence interval for B		Correlations			Collinearity statistics	
		B	Std. error	Beta	t	Sig.	Lower bound	Upper bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.085	.084		-1.006	.316	-.250	.081					
	Length of current employment (yrs)	-.035	.016	-.188	-2.114	.036	-.067	-.002	.167	-.165	-.147	.614	1.629
	IT training (yrs)	.176	.082	.195	2.153	.033	.015	.338	.379	.168	.150	.591	1.691
	Project length	.119	.028	.430	4.251	.000	.063	.174	.438	.319	.296	.472	2.119

a. Dependent variable: Team structure affect project outcome.

When the three variables were combined, they contributed 23.1% in shared variability, indicating a moderate model for predicting the relationship. The 95% confidence interval for project length ranged from .063 to .174 and did not have a zero, which indicated that zero is an unlikely possibility in the population for this association. The 95% confidence interval for level of IT training ranged from .015 to .338 and did not have a zero, which indicated that zero is an unlikely possibility in the population for this association. The 95% confidence interval for project length ranged from .063 to .174 and did not have a zero, which indicated that zero is an unlikely possibility in the population for this association. The 95% confidence interval for length of current employment ranged from -.067 to -.002 and did not have a zero, which indicated that zero is an unlikely possibility in the population for this association. The partial correlation between project length and team structure was .319. For level of IT training and team structure it was .168 and for length of current employment and team project it was -.165.

The multicollinearity tolerance diagnostic was used to measure the strength of the linear relationship among the independent variables. A perfect tolerance that explains the proportion of variability not explained by its linear relationship with the other independent variables in the model is one. Length of current employment of .614 had the greatest multicollinear level within the model. The tolerance level for level of IT training was .591 and for project length it was .472.

The model used to predict the association was $\hat{Y}$ = -.085 + .119 project length + .176 level of IT training -.035 length of current employment. This indicated that when all coefficients are zero, the composition of a team structure will affect a project's outcome. For every unit the team structure affects project outcome, the project length is increased by .119 years. Project length positively affects structure. For every unit the team structure affects project outcome, the level of IT training is increased by .176 years of training. For every unit the team structure affects project outcome, the length of current employment is decreased by -.035.

The model is a good fit and the null hypothesis is rejected in that there is no significant association between software project success and the team structure followed in offshore IT companies. The model predicted that team structure affects project outcome; however, the factors that affect the outcome are the length of the project, the level of IT training of the team, and the length of employment of team members.

Hypothesis 6

$H6_0$: There is no significant association between software project success and compensation of team members in offshore IT companies.

$H6_A$: There is an association between software project success and compensation of team members in offshore IT companies.

T test. A paired sample *t* test was performed for eight variable pairs to determine whether there was a mean difference among people who were satisfied with their compensation based on the length of employment, people who were satisfied with their compensation based on their years of education completed, people who were satisfied with their compensation based on degree earned, people who were satisfied with their compensation based on length of IT training, people who were satisfied with their compensation based the SDLC, people who were satisfied with their compensation based on team structure, and people who were satisfied with their compensation based on salary level. These variables were chosen for the t test because they were significantly related to the dependent variable in the correlation matrix at a .05 alpha level. The differences in scores are normally distributed in the population, the sample size is large (n = 163), and the cases represent a random sample from the population with each score independent of each other.

Refer to Table 18 for details of paired samples test statistics, and correlations related to hypothesis 6.

Table 18

Paired Samples Test Between Satisfied With Compensation and Length of Current Employment (Yrs), Education Completed, Degree Earned, IT Training (Yrs), Project Length, SDLC Impact on Project Success, and Team Structure

Paired samples statistics

		Mean	*N*	Std. deviation	Std. error mean
Pair 1	Satisfied with compensation	.26	163	.442	.035
	Length of current employment (yrs)	5.0557	163	2.49937	.19577
Pair 2	Satisfied with compensation	.26	163	.442	.035
	Education completed (yrs)	17.5644	163	2.16891	.16988
Pair 3	Satisfied with compensation	.26	163	.442	.035
	Degree earned	3.61	163	.765	.060
Pair 4	Satisfied with compensation	.26	163	.442	.035
	IT training (yrs)	.629	163	.5086	.0398
Pair 5	Satisfied with compensation	.26	163	.442	.035
	Project length	3.7853	163	1.66941	.13076
Pair 6	Satisfied with compensation	.26	163	.442	.035
	SDLC affect project success	.17	163	.373	.029
Pair 7	Satisfied with compensation	.26	163	.442	.035
	Team structure affect project outcome	.30	163	.460	.036
Pair 8	Satisfied with compensation	.26	163	.442	.035
	Salary level	.35	163	.478	.037

Paired samples correlations

		N	Correlation	Sig.
Pair 1	Satisfied with compensation & length of current employment (yrs)	163	.262	.001
Pair 2	Satisfied with compensation & education completed (yrs)	163	.204	.009
Pair 3	Satisfied with compensation & degree earned	163	.144	.067
Pair 4	Satisfied with compensation & IT training (yrs)	163	.352	.000
Pair 5	Satisfied with compensation & project length	163	.328	.000
Pair 6	Satisfied with compensation & SDLC affect project success	163	.145	.064
Pair 7	Satisfied with compensation & team structure affect project outcome	163	.184	.018

Paired samples correlations

		N	Correlation	Sig.
Pair 1	Satisfied with compensation & length of current employment (yrs)	163	.262	.001
Pair 2	Satisfied with compensation & education completed (yrs)	163	.204	.009
Pair 3	Satisfied with compensation & degree earned	163	.144	.067
Pair 4	Satisfied with compensation & IT training (yrs)	163	.352	.000
Pair 5	Satisfied with compensation & project length	163	.328	.000
Pair 6	Satisfied with compensation & SDLC affect project success	163	.145	.064
Pair 7	Satisfied with compensation & team structure affect project outcome	163	.184	.018
Pair 8	Satisfied with compensation & salary level	163	.320	.000

Paired samples test

		Paired differences							
					95% confidence interval of the difference				
		Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Satisfied with compensation—Length of current employment (yrs)	-4.79192	2.42153	.18967	-5.16646	-4.41738	-25.265	162	.000
Pair 2	Satisfied with compensation—Education completed (yrs)	-17.30061	2.12317	.16630	-17.62901	-16.97222	-104.033	162	.000
Pair 3	Satisfied with compensation—Degree earned	-3.344	.827	.065	-3.471	-3.216	-51.626	162	.000
Pair 4	Satisfied with compensation—IT training (yrs)	-.3656	.5437	.0426	-.4497	-.2816	-8.586	162	.000
Pair 5	Satisfied with compensation—Project length	-3.52147	1.58050	.12379	-3.76593	-3.27701	-28.446	162	.000
Pair 6	Satisfied with compensation—SDLC affect project success	.098	.535	.042	.015	.181	2.341	162	.020
Pair 7	Satisfied with compensation—Team structure affect project outcome	-.037	.576	.045	-.126	.052	-.816	162	.416
Pair 8	Satisfied with compensation—Salary level	-.086	.537	.042	-.169	-.003	-2.040	162	.043

The results of the paired sample *t* test were significant for pair one, $t(162) = -25.265$, $p < .001$, $\eta 2 = .80$; for the second pair, $t(162) = -104.033$, $p < .001$, $\eta 2 = .98$; for the third pair, $t(162) = -513626$, $p < .001$, $\eta 2 = .93$; for the fourth pair, $t(162) = -8.586$, $p < .001$, $\eta 2 = .36$; for the fifth pair, $t(162) = -28.446$, $p < .001$, $\eta 2 = .82$; and for the sixth pair, $t(162) = 2.341$, $p < .05$, $\eta 2 = .11$. For the seventh pair the result was $t(162) = -.816$, $p > .05$, *NS*, and for the eighth pair, $t(162) = -2.04$, $p < .05$, $\eta 2 = .10$. Most of the effect sizes reported by eta squared were large; however, pairs six and eight were small. The means and standard deviations are presented in Table 18.

The 95% confidence interval for the all pairs except pair seven did not include a zero and indicated the mean differences are reasonable. The mean differences between the paired sample fell within the level of confidence interval that the sample came from the population. It is therefore reasonable to expect that the population differences are also different from zero.

Regression. Before a standard bivariate multiple regression analysis was conducted, an examination between the variables using a scatterplot was performed to examine if a linear relationship existed between the dependent variable and the independent variables. There was a linear relationship between each independent variable and the dependent variable satisfied with compensation. The linear relationship was very small and it is not expected to yield a strong model for predicting an association between the predictor variables and the dependent variables. Figure 22 shows scatter plot between satisfied with compensation and length of current employment in years. Refer to Figure 23 for scatter plot between satisfied with compensation and education completed. Details of scatter plot between satisfied with compensation and degree earned are shown in Figure 24. Refer to Figure 25 for scatter plot between satisfied with compensation and IT training in years. Details of scatter plot between satisfied with compensation and project length are shown in Figure 26.

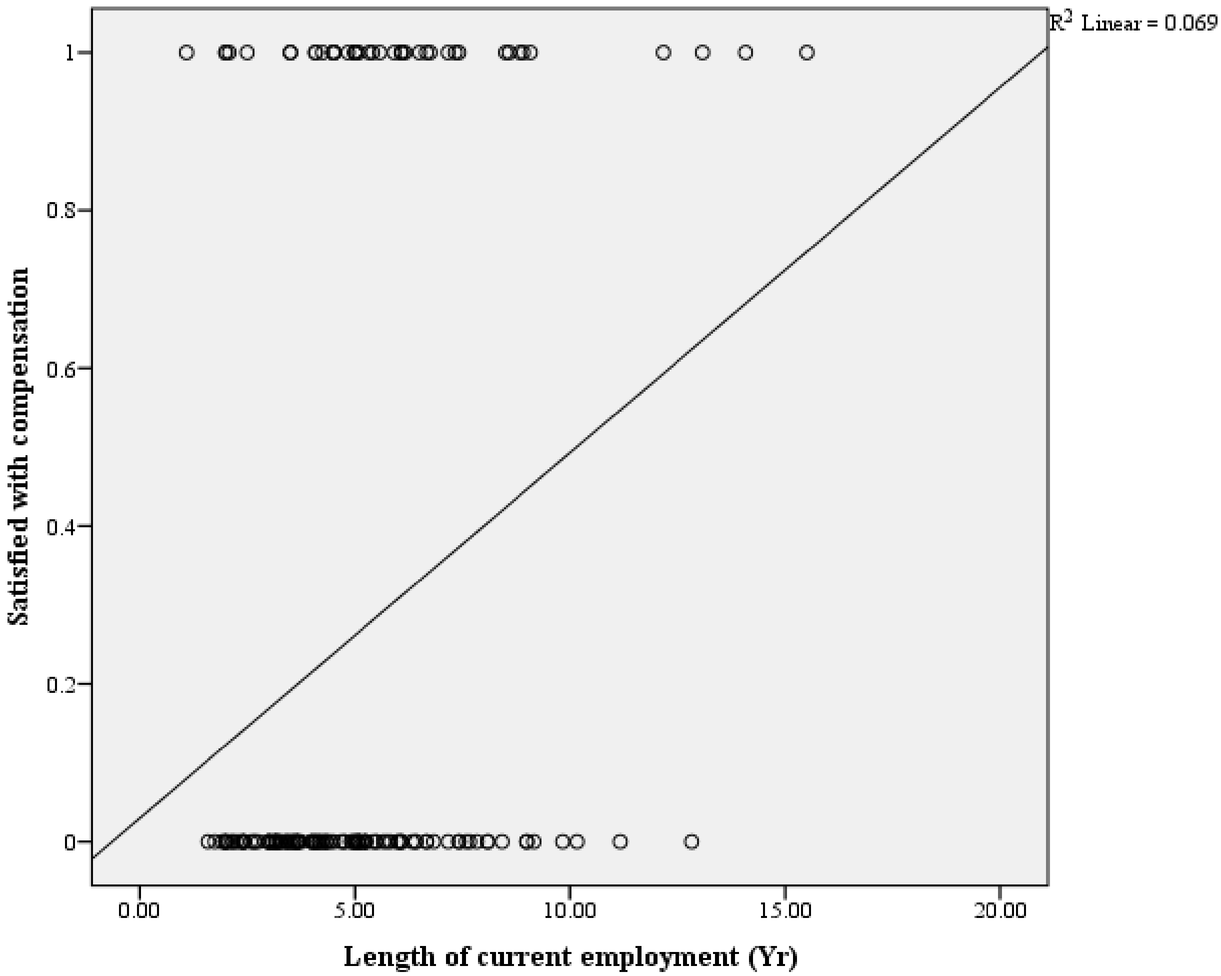

Figure 22. Scatter plot between satisfied with compensation and length of current employment (yrs).

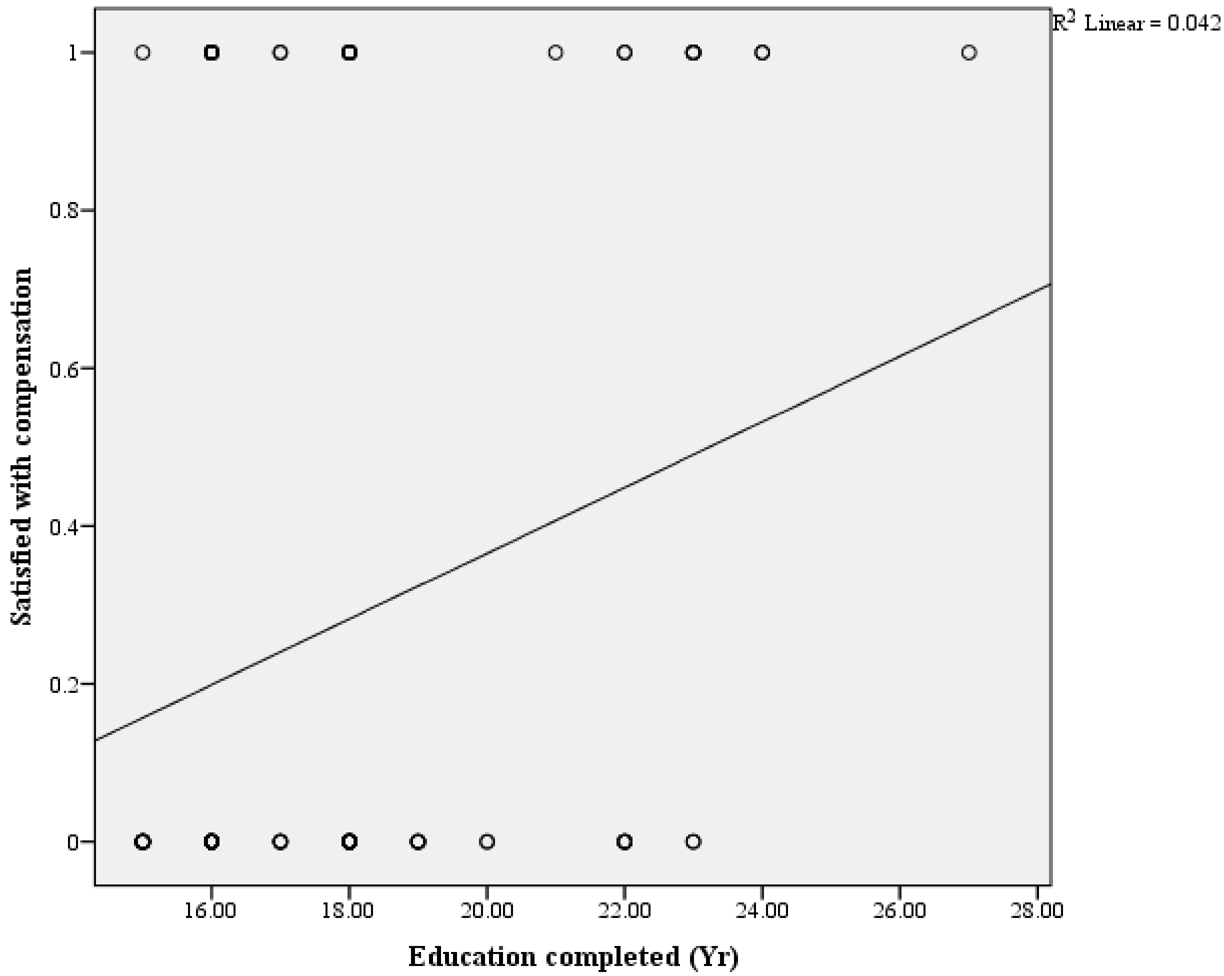

Figure 23. Scatter plot between satisfied with compensation and education completed (yrs).

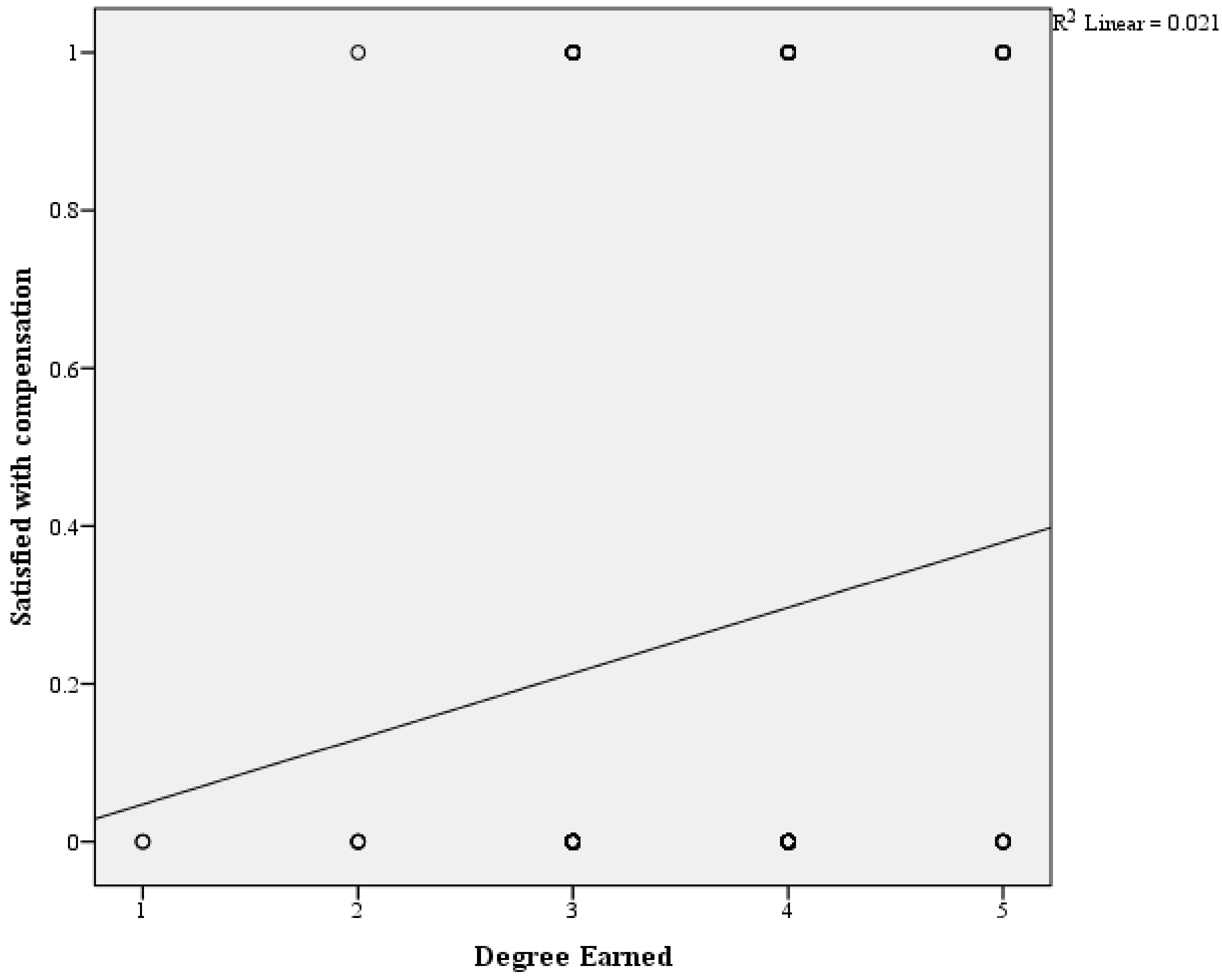

Figure 24. Scatter plot between satisfied with compensation and degree earned.

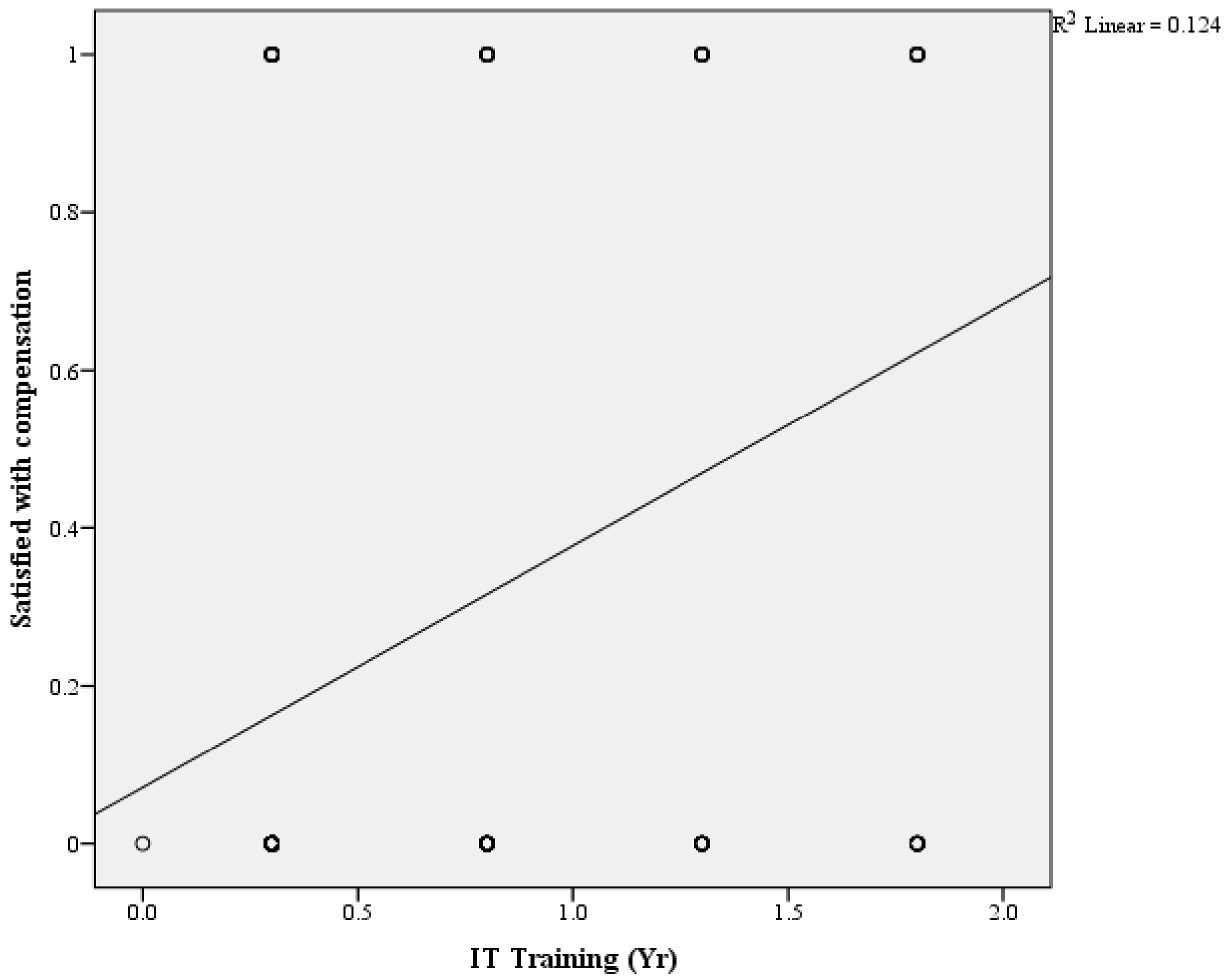

Figure 25. Scatter plot between satisfied with compensation and IT training (yrs).

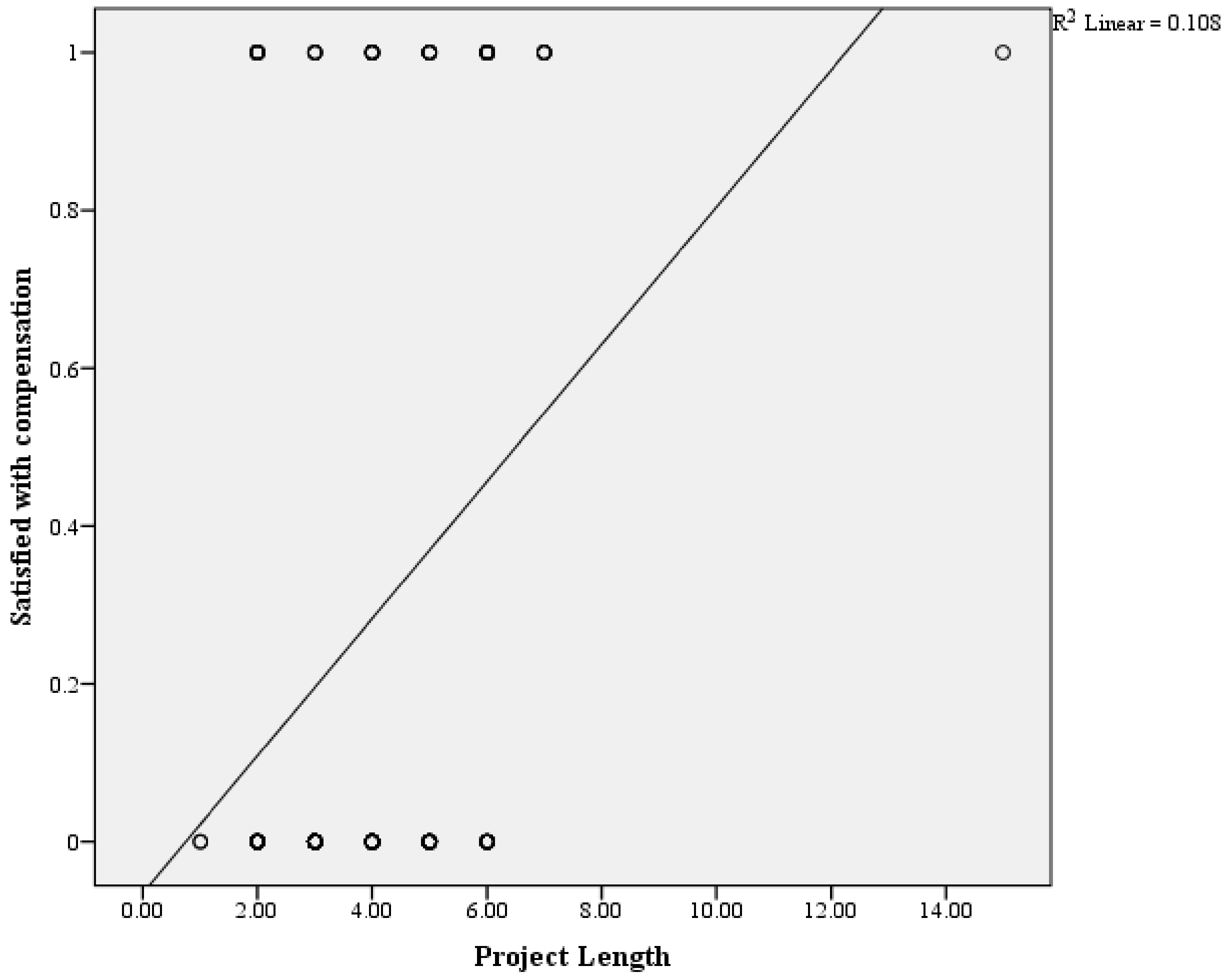

Figure 26. Scatter plot between satisfied with compensation and project length.

The assumptions were tested by examining normal probability plots of residuals and scatterplot diagrams. No violations of normality, homoscedasticity, or linearity were found. No apparent outliers were found when boxplots and scatterplots were examined.

The results of the regression analysis revealed that the model significantly predicted a relationship among the dependent variable (satisfied with compensation) and the predictor variables (length of current employment, education completed, degree earned, project length and SDLC), $F(6, 156) = 4.823$, $p < .001$, *R2* for the model was

.156 and the adjusted *R2* was .124. The results are listed in Table 18, which shows unstandardized coefficients (*B*) and the standardized coefficients (β) for each variable.

The following are the results of examining how these variables correlate with satisfaction with compensation: SDLC (t = 1.193, p >.05, *NS*), project length (t = -.285, p >.05, *NS*), IT training (t = 2.120, p <.05), degree earned (t = -.430, p > .05, *NS*), education completed (t = .742, p > .05, *NS*), and length of employment (t = .634, p > .05, *NS*). The only significant association was IT training; all others were not significantly related to satisfaction with compensation. The model that predicted the association with satisfaction with compensation was $\hat{Y}$ = -.319 + .107 SDLC + .031 project length + .185 IT training - .036 degree earned + .023 education completed + .011 length of current employment.

The multicollinearity tolerance diagnostic was used to measure the strength of the linear relationship among the independent variables. A perfect tolerance that explains the proportion of variability not explained by its linear relationship with the other independent variables in the model is one. The SDLC variable's collinearity tolerance of .953 had the greatest multicollinear level within the model and none of the tolerances were less than .228.

When all variables are at zero, the constant was -.319. The length of current employment had a positive effect on the model so that for every unit of increase of satisfaction with compensation, the current length of employment also increased by .011 years. Education also had a positive effect on satisfaction with compensation; therefore, when each unit of compensation satisfaction increased, education completed also increased by .023 years. Degree earned had a negative effect on compensation satisfaction, so that as compensation satisfaction rose, people who had lower degrees were happier than people who had higher degrees. This indicated that for every unit of increase of satisfaction with compensation, the degree earned decreased .036 units. IT training had a positive effect on satisfaction with compensation, so that when each unit of compensation satisfaction increased, the amount of IT training also increased by .185 years. Project length and SDLC similarly had a positive effect and as compensation satisfaction increased, these units also increased.

The null is rejected in that there is no significant association between software project success and compensation of team members in offshore IT companies. The variables that predicted the association between project success and satisfaction with compensation were length of employment, education completed, degree earned, amount of IT training, project length, and the SDLC.

Chapter Summary

The purpose of the current quantitative study is to find out if an association exists between software project success and various factors in offshore IT companies. In this chapter, the findings showed significant association between software project success and various factors.

Chapter 4 presented the data collection procedures for the research study. The chapter presented the process by which the data were collected and analyzed. The chapter also presented the statistical findings in answering the research question and testing the hypotheses.

Chapter 5 presents further analysis of the data and summarizes the findings presented in chapter 4. In the next chapter, I also discuss the limitations and the significance of the study for software project success. In addition, chapter 5 presents recommendations and suggestions for further research studies.

Chapter 5: Summary, Conclusions, and Recommendations

IT projects continue to fail at a rate of 60% to 80% per year despite the vast amount of project management literature, education, and IT training available (Mahaney & Lederer, 2006). IT professionals failing to meet project deadlines cost organizations millions of dollars (Petter & Vaishnavi, 2008). Since 1994, IT projects have been failing by not meeting cost requirements and time schedules at a rate of 60% to 80% per year despite training programs, education, and certifications (Standish Group, 2004).

This chapter provides a summary, conclusions, and recommendations for further studies. The quest for understanding the relationship between various factors and software project success is ongoing. This study was conducted in an attempt to gain an understanding of the dependence of software project success on various factors such as host country, highest degree earned by software team members, duration of the project, the Software Development Life Cycle (SDLC) methodology used, team structure, and the compensation of the team members in offshore IT companies.

The study focused on the views of IT professionals in India with regards to the dependency of software project success on various factors in offshore IT companies. The study helps offshore IT companies in designing and implementing policies and processes related to various factors that contribute to improving software project success. It furnishes a road map for offshore IT companies regarding the important factors to consider in choosing an SDLC methodology and team structure. This study is very beneficial to the increasing number of offshore IT companies that are competing for business from clients located in North America, Europe, and Asia Pacific.

The study sought an understanding of various factors that impact software project success in offshore IT companies. The literature review led to the conclusion that there has been very little focus on studying the relationship between various factors and software project success in offshore IT companies.

Hypotheses

There were six hypotheses that represented a stepped process for gaining insight into the research questions in a way that was necessary for drawing conclusions. The survey data were sufficient and of a quality that was useful for formulating conclusions with confidence.

Hypothesis 1

Hypothesis 1 stated (Null): Software project success is independent of the host country where the IT project is developed. The null hypothesis was retained based on the results of the regression analysis; there is no significant association between software project success and host country, i.e., where IT projects are developed. Although there were factors that may affect the project's success, the factors related to this hypothesis were weak and did not contribute significantly to the overall model for predicting offshore project success.

Hypothesis 2

Hypothesis 2 stated (Null): Software project success is independent of the highest degree earned by team members involved in the projects that are developed at the offshore IT companies. The null hypothesis was rejected: that there is no significant association between software project success factors and the highest degree earned by team members in offshore IT companies. The success factors that are associated with level of education are the age of the respondents, the level of IT experience, and the level of IT training.

Hypothesis 3

Hypothesis 3 stated (Null): Software project success is independent of the duration of the project that is developed in offshore IT companies. The null hypothesis was rejected: that there is no significant association between software project success factors and the duration of the project in offshore IT companies.

Hypothesis 4

Hypothesis 4 stated (Null): Software project success is independent of the SDLC methodology used in developing projects in offshore IT companies. The null hypothesis was rejected: that there is no significant association between software project success and the SDLC methodology used in offshore IT companies. The success factor that was significantly associated with SDLC methodology was the level of salary people were paid. This indicated that when salaries are high, the SDLC methodology affects the project in a positive way.

Hypothesis 5

Hypothesis 5 stated (Null): Software project success is independent of the team structure that is implemented in developing projects in offshore IT companies. The null hypothesis was rejected: that there is no significant association between software project success and the team structure followed in offshore IT companies. The model predicted that team structure affects project outcome, but the factors that affect the outcome are the length of the project, the level of IT training of the team, and the length of employment of team members.

Hypothesis 6

Hypothesis 6 stated (Null): Software project success is independent of the compensation that team members receive who are involved in developing projects in offshore IT companies. The null hypothesis was rejected: that there is no significant association between software project success and the compensation of team members in offshore IT companies. The variables that predicted the association between project success and satisfaction with compensation were length of employment, education completed, degree earned, amount of IT training, project length, and the SDLC.

Refer to Table 19 for hypotheses findings.

Table 19

Hypotheses Findings

Hypotheses	Results
H10: No significant association exists between software project success and host country where IT projects are developed in offshore IT companies.	Accepted
H20: No significant association exists between software project success and the highest degree earned by team members in offshore IT companies.	Rejected
H30: No significant association exists between software project success and duration of the project in offshore IT companies.	Rejected
H40: No significant association exists between software project success and SDLC methodology used in offshore IT companies.	Rejected
H50: No significant association exists between software project success and team structure followed in offshore IT companies.	Rejected
H60: No significant association exists between software project success and compensation of team members in offshore IT companies.	Rejected

Significance of the Study

The significance of this study is its contribution to a greater understanding of various factors that impact software project success in offshore IT companies. On a larger scale, this study is important because it has the potential to help project managers, IT professionals, and HR managers better understand the impact of various factors on software project success. The contributions of this study are not limited to promoting our understanding related to software project success. It also builds on our knowledge of how various factors impact software project success. This study builds on our knowledge of project management, offshore IT company policies related to work, SDLCs, team structures that are followed in offshore companies, and IT certifications. Its contribution to practice is it builds on our knowledge of the role various factors play in software project success.

This study will contribute to the body of knowledge on software project success in offshore IT companies because it involves the quantitative evaluation of various factors for how they impact software project success in offshore IT companies. The significance of this study lies in the fact that its results will help offshore IT outsourcing companies and senior management understand the relative importance of various factors to software project success. By understanding the importance of various factors, senior management can plan new organizational policies such as standardizing team structures, using particular SDLCs, and adhering to certain compensation policies that will increase software project success rates at the organizational level. This study helps the project management community know which SDLC and what type of project duration helps improve project success rates.

Suggestions for Further Research

It was concluded from the literature review that little research has been done regarding the impact of various factors on software project success in offshore IT companies. The survey showed very interesting results. Some factors had a greater chance of determining software project success; other factors were completely unpredictable. The intent of this study was not only to contribute to research but also to offer IT professionals' knowledge about various factors that impact software project success in offshore IT companies. The following recommendations are aimed toward those within offshore IT companies that have the authority and responsibility to make software projects successful. The intended audience for this project was HR managers, senior management, researchers, executive boards, and project managers, IT professionals, and clients.

Further research should focus on male–female team members' ratio in the team and female project managers' impact on software project success. Further research can also be based on offshore IT captive centers. The research used a web-hosted survey with participation from IT professionals in India. Other methods of gathering information such as interviews, mail surveys, and live surveys can be used. The survey questionnaire can also include open-ended questions for gathering more details or views from participants.

Limitless opportunities for further research exist in areas such as how the following impact project success:

1. Having more women on teams,
2. The role of female project managers, and
3. Having an equal number of software developers and testers or quality assurance members.

One other approach for future research would be to conduct surveys in other countries to broaden our knowledge of the impact of various factors on software project success.

Limitations of the Current Study

The study has two main limitations. The first limitation is related to the sample size and the number of respondents. Using IT professionals from an offshore IT company for the survey limited the number of respondents; a larger number of participants could have been more beneficial. Having a larger sample might bring about different results.

The second limitation is the potential for self-reporting bias. The fact that participants were asked to describe the association between various factors and software project success might be influenced by their number of years of experience in the IT industry.

Conclusion

Although this study provides statistically significant findings that various factors impact software project success in offshore IT companies, it also raises some interesting questions. For example, why do highly educated or qualified IT professionals think that their role is critical in projects and that they contribute a lot toward software project success?

The biggest social impact of this study is its ability to provide guidance or direction to project managers, senior management, and HR managers of offshore IT companies regarding various factors that influence software project success. The study has shown that various factors play a pivotal role in software project success in offshore IT companies.

In conclusion, the perception that various factors do not have any impact on software project success has the potential for negative consequences if it influences project managers, IT professionals, clients, and HR managers of IT companies. Project managers and senior management of offshore IT companies are encouraged to examine the full picture before designing certain policies or taking actions related to various factors.

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Appendix A: Research Survey Introduction

Introduction

My name is Venkat Edara and I am a student at Walden University. My e-mail id is venkat.edara@waldenu.edu. My research committee chair's name is Raghu Korrapati, and his e-mail id is rkorrapa@waldenu.edu. I am carrying out this survey for my research as part of my Ph.D. program. The title of my study is: A Quantitative Study of Various Factors That Impact Software Project Success in Offshore Information Technology (IT) Companies. This study will add to the knowledge of project management and project success factors in offshore IT companies. The objective is to understand the association between various factors and software project success in offshore IT companies.

Certain requirements need to be met for you to participate in this study. The time you have been working on the current IT project and the length of service with the current IT company are important factors for this study. This research is solely for my Ph.D. project. Your participation is voluntary and all your responses will be kept confidential by removing any reference to specific individuals. This data will not be used in any manner that will compromise your reputation or position in your project or group or division or the company.

Please circle the appropriate answer:

1. Do you understand the purpose of this interview and that your identity will be kept confidential? **Yes** or **No**
2. Are you willing to participate in this interview? **Yes** or **No**

Appendix B: Research Survey Questions

eSurvey Questions

This survey is for my Ph.D. research project to collect information about the impacts of various factors such as host country, highest degree earned by software team members, duration of the project, SDLC methodology used, team structure, and the compensation of the team members in offshore IT companies. Only summarized data will be presented in the research results and no personal information will be included.

Note: In this study, project success is defined as delivering the agreed-upon functionality to the client on-time and within the budget.

The survey consists of 16 questions. It can be answered by yes or no, by providing answers that are relevant to the question or comments.

1. What is your Gender?

   Male_____ Female ______

2. What is your Age?

   _______ Yrs

3. What is the average time you worked for an employer in IT? _ Yrs and ___Mths

4. How many years of experience do you have in the IT industry? __ Yrs and ___Mths

5. How long is the average IT project you have worked on? _ Yrs and ___Mths

6. Can a project be successful if it is based in another country (i.e., offshore countries)?

   Yes___ or No ___

7. How many years of formal schooling do you have? __Yrs

8. What is the highest degree completed? *(Please choose one answer)*

   High School ___ Associates ___ Bachelor's____ Master's___ Doctorate____

9. How long was the training for IT projects you have worked on? *(Please choose one answer)*

   0 Mths_____ 1 – 6 Mths_____ 6 – 12 Mths_____ 12 – 18 Mths_____ 18 – 24 Yrs______

10. How much time is too long to work on a project? ___ Yrs and ___Mths

11. Has the Software Development Life Cycle affected the outcome of your projects? Yes___ or No ___

12. Has the structure of your project team affected the outcome of your projects Yes___ or No ___

13. How many projects have you worked on in the past 5 yrs that were successful? *(Time, budget, & scope)*

    0 – 3 4 – 7 8 – 12 13 – 20 21 plus

14. How many projects have you worked on in the past 5 yrs that were *NOT* successful? *(Time, budget, & scope)*

    0 – 3 4 – 7 8 – 12 13 – 20 21 plus

15. Does being paid a high salary cause a project to be successful?

    Strongly disagree Disagree Agree Strongly Agree

16. Do you feel you are compensated fairly for your work on IT projects? Yes___ or No __

Thank you for your time and for participating in this research.

Your responses and views are significant to this research and are highly appreciated. If you require any further details regarding this research feel free to contact me.

Curriculum Vitae

Venkat R. Edara

Summary:

- 16 years of experience in managing software development projects as a Technical Director/Project Manager, Resource Director, Project Lead/Systems Analyst, Software engineer and programmer
- 10 years of experience in the design, development, testing, and implementation of application software in client-server environments and Intranet web applications and Mainframe applications
- 10 years of IT experience in Design, Analysis, Coding, Implementation, Testing, Support, Documentation, and SDLC experience in Client/ Server, and Web application with .Net, VB.Net, ASP.Net, C#, BizTalk, Visual Basic, ASP, HTML, VB Script, Java Script, JSP, SOAP, XML, SQL, PL/SQL, DHTML, Crystal Reports, Oracle, Teradata, T-SQL, Sybase, Ms Access, COBOL, JCL, MVS, CICIS, DB2, Easytrieve classic/Plus, and Windows NT and Enterprise application Integrations
- Expertise in Internet/Intranet. Strong knowledge and working experience of Web Programming using HTML, ASP, JavaScript, VBScript, JSP, XML, XSL, and CSS
- Exposure to SOAP Protocol, Windows Management Instrumentation (WMI)
- Knowledge of Supervisory Control and Data Acquisition (SCADA)
- Expertise in Database Design, Administration and Programming using Oracle 8i, PL/SQL, MS-SQL Server, T-SQL, and MS Access.
- Expertise in SQL, PL/SQL, Stored Procedures and Database Triggers using Oracle, SQL Server, DB2, Sybase, COM+, DCOM, and MTS.
- Expertise in office Automation using VBA Macros.
- Expertise in office tools: Microsoft Word, PowerPoint, and Excel.
- A dedicated team player with excellent communication, organizational, and interpersonal skills.
- Self-starter and comfortable in a high intensity and challenging work environment.
- Excellent communication skills and a recognized team player.

Education MBA from Webster University, St. Louis, MO, USA
B.S. in Engineering from India
Post-Graduation Diploma in Computer Applications

Honors Recipient of "Best Software Engineer" Award from WH software division for the year of 2000
Recipient of "Best Programmer" Award for the year of 1995